INTERNATIONAL LABOUR OFFICE

PAYMENT BY RESULTS

GENEVA
1965
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## PART I

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INTRODUCTION

Systems of payment by results are now widely used in many countries and increasing recognition of the need to raise the productivity of labour has led to a growing interest in the possibilities of such systems. The International Labour Office has prepared the present report in order to provide Governments, employers, and other interested parties with up-to-date information concerning the various types of systems now in use, the procedures used in introducing and applying them, the extent to which they are used in various countries and industries, their effects on output and workers' earnings, their advantages and disadvantages and the various provisions which have been found necessary to safeguard the interests of employers and workers.

It is hoped that the information thus presented will be of assistance, in particular, to employers and workers who are considering whether or not to adopt a system of payment by results or to modify a system that is already in operation. It is, however, no part of the purpose of the report to advocate the adoption of payment by results in preference to payment by time, or vice versa. The choice in this matter is one that must be made in each case by the parties directly concerned in the light both of the nature of the work and of their own personal preferences. It is well to remember that the essential characteristic of payment by results—the direct linkage of earnings to output—is regarded by some workers as inherently objectionable and by others as inherently desirable. Some men set a higher value on a relatively unhurried tempo of work and on equality of earnings than they do on the opportunity to raise their individual earnings or to earn more than their less proficient or less energetic fellow-workers; others take the opposite view. These are value judgments which each individual must make for himself. Where one or the other view is strongly dominant in any group, that in itself may determine both the desirability and the practicability of operating a system of payment by results.

The first part of the report, comprising the first seven chapters, has been prepared by the International Labour Office, mainly on the basis of information supplied by the Governments, employers'
organisations and workers' organisations of a number of countries in response to a special enquiry undertaken by the Office. Certain of the observations concerning systems of payment by results which were made by Governments and by employers' and workers' organisations in reply to this enquiry, and which seem likely to be of general interest, are reproduced in an Appendix.

The second part of the report contains a statement of general principles concerning the use of systems of payment by results which was drawn up by a meeting of experts on such systems held under the auspices of the International Labour Organisation at Geneva in April 1951. The conclusions of this meeting are of special interest as representing the unanimous judgment of a group of experts with wide experience drawn from employers', trade union and independent circles in nine different countries. The membership of the meeting was as follows: Mr. Robert R. Behlow (Regional Director, Bureau of Labor Statistics, United States Department of Labor, New York); Mr. Emile Boursière (Deputy General Secretary, Federation of Metal and Mining Industries, Paris); Mr. E. C. J. Cunningham (Deputy Director of Personnel, Tata Iron and Steel Company, Jamshedpur); Prof. Léon Delsinne (Technical Director of the Revue du Travail; University of Brussels, Brussels); Mr. Arne Geijer (President, Metal Workers' Union, Stockholm); Prof. T. U. Matthew (Lucas Professor in the Principles of Engineering Production, Birmingham University, Birmingham); Mr. J. A. Neale (National Secretary, New Zealand Engineering, Coachbuilding, Aircraft and Related Trades Industrial Union of Workers, Wellington); Dr. Ernesto Street (Economist, National Department of Industry and Commerce, and Economic Assessor, Economic Department, National Confederation of Industry, Rio de Janeiro); Prof. Vittorio Zignoli (Professor of Engineering Production, Turin Polytechnic; Director of the Institute of Transport Engineering and Economics; and Professor of Construction at the Army School of Engineers, Turin).

On the instructions of the Governing Body of the International Labour Office the experts' conclusions are being communicated to the Governments of all States Members of the International Labour Organisation with the request that they be brought to the attention of employers' and workers' organisations and other interested bodies.

In addition to formulating these general principles the meeting recommended that the International Labour Office should make known its willingness to provide such technical assistance in the
field of systems of payment by results as may be requested by Governments under the provisions of the expanded programme of technical assistance being operated by the United Nations, the International Labour Organisation and other specialised agencies. The experts suggested further that the types of assistance which the Office should be prepared to provide on request might include the following:

(i) provision of up-to-date information on systems of payment by results;

(ii) missions of experts with practical experience in the operation of systems of payment by results to study on the spot problems connected with, and to give advice concerning, the introduction and application of such systems;

(iii) the holding in appropriate regions of seminars for selected persons from management and trade union circles on methods of introducing and applying such systems;

(iv) the making of arrangements for the training at appropriate centres of government, management and worker personnel in methods of introducing and applying the various systems (including work study, job evaluation, etc.). These arrangements might include, where appropriate, the provision of training fellowships.

The International Labour Office has indicated its readiness to provide assistance of these types.

The present report was prepared under the direction of the Economic Adviser of the Office, Mr. E. J. Riches. The greater part was prepared in the Economic Division, mainly by Mr. H. F. Ross with the assistance of Mr. K. M. Savosnick; but in preparing Chapter II the Office had the advantage of the collaboration of Professor T. U. Matthew, of Birmingham University, who also served as chairman of the meeting of experts whose conclusions are reproduced in the second part of the report.
PART I

CHAPTER I

MAIN FEATURES OF INDIVIDUAL AND GROUP SYSTEMS
OF PAYMENT BY RESULTS

There are many different systems of wage payment under
which the worker's earnings are related directly to some measure-
ment of the work done either by himself or by the group or working
unit to which he belongs. Such systems, known as payment by
results, can, however, be classified in four main groups according
to whether the worker's earnings vary (1) in the same proportion
as output; (2) proportionally less than output; (3) proportionally
more than output; or (4) in proportions which differ at different
levels of output. The present chapter classifies in this way and
describes briefly with the aid of charts the systems most com-
monly used.¹

Charts I to XII show graphically how workers' earnings and
unit direct labour costs ² vary with output under each of the systems
described. These charts also show, for purposes of comparison,
the earnings under straight piece-work with a guaranteed time rate.
Charts XIII and XIV compare earnings and direct labour costs
under the systems most commonly used.

¹ For more detailed descriptions, reference may be made to the following:
C. W. Lytle: Wage Incentive Methods—Their Selection, Installation and
Operation (New York, The Ronald Press Company, 1942); C. L. Guest: The
Technique of Industrial Labour Payment (London, MacDonald and Evans,
1948); Cinquième Congrès des Relations Industrielles de Laval: Structure des
salaires (Quebec, Université Laval, 1950); Van Dusen Kennedy: Union
Policy and Incentive Wage Methods (New York, Columbia University Press,
1945); Z. Clark Dickinson: Compensating Industrial Effort. A Scientific
Study of Work and Wages (New York, The Ronald Press Company, 1937);
J. K. Louden: Wage Incentives (New York, John Wiley and Son, 1944);
Institut de science économique appliquée: Salaire et rendement (Paris, Presses
Universitaires de France, 1947); Experience of 117 Companies with Wage
Incentive Plans, Report No. 561 (Chicago, Dartnell Corporation, 1948);
A. Perren: Les Primes sur salaires dans les entreprises industrielles (Neuchâtel
and Paris, Delachaux et Niestlé S.A., 1933); and Vittorio Zignoli: Tecnica
della produzione, economia industriale, organizzazione della produzione e del
lavoro, con speciale riguardo alla nuova tecnica produttiva (Milan, Editore
Ulrico Hoepli, 1950).

² That is, earnings (of the workers concerned) divided by numbers of units
of output.
The charts cover in each case a range of output from 0 to 200, the level of 100 representing the output passing inspection which is attained by the average worker working under average conditions at his normal pace. This level of 100 is referred to as "standard output". This use of the term "standard output", it should be noted, corresponds to current practice in many countries but not in all. In some countries, for example, the output of the slowest worker is taken as the standard by reference to which piece-rates, allowed-times or bonuses are paid.

In the charts earnings are shown as percentages of the time rates of the workers concerned.

In Charts I, II, III, V and IX it is assumed that for "standard task" the worker paid by results is guaranteed his time rate for all levels of output up to and including standard output, and that higher amounts are paid for levels of output above standard. Chart III also shows how earnings and direct labour costs vary when a low task is set. Chart X relates to the Emerson empiric system under which the worker is guaranteed his time rate for levels of output up to and including 67 per cent. of standard output and bonuses are paid for levels of output above this level.

No guaranteed time rate is shown in Charts IV, VII, VIII, XI and XII, because the systems to which these charts refer do not provide for such a guarantee. In the case of the high piece-rate system also (Chart VI) the earnings are shown as they would be without a guaranteed time rate, though such a guarantee may in fact be provided for.

In Charts XIII and XIV, which compare earnings and direct labour costs under the systems most commonly used, it is assumed that the piece or bonus rates have been fixed at a level which will enable the average worker working under average conditions to earn at standard output, as defined above, 25 per cent. more than his time rate. This assumption, like the definition of standard output, corresponds to practice in some countries but not in all.

For example, in some countries the rates are fixed at a level which will enable the worker to earn at least a specified percentage

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1 The term "task" refers to the level of output which must be reached before the worker can earn more than his time rate. Thus standard task is set at the level of standard output, while low task is set at some selected level below, and high task at some selected level above standard output.

2 Collective agreements or orders of wage-determining authorities in a number of countries specify percentages varying from 5 to 33⅓."
above his time rate or to earn more than a time worker in the same occupation.\footnote{Thus in France most collective agreements contain clauses according to which the piece-rates must be determined in such a way as to enable a worker working normally to obtain earnings exceeding the minimum wage which is guaranteed to time workers. The difference varies on the average between 7 and 15 per cent. (Communication to the I.L.O. from the Federation of Metal and Mining Industries, Paris, 21 Mar. 1951.)}

**Systems with Workers' Earnings Varying in the Same Proportion as Output**

The chief characteristic of systems of payment by results under which the worker's reward varies in the same proportion as his output is that any gains or losses resulting directly from changes in his output accrue to him (leaving to the employer any gains or losses in overhead costs per unit of output). In contrast, when the worker is paid by the hour or by the day all gains or losses resulting from changes in his output accrue to the employer.

It should, however, be noted that in countries with pay-as-you-earn systems of taxation the worker's take-home pay may not vary in the same proportion as output if his increased earnings from higher output give him an income to which higher rates of taxation apply.

The successful operation of this type of system of payment by results requires, however, that the measurement of standard and individual outputs must be extremely accurate. Inaccuracy in these matters gives rise to inequities and may lead to the ultimate failure of a scheme due to worker dissatisfaction.

**The Straight Piece-Work System**

This is the most common system of payment by results and was the earliest system in use in most countries, having long been common in the textile industry. Frequently, however, the exact proportionality of this system is modified in one respect: the workers' time rate is guaranteed. This rate is set usually at a level which will yield earnings below the expected average earnings on piece-work in average conditions. It is designed to protect the worker against unduly low earnings due to causes beyond his control. This guarantee of earnings is normally applied so that
high earnings in one period are not set off against low earnings in another period.

Under the straight piece-work system, which may be applied either to individuals or to groups of workers, the worker is paid at a specified rate per unit of output measured in terms of, for example, tons of coal, number of pieces of garments or pounds of yarn. Direct labour costs per unit of output thus remain constant as output increases above standard, but total unit costs decrease because fixed and semi-variable overhead unit costs decrease. This decrease results from the fact that, unless capital equipment is increased or decreased, fixed charges remain the same no matter what the output is, while such semi-variable costs as selling and administrative expenses remain fixed for moderate increases in output.

The manner in which earnings and direct labour costs vary under straight piece-work (and under the standard hour system described below) can be seen from Chart I.

With a guaranteed time rate the earnings curve for rates of output below standard is horizontal up to standard output, at which it becomes a straight line having a slope of unity. This means that a 1 per cent. increase in output results in a 1 per cent. increase in earnings. Since earnings are constant up to standard output, unit labour costs fall continuously until standard output is reached. For rates of output above this standard, unit labour costs remain constant.

The Standard Hour System

This system, which is sometimes also known as the “standard time”, “time piece-work” or “100 per cent. gain sharing” system, is essentially the same as the straight piece-work system and is becoming increasingly popular. Both systems reward workers in direct proportion to their output. In the case of the standard hour system, instead of a price being allowed for each unit produced as in straight piece-work, a “standard time” is allowed to complete a particular job, and the worker is paid for the standard time at his time rate if he completes the job in standard time or less. Thus, if a man completes in eight hours a job for which the standard time is ten hours, his earnings for this job will amount to ten times his time rate. If, on the other hand, he takes more than the standard time to complete the job, he will, if he is guaranteed his time rate, be paid at this rate for the time
he actually spent on the job. But if he is not guaranteed his time rate, he will be paid only for the standard time.

In the case of a job which takes only a fraction of an hour to complete, as is often the case with repetitive processes, the standard time is usually expressed as a decimal fraction of an hour. For example, if the standard time to produce a unit is 0.01 hour, which is equivalent to a production of 100 units per hour, and a worker actually produces 150 units in an hour, he will have earned 1.5 "hours" which will be paid for at his hourly rate. If this rate is 0.96 money units he will receive 1.44 money units for his hour's work as compared with the 0.96 money units he would have received if he had not produced more than the standard number of units of output.

**Systems with Workers' Earnings Varying Proportionally Less than Output**

The chief characteristic of systems of payment by results under which the worker's earnings vary proportionally less than output is that the worker shares with his employer the gains or losses resulting from changes in output.

These systems are often applied in cases where it is not possible to set standards or to measure the worker's output accurately. Under some of these schemes it is possible, as will be seen later, for a worker to earn more for certain levels of output than he would under piece-work when production difficulties are encountered. But, of course, if no such difficulties are encountered and the worker is able to increase his output significantly, he receives under these schemes progressively less for such output than he would if he were working on straight piece-work.

All these systems, except the Barth, guarantee a worker his time rate if his output does not reach a specified level. Consequently, direct labour costs are, except in the case of the Barth system, the same as under straight piece-work for rates of output up to this level. Further, under all of these systems, unit direct labour costs above standard output are lower than under straight piece-work. As overhead costs per unit also decrease under these systems to the same extent as under straight piece-work, profits are

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1 Cf. p. 27 and Chart XIII.
2 Cf. p. 29 and Chart XIV.
higher in most cases than under straight piece-work for significant increases in production. The most widely used of these systems are described in the following paragraphs.

**CHART I. EARNINGS AND DIRECT LABOUR COSTS UNDER THE STRAIGHT PIECE-WORK SYSTEM WITH A GUARANTEED TIME RATE**

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<th>Earnings as percentage of time rate</th>
<th>Direct labour costs per unit of output</th>
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### The Halsey System

Under the Halsey system, a standard time, which is usually set from past production records, is allowed for the completion of a certain piece of work or job. If the work is done in exactly, or more than, this time the worker is paid a wage equal to his time rate for the time actually spent on the job. The worker is thus guaranteed a minimum wage even if his output falls below standard. If, however, the job is completed in less than standard time, the worker is paid at his time rate for the actual time taken and, in addition, receives as a bonus a payment at his time rate for a specified percentage of the time saved. In practice, this percentage varies from 30 to 70 per cent. of the time saved, the most usual proportion being 50 per cent., the other 50 per cent. representing the employer's
share of the time saved. For example, if a worker’s hourly rate is 0.96 money units and the standard time for a job is ten hours, a worker who completes it in seven hours receives a payment

**CHART II. EARNINGS AND DIRECT LABOUR COSTS UNDER THE HALSEY 50-50 AND 30-70 SHARING SYSTEMS WITH A GUARANTEED TIME RATE**

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<th>Earnings as percentage of time rate</th>
<th>Direct labour costs per unit of output</th>
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A = Earnings (A₁ for 50-50 sharing and A₂ for 30-70 sharing).
B = Direct labour costs (B₁ for 50-50 sharing and B₂ for 30-70 sharing).
C = Earnings on straight piece-work with a guaranteed time rate.

of 6.72 money units (0.96 × 7) and, in addition, (a) in the case of a sharing in the proportion of 50 and 50 per cent., a bonus payment for one-and-a-half hours (50 per cent. of the three hours saved) at his hourly rate (i.e., a bonus of 1.44 money units), or a total of 8.16 money units for seven hours' work (1.16 money units per hour as compared with his basic hourly rate of 0.96 money units); or (b) in the case of a sharing in the proportion of 30 and 70 per cent., a bonus payment for 0.9 hours (30 per cent. of the three hours saved) at his hourly rate (i.e., a bonus of 0.86 money units) or a total of 7.58 money units for seven hours' work (1.08 money units per hour).
The characteristics of the earnings and direct labour cost curves for 50-50 and 30-70 sharing are shown in Chart II. The earnings curve is horizontal until standard output is reached. Thereafter it becomes a straight line having, in the case of 50-50 sharing, a slope of one half, that is, a 1 per cent. increase in output results in a 0.5 per cent. increase in earnings; and, in the case of 30-70 sharing, a slope of three tenths, that is, a 1 per cent. increase in output results in a 0.3 per cent. increase in earnings. For rates of output below standard, unit direct labour costs are the same in both cases as for straight piece-work. When output exceeds standard, unit direct labour costs continue to fall instead of remaining constant as under straight piece-work.

**CHART III. EARNINGS AND DIRECT LABOUR COSTS UNDER THE ROWAN SYSTEM FOR LOW TASK AND FOR STANDARD TASK WITH A GUARANTEED TIME RATE**

Earnings as percentage of time rate | Direct labour costs per unit of output
---|---
0 | 0
10 | 10
20 | 20
30 | 30
40 | 40
50 | 50
60 | 60
70 | 70
80 | 80
90 | 90
100 | 100
110 | 110
120 | 120
130 | 130
140 | 140
150 | 150
160 | 160
170 | 170
180 | 180
190 | 190
200 | 200

A = Earnings (A₁ for low task and A₂ for standard task).
B = Direct labour costs (B₁ for low task and B₂ for standard task).
C = Earnings on straight piece-work with a guaranteed time rate.
The Rowan System

Under the Rowan system a standard time is also allowed for the completion of a certain job, and a bonus is similarly paid for any time saved. The bonus takes the form of a percentage of the worker’s time rate. This percentage is equal to the proportion which the time saved forms of standard time. For example, if (as in the last example) a worker’s hourly rate is 0.96 money units and he completes in seven hours a job for which the standard time is ten hours, the bonus percentage is 30 per cent., since the time saved (three hours) is 30 per cent. of the standard time (ten hours). The worker is paid for the time taken to do the job (seven hours) at his hourly rate (0.96 money units) plus 30 per cent. He will thus be paid 1.25 money units per hour; and his total pay for this job will be 8.75 money units. The worker is guaranteed his time rate if he fails to reach standard.

The characteristics of the earnings and direct labour cost curves for low task and for standard task are shown in Chart III. For low task, the earnings curve often starts at 62.5 per cent. of standard output, rising with increases in output sharply at first and then more and more slowly. At comparatively high rates of output the earnings curve approaches but never reaches 200 per cent. of basic wage. For certain ranges of output above standard the earnings are, for low task, higher than under piece-work.

For standard task the earnings curve, which starts at the 100 per cent. output level, rises rather sharply at first but more slowly at higher rates of output. For standard task, earnings are thus always less than they would be for straight piece-work.

The Barth Variable Sharing System

This system is similar to the Halsey and Rowan systems. It is also based on standard time, but does not provide for a guaranteed time rate. The worker’s pay is ascertained by multiplying the standard hour by the number of hours actually taken to do the job, taking the square root of the product and multiplying by the worker’s hourly rate. Thus, if a worker’s performance and hourly rate are the same as in the example given in the case of the Rowan system, his wage for completing the job will be \((\sqrt{10 \times 7}) \times 0.96\), or 8.06 money units.

The characteristics of the earnings and direct labour cost curves for low task and for standard task are shown in Chart IV.
CHART IV. EARNINGS AND DIRECT LABOUR COSTS UNDER THE BARTH VARIABLE SHARING SYSTEM

Since the Barth Variable Sharing system does not guarantee the worker his time rate for levels of output below standard, the earnings curves for both low task and standard task start at zero and rise steeply but at a decreasing rate, until for high rates of output they become almost straight lines. For levels of output above standard the worker's earnings under the Barth system are always lower than under straight piece-work for standard task, but are, for low task, higher than under straight piece-work at certain levels of output above standard.
The Bedaux System

Under the Bedaux system, the standard time for a job is determined by time and motion study. Each minute of allowed time is called a point, or $B$, thus making in all 480 points in an eight-hour day. A standard number of points is specified for the completion of each job. The worker receives, in addition to his hourly or daily rate, a bonus which is, under the original Bedaux system, equal to 75 per cent. of the number of points earned in excess of 60 per hour multiplied by one sixtieth of the worker's hourly rate. Thus, if the standard time and a worker's performance and hourly rate are the same as in the example given for the Rowan system above, the standard number of points for completing

**CHART V. EARNINGS AND DIRECT LABOUR COSTS UNDER THE BEDAUX SYSTEM WITH A GUARANTEED TIME RATE**

<table>
<thead>
<tr>
<th>Earnings as percentage of time rate</th>
<th>Direct labour costs per unit of output</th>
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<tr>
<td>Earnings</td>
<td>B = Direct labour costs</td>
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<tr>
<td>C = Earnings on straight piece-work with a guaranteed time rate.</td>
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A = Earnings.
B = Direct labour costs.
C = Earnings on straight piece-work with a guaranteed time rate.
the job is 600. The worker thus earns 600 points in seven hours.

His bonus will, therefore, be 75 per cent. of \( \frac{180 \times 0.96}{60} \) which is equal to 2.16 money units. Since his time wage for seven hours' work is 6.72 money units his total wage will be 8.88 money units. If a worker does not reach standard he is paid at his time rate.

The Bedaux system is really more than an incentive system, since it enables the management to record the output of any worker or department in units which show at once if production is up to the standard the management desires. In recent years, the percentage allowed to workers has, in some cases, been raised from 75 per cent. to, or almost to, 100 per cent. If 100 per cent. is allowed, the worker's earnings become the same as under straight piece-work but in all other cases his earnings are, under the Bedaux system, always less than under straight piece-work.

The characteristics of the earnings and direct labour cost curves are shown in Chart V. With a guaranteed time rate the earnings curve has, in the case of the original Bedaux system, a slope of three quarters for rates of output exceeding standard—that is, for each 1 per cent. increase in output there is a 0.75 per cent. increase in earnings. Direct labour costs fall at a nearly constant rate, the direct labour cost curve being somewhat the same as the corresponding curve for straight piece-work.

**Systems with Workers' Earnings Varying Proportionally More than Output**

The chief characteristic of systems under which the worker's earnings vary proportionally more than his output is that, since under most of these systems direct labour costs per unit increase for levels of output above the standard (which is usually set quite high), the worker also shares the savings in overhead costs which result from increased output. The amount of this share depends on the size of the increments in earnings which are payable at different levels of output. If these increments were large enough and increased progressively with output, it is obvious that the workers could obtain all the savings in overhead costs. This is not, of course, the case where the increment in earnings remains the same for each successive increase in output, that is, where the earnings curve is a straight line as in the high piece-rate system described below.
The High Piece-Rate and Standard Hour Systems

Under the high piece-rate system the worker's earnings are in proportion to output as under straight piece-work but the increment in earnings for each increase in output is greater. For example, there may be a $1\frac{1}{3}$ per cent. increase in earnings above the worker's time rate for each 1 per cent. increase in output.
above standard as compared with a 1 per cent. increase in earnings under straight piece-work for the same percentage increase in output. A $1\frac{1}{3}$ per cent. increment will yield earnings $33\frac{1}{3}$ per cent. above the time rate when “normal” or standard production is reached save for the fact that it provides in all cases for a guaranteed time rate. The standard hour system described above, with the increment in earnings larger than the increments in output, is in effect the same as the high piece-rate system. The

CHART VII. EARNINGS AND DIRECT LABOUR COSTS
UNDER THE TAYLOR DIFFERENTIAL PIECE-RATE SYSTEM

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<tr>
<th>Earnings as percentage of time rate</th>
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A = Earnings.
B = Direct labour costs.
C = Earnings on straight piece-work with a guaranteed time rate.
characteristics of the earnings and direct labour cost curves of the high piece-rate system, as applied without a guaranteed time rate, are shown in Chart VI. It should however be noted that such a guarantee is applied in most countries with this system.

**Systems with Workers' Earnings Varying in Proportions which Differ at Different Levels of Output**

A great variety of systems of this type has been developed. These systems can best be explained by describing how earnings vary from minimum to maximum at different levels of output. Earnings for part of the range may vary proportionally less than output and for another part proportionally more, or more usually in the same proportion as output. It is, therefore, not possible to classify any of these systems with any of the three other types described above although many of these systems closely resemble some of the systems of these other types. The main features of the most important systems of this type are the following:

**The Taylor Differential Piece-Rate System**

This system, which was developed by F. W. Taylor in 1880, has a low piece-rate for output below standard and a higher piece-rate for output above standard with a large bonus of 50 per cent, of the time rate when standard output is attained. This system therefore, as can be seen from Chart VII, penalises the slow worker but rewards handsomely workers with a high output.

**The Merrick Differential Piece-Rate System**

This system is a modification of the Taylor system, with three instead of two rates, as can be seen from Chart VIII. The one large step is broken into two so as to encourage new and average workers. Straight piece-rates are paid up to 83 per cent. of standard output, at which a bonus of 10 per cent. of the time rate is payable, with a further 10 per cent. bonus on reaching standard output. For output above standard, high piece-rates are paid.

**The Gantt Task System**

Chart IX shows that under the Gantt system the worker is guaranteed his time rate for output below standard. On reaching
standard output or task, which is set at a high level, the worker is paid a bonus of 20 per cent. of his time wage. For output above task, high piece-rates are paid, as illustrated by the fact that the dotted part of the earnings curve in the chart extends to the origin. The Taylor, Merrick and Gantt systems are, it will be noted, based on a similar principle—that of rewarding workers for reaching task which is set at a high level.
CHART IX. EARNINGS AND DIRECT LABOUR COSTS UNDER THE GANTT HIGH TASK SYSTEM

Earnings as percentage of time rate

Direct labour costs per unit of output

A = Earnings.
B = Direct labour costs.
C = Earnings on straight piece-work with a guaranteed time rate.

The Emerson Empiric or Efficiency System and Similar Systems

Under the Emerson and other similar systems, which are mentioned below, a standard time is established for each job, and during each pay period a record is made of the number of hours each worker takes to complete the job or jobs.
The efficiency of each worker is then determined by dividing this number of hours into the standard time. Thus, if a worker takes ten hours to complete a job for which the standard time is eight hours, his efficiency is 80 per cent. Chart X shows that up to 67 per cent. efficiency the worker is paid at his time rate and from this point up to 100 per cent. efficiency a bonus is payable. This bonus is equal to certain specified fractions of 1 per cent. of the hourly rate for each additional 1 per cent. of output until at 100 per cent. efficiency a bonus of 20 per cent. is payable. Thereafter an additional bonus of 1 per cent. is added for each additional 1 per cent. efficiency. At first sight it would appear that from 100 per cent. efficiency the system becomes one of straight piece-work. Actually this is not the case. Thus, if output increased from 100 to 101 per cent., a bonus of 21 per cent. of the hourly rate would be payable under the Emerson system. With straight piece-work the bonus would be 21.2 per cent. of the hourly rate.

**CHART X. EARNINGS AND DIRECT LABOUR COSTS**
**UNDER THE EMERSON EMPIRIC SYSTEM**

Earnings as percentage of time rate

Direct labour costs per unit of output

![Chart X](chart.png)

A = Earnings.
B = Direct labour costs.
C = Earnings on straight piece-work with a guaranteed time rate.
It will be noticed from Chart X that, under the Emerson system, direct labour costs fall rapidly in the range from 67 to 100 per cent. of standard output but that these costs fall only slowly for increases in output above standard.

Various other systems, such as the Wennerlund, Knoeppel, Bigelow, Bigelow-Knoeppel, Atkinson and Allingham systems, are simply modifications of the Emerson system. The Wennerlund system has a somewhat different empirical curve from the Emerson system and applies straight piece-rates for increases above 100 per cent. efficiency. All the others have steps in the earnings curves to encourage workers to reach the high task which is set in all these systems. For example, in the Knoeppel system, for 98, 99 and 100 per cent. efficiency the bonuses are equal to 18, 19 and 25 per cent. of the basic wage respectively. There is thus at 99 per cent. efficiency a jump of 6 per cent. in bonus for a 1 per cent. increase in efficiency.

**CHART XI. EARNINGS AND DIRECT LABOUR COSTS UNDER THE ACCELERATING PREMIUM SYSTEM (HYPERBOLIC)**

A = Earnings.
B = Direct labour costs.
C = Earnings on straight piece-work with a guaranteed time rate.
Accelerating Premium Systems

A reference to Charts XI and XII which show two sample earnings curves (hyperbolic and parabolic)\(^1\) and cost curves for different levels of output indicates that the principle of all the numerous possible accelerating premium systems is that, for low and average levels of output, there are only small increments in earnings, but that for above average output there are increasingly larger increments in earnings. The earnings increments are thus different for each 1 per cent. increase in output. For low output

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\(1\) For methods of calculating hyperbolic and parabolic earnings curves, see C. W. Lytle: *op. cit.* (New York, The Ronald Press Company, 1942).
the differences are small and therefore scarcely apparent to the worker, but at high output the differences are significant and, therefore, provide a powerful stimulus to the worker to increase his output more and more. Earnings under most accelerating premium systems are, however, only slightly different from those under high piece-rate or high task systems with a guaranteed minimum wage payable for levels of output below standard. But the accelerating premium systems have the considerable disadvantage of being much more complicated and difficult to understand.

**Group Systems**

In some cases it is impossible to apply individual systems since, where several workers are required to perform a single operation, as in the case of a steel melting furnace in an engineering works, it is obviously impossible to measure the output of individuals. If it is desired to introduce a system of payment by results for such workers this can only be done on a group basis. All of the various individual systems may be applied to groups of workers, although piece-work is most common.

The earnings of each member of the group are determined first of all by measuring the amount of production which passes inspection as it leaves the group. The total earnings for the group are then determined and if all the members are of equal skill these earnings are usually divided among them equally. Frequently, however, the members of the group are not of equal skill. In these cases the total earnings of the group may be divided among the members in proportion to their individual time rates, or according to specified percentages, or in some cases among only a certain number of the members of the group. Where, for example, the group consists of some highly skilled workers and some quite unskilled workers, or “helpers”, the unskilled workers may receive their time rates and the skilled workers share the remainder of the total earnings.

**Department or Plant Systems**

Systems of payment by results may be applied to a department or even to a whole plant. Such systems differ from group systems in that the requirement of interdependence of operations does not necessarily apply, and in that whereas under group systems the
amount of production is measured and the earnings of the group are calculated at short intervals, under department or plant systems the measurement of production and the calculation of bonuses may be carried out at relatively lengthy intervals, generally once a month. In some cases, a certain time is allowed for standard output to be produced and special bonuses are paid if this is achieved, or a standard output per man-hour is laid down for the department or plant and a bonus is declared in the proportion by which the actual output per man-hour exceeds the standard. In other systems bonuses are declared according to changes in the value of output at factory cost, or in the value of sales. The bonuses are frequently paid to the individual workers in proportion to their time rates. Thus, provision can be made for not only direct but also indirect workers to participate.

SYSTEMS FOR INDIRECT WORKERS

Brief mention may be made here of the systems of payment by results which have been applied to indirect workers such as maintenance workers, cleaners, inspectors and packers. Bonuses may be paid to such workers either on the ground that they contribute to any increased production which the direct workers may achieve, or on the ground that their work is increased because of increased production, as in the case of inspectors. Such payment may also be designed to avoid the dissatisfaction and dissension among the workers in a plant, or even strikes, which may result if indirect workers are paid at their time rates while direct workers are receiving substantial bonuses. For these reasons, arrangements are sometimes made to reward indirect workers in some way for their increased efforts. For example, floor sweepers are sometimes allowed a standard time to sweep a specified area of floor, and if they complete the job in less than this time they are granted a bonus according to the time saved. Packers can be paid a bonus for the number of units packed above standard. A similar method can be adopted for inspectors. No such direct methods can, however, be applied to maintenance men and certain other workers. For this reason, and on the grounds of equity, a single system of bonus payments is often applied to all or most of the indirect workers in a plant even though it would be possible to measure accurately the output of some of these workers such as inspectors. In some cases the bonus is calculated according to some agreed principle on the output of the plant or of a department. In others
the bonus is a specified percentage of the bonuses or total earnings of all or some of the direct workers. Many managements, however, prefer to apply a merit-rating system to indirect workers which rewards these workers for other qualities in addition to their output.

**COMPARISON OF THE EARNINGS AND DIRECT LABOUR COST CURVES OF THE MOST FREQUENTLY APPLIED SYSTEMS**

The earnings and labour cost curves of some of the systems most commonly used are brought together, for purposes of comparison, in Charts XIII and XIV. The systems compared are the Halsey (50-50 sharing), the Rowan, the Barth Variable Sharing, the Bedaux and the piece-work systems.

In order to make comparison possible each curve has been drawn to show the relationship which exists between earnings and output under the system concerned when times or rates are so set as to enable the worker to earn at standard output \(^1\) 25 per cent. more than his time wage.\(^2\) Chart XIII thus shows all the earnings curves passing through the point which corresponds to 125 on the earnings scale and 100 on the scale for output; and Chart XIV shows the corresponding curves for direct labour costs.

From Chart XIII it can be seen that for rates of output above standard, earnings are greatest for the piece-work system, followed by the Bedaux, the Halsey (50-50 sharing), Barth and Rowan systems. It should be noted, however, that for levels of output between 100 and 130 per cent. of standard, a worker is able to earn slightly more under the Rowan system than under the Barth Variable Sharing system.

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\(^1\) See p. 7 above for a definition of standard output.

\(^2\) Thus, in the case of the Halsey system (50-50 sharing) a bonus will be paid at 66.7 per cent. of standard output, and the guaranteed time rate is paid if output falls below that level. In other words, the standard time against which time saved is calculated will be 150 per cent. of standard time for the average worker.

For the Rowan system a low task of 75 per cent. of standard output will have to be set in order to enable the worker to earn 125 per cent. of his time rate at standard output, and for the Barth Variable Sharing system the adjustment involves fixing the standard time at about 56 per cent. above that for the average worker.

Finally, for the Bedaux system, assuming a bonus of three quarters of time saved, the allowed time will be \(1^{1/4}\) of the standard time for the average worker.
CHART XIII. EARNINGS UNDER THE ROWAN, BARTH VARIABLE SHARING, BEDAUX, HALSEY (50-50 SHARING) AND PIECE-WORK SYSTEMS

Earnings as percentage of time rate

Output as percentage of standard

--- Halsey (50-50 Sharing) system (with a guaranteed time rate).
- - - - - Bedaux system (with a guaranteed time rate).
- - - - Barth Variable Sharing system.
- - - - Rowan system (with a guaranteed time rate).
- - - - Piece-work system (with a guaranteed time rate).
CHART XIV. DIRECT LABOUR COSTS UNDER THE ROWAN, BARTH VARIABLE SHARING, BEDAUX, HALSEY (50-50 SHARING) AND PIECE-WORK SYSTEMS

Direct labour costs per unit of output

Output as percentage of standard

- Halsey (50-50 Sharing) system (with a guaranteed time rate).
- Bedaux system (with a guaranteed time rate).
- Barth Variable Sharing system.
- Rowan system (with a guaranteed time rate).
- Piece-work system (with a guaranteed time rate).
The differences in earnings between the various systems increase gradually at higher rates of output. At 200 per cent. of standard output the difference between the highest and lowest earnings is 87.5 per cent. of the time rate (the earnings under piece-work are 250 per cent. of the time rate, while under the Rowan system they are 162.5 per cent. of the time rate). At 133\(\frac{1}{3}\) per cent. of standard output this difference is 23 per cent. of the time rate.

For output below standard the position is more complicated. It can be seen that between 75 and 100 per cent. output earnings under piece-work are the lowest, and that the Barth Variable Sharing system, which does not guarantee a time rate for levels of output below 65 per cent. of standard, enables the worker to earn more than under any other system in the range of output between 65 per cent. and 100 per cent. of standard.

If the whole range of output above 65 per cent. is surveyed, it can be seen that earnings under the Bedaux and Halsey (50-50 sharing) systems are intermediate between the earnings under the other systems.

Chart XIV shows that for rates of output above standard the piece-work system has the highest direct labour costs\(^1\), followed by the Bedaux, Halsey (50-50 sharing), Barth and Rowan systems, all of which yield falling direct labour costs at higher levels of output. Again it should be noted that from 100 to 130 per cent. of standard output, the Barth Variable Sharing system has the lowest direct labour costs of all five systems.

For output below standard, the piece-work system has the lowest, and the Barth Variable Sharing system the highest, direct labour costs.

\(^1\) These costs are, it will be observed, also constant for levels of output above standard.
CHAPTER II

PROCEDURES USED IN INTRODUCING AND APPLYING SYSTEMS OF PAYMENT BY RESULTS

The success of any system of payment by results depends in a large measure on the way in which it is introduced and applied. The procedures commonly followed in certain countries which have had extensive experience with such systems are outlined in the present chapter.

These procedures, which are described in the order in which they are generally applied, include those concerned with consulting and informing the workers, work study (which comprises methods study and work measurement), job evaluation, the measurement of performance and the settlement of disputes. It will of course be realised that the practice in these matters is far from uniform. In some countries, for example, systematic methods study is not applied to any great extent in connection with payment by results, while in many cases piece-rates are set by bargaining or unilaterally by employers without the use of motion and time studies.

CONSULTING AND INFORMING THE WORKERS

The first requirement for the success of a system of payment by results is that it should be developed and applied with the agreement of the workers concerned and in an atmosphere of good industrial relations. As the British Institute of Management has pointed out,

The task of installing a successful incentive scheme is one of the most difficult and complex of management jobs and should be approached with great care and forethought. Unless mutual confidence and good relations exist between Management and Workers in a concern the chance of full success for a new wage incentive system is very poor. Good relations, if they are absent, cannot be created overnight but their establishment must precede the introduction of a new incentive scheme. The introduction of a wage incentive scheme will take time. This fact must be faced and sufficient time allowed to complete the installation with care. A rushed job is bound to lead to later troubles.

Wherever possible the methods to be followed in the introduction and application of systems of payment by results should be settled by collective bargaining between the employers and workers concerned.

Agreement is desirable in particular upon—

(1) the methods followed in measuring the "results" or output upon which payment is based;

(2) the methods followed in setting wage rates for the different classes of work; and

(3) appropriate safeguards concerning earnings, job security and the settlement of disputes over piece-work prices or allowed times.

The first two of these points are discussed in the present chapter and the third in Chapter VII.

Agreement on these points needs to be supplemented by clear and careful explanation of the proposed scheme to the workers concerned before any attempt is made to introduce it.

Some managements first of all discuss the proposed scheme with the representatives of the workers and with the supervisors of the various departments and then rely on them to acquaint the workers with the necessary details. Some also hold meetings with all the workers in the various departments and describe the scheme, answer questions and meet objections to it directly. Others also address personal letters to the workers concerned or issue clearly worded and interestingly illustrated bulletins to them.

Once the details of the system have been settled, it is important to explain adequately to all of the workers concerned the procedures involved at each stage in its introduction and application. While it may not be necessary to go into great detail, sufficient information should be supplied to give all workers a clear idea of what is going on.¹

Work Study

If workers are to be paid by results, these results must be accurately measured. This means that the nature of the task which the worker is expected to perform and the quality of the

product he is to turn out must be clearly defined. The definition must cover such matters as the layout, equipment, materials, process, machine speeds and feeds, working conditions, the quality of the product and all other relevant and significant details affecting output. The establishment of such a definition or specification requires a detailed study of work procedures and of every operation of direct productive workers, service workers and supervisors. To this study, which is based on scientific methods of fact-finding, analysis and deduction, the name “work study” has been given.

Besides its use as a basis for payment by results such work study can contribute greatly to improved efficiency. It is in fact a part of the procedure normally followed in many undertakings for the purpose of ensuring that the most effective use is made of the organisation, labour force and equipment at their disposal. It draws attention to unnecessary, ineffective or wasteful procedures and operations which need to be eliminated or to be improved up to the highest level of efficiency permitted by the technical characteristics of the plant concerned. At the same time it provides a basis for the measurement of machine performance and labour effort with a view to the planning and control of production at the most effective and economical levels in terms of defined standards of output and time.

Work study as it has been developed in certain countries comprises a definite sequence of procedures and techniques, the nature and objectives of which may be summarised as follows:

**WORK STUDY PROCEDURES AND OBJECTIVES**

<table>
<thead>
<tr>
<th>Title</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work study</td>
<td>To improve productivity (in terms of increased output, improved quality and reduced costs, using, as far as possible, existing equipment and manpower).</td>
</tr>
<tr>
<td>(a) Methods study (the detailed analysis of present or proposed methods of production).</td>
<td>To improve methods of production (leading to more effective use of materials, plant, equipment and manpower).</td>
</tr>
<tr>
<td>(b) Work measurement (the detailed assessment of the work content of a defined task).</td>
<td>To provide a base for assessing human effectiveness (leading to improved production planning and control and more effective allocation of manpower. It also provides a basis for reliable production control indices and for acceptable and equitable systems of payment by results, leading to increased individual and group effectiveness).</td>
</tr>
</tbody>
</table>
The two major techniques used in work study, namely methods study and work measurement, are complementary and must be used in sequence. The necessity for this stipulation becomes clear when the nature of the methods study approach is examined in detail.

Methods Study Procedures

Experts with experience in this field have found that production methods and tasks are capable of improvement by systematic and detailed methods study. The informal use of methods study has enabled skilled and experienced workers to improve their working routine so as to achieve a higher normal level of output. It is reported that this output has, in some cases, been ten times as great as the output of the trainee who has still to learn the best method of performing the task, and has frequently been twice as great as the normal output of an equally experienced craftsman working according to customary methods.

The best results have, however, been obtained from the use of the methods study procedure when it has been applied objectively and to its full extent by trained engineers who are able to develop new ideas and improvements on old methods of working and who are able also to understand and surmount the human problems involved in introducing new ideas and methods of working. There is a growing literature of case histories giving details of the results achieved by methods improvement programmes in many different industries and in clerical as well as in skilled and unskilled manual work.\(^1\) A number of films have also been prepared to show how this procedure can be used to secure increased productivity in various industries.

An important feature of many methods improvement programmes is the care which is taken to secure the widest possible participation of workers and supervisors in the development and adoption of improved methods of working. This is especially important in cases where payment by results has been in operation for a long period since there may otherwise be serious opposition to the introduction of any improved methods which will disturb the customary working pattern or habits of workers and supervisory staff. Some managements have found that such opposition

to improved methods can be avoided and complete co-operation obtained if workers and staff and their supervisors are shown by moving picture films that these methods enable them to perform their tasks more efficiently and with less expenditure of effort.

The methods study procedure consists of a sequence of steps leading to the development and definition of the best method of doing a particular task in the existing circumstances. The principal steps applied to an existing or proposed process, task or product may be summarised as follows:

**METHODS STUDY PROCEDURES**

<table>
<thead>
<tr>
<th>Step</th>
<th>Purpose</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select for study.</td>
<td>Selection made on a priority basis depending upon the relative economic importance of: (1) material, machine or labour utilisation; (2) the duration and type of production; and (3) production difficulties.</td>
</tr>
<tr>
<td>2.</td>
<td>Record the facts.</td>
<td>Method of recording is dependent upon the potential value of the improved methods as determined by the volume of production. Where plant layout and work allocation have to be recorded, process charts of various types are used (operation charts, slow process charts, man-machine charts, etc.). Where workplace arrangement and detailed methods of working have to be recorded, motion study is necessary and films, chrono-cyclographs and two-handed simultaneous charts of various types may be used.</td>
</tr>
<tr>
<td>3.</td>
<td>Analyse the facts.</td>
<td>The systematic recording of working arrangements and details provides the initial analysis.</td>
</tr>
<tr>
<td>4.</td>
<td>Develop an improved method.</td>
<td>On this basis and by systematically investigating every operation as to its purpose, place, sequence, person and the means used to perform it, an improved method can be engineered by eliminating, combining, changing or simplifying operations and sequences.</td>
</tr>
<tr>
<td>5.</td>
<td>Define the new method.</td>
<td>The same process charts, films, etc., used to record the initial facts are used in defining the process or procedure, layout, equipment, materials, instruction, working conditions, etc.</td>
</tr>
<tr>
<td>6.</td>
<td>Install and maintain the new method.</td>
<td>On the basis of the defined new method.</td>
</tr>
</tbody>
</table>

Apart from the refined use of the more elaborate charts, models and motion study equipment by the expert methods study analyst, the basic procedure of methods study has been developed for use as a normal working procedure by engineers and production executives down to the level of charge hands, and in many cases by craftsmen engaged on direct productive operations.
Work Measurement Procedures

Having determined and defined how a particular job is to be done, it becomes a feasible although not a simple procedure to measure the work content of the job in terms of the human effort involved.

A number of attempts have been made to measure directly the work content of different industrial tasks and the average energy expenditure of workers engaged on different types of manual work, such as labouring, mining, etc., under different conditions of atmospheric pressure, temperature and humidity and in different postures. While many useful data have been obtained from these research studies, the equipment necessary for measurements of metabolic rate, oxygen consumption, pulse rate, etc., is bulky and has to be attached to the worker so that it is not suitable or acceptable for general use as an industrial work measurement procedure. A number of alternative methods of work measurement have been developed, however, and these have been adopted widely in industry in certain countries as being sufficiently accurate and acceptable for production planning and work allocation and for the development of performance indices which can be used satisfactorily as the basis of systems of payment by results.

In practice, rates are still often fixed on the crude basis of an over-all floor-to-floor timing of a task from beginning to end, without making adjustment for changes in method or allowing for the continued repetition of the operation over the working day.

Most modern methods of work measurement, however, require that the operation or task be broken down into its constituent elements, each of which is rated and timed separately. A sufficient number of studies are made to enable the effective work elements to be defined and due allowance to be made for ineffective and non-standard work elements.

In a large number of companies the work content of any job is calculated and expressed in terms of the work unit, which may be defined as—

The amount of work, both physical and mental, to be expected in one minute from a normal worker, suited and accustomed to his task, and working at normal speed and effort in normal conditions, an allowance of time being included within that minute for recovery from the fatigue caused by the nature of the effort involved.
A work unit as thus defined provides a common unit for the measurement of different kinds of human work and makes possible direct comparisons between the output of individuals and of departments and firms engaged on different types of production.

A major difficulty in work measurement arises in connection with the process of judging the rate of speed and effort at which the operator is working from element to element throughout the work cycle, so that appropriate ratings may be used to level or adjust the elemental time values determined from stopwatch readings. This process of rating depends upon the time study engineer’s subjective judgment to a large extent and upon his ability to rate the actual level of performance of the worker in relation to his mental concept of a normal performance standard. Attempts are sometimes made to avoid this difficulty by requesting the operator to work during the study either at normal or at the incentive level of speed and effort, but this merely transfers the responsibility for rating from the time study engineer to the worker. It has been found, however, that careful training and the use of a number of statistical checking methods are of considerable assistance in enabling the trained time study engineer to maintain a high level of consistency in his work and to establish, for any given job, values acceptable to both worker and management.¹

By using films of industrial operations it is possible to define both the working method and the normal or the incentive pace of working for any task. Such films are of great assistance in training time study engineers and in enabling uniform practice to be maintained in time study work.

It is also becoming recognised that films of this type could be used as a permanent record of working methods and as a basis for negotiation and agreement between management and workers in defining more objectively what constitutes a mutually acceptable, normal incentive performance or working pace in keeping with the norms of the industry and area.

Detailed time study procedures as described above can be justified economically, however, only where there is a considerable volume of similar work to be done. Thus should it be necessary to establish the work unit value for a highly repetitive job which is to be carried out by a large number of operators for several years, it would be justifiable to carry out a detailed methods and motion study of each part of the job and then to time study a sufficiently large sample of the operators. In such cases, statistical sampling and quality control procedures are helpful in determining when the number of studies is sufficient to ensure that the required degree of accuracy in the final work unit value has been attained.

Other methods of work measurement have, however, been developed on a basis of time study for use in cases where the volume of work is insufficient to justify the full time study procedure being used. These methods include the use of—

(a) synthetic time standards built up from time study values for different work elements in a given plant;

(b) predetermined elemental time data obtained from research on the basic movements involved in industrial work; and

(c) activity ratio studies based upon the direct use of statistical sampling methods applied to industrial activities and stoppages.

The term synthetic time standards is normally applied to tables of standard time values which have been built up systematically from time studies to cover elements of operations and tasks which recur frequently with minor modifications within a given plant or works. The synthesis of time standards from tables of values built upon sound and accurate time study practice can be carried out quickly and is an important method of maintaining uniformity of time standards and, incidentally, of reducing the cost of time study.

Predetermined elemental time data, which are a form of synthetic time data, have been developed and published by a number of specialists in the methods, motion and time study field under such descriptive titles as methods-time measurement,1 and the work factor system.2 These data are based upon detailed time

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2 See, for example, Quick, Shea and Koehler: "Motion-Time Standards", in Factory Management and Maintenance, May 1945.
studies of elemental movements of the fingers, hands, arms, legs and trunk which are basic to a large number of industrial tasks, and in terms of which many work movement patterns can be defined.

There are many practical advantages in the use of such data, particularly where it is difficult or impossible to make direct determinations of operation times by time study, as, for example, at the product and process design and workplace layout stage of production planning. There is, however, a considerable amount of controversy regarding the accuracy and acceptability of standard time values which are built up or synthesised from data of this type in terms of basic movements such as "reach", "move", "turn", "grasp", "position and release load", and many others which are difficult to define with any great exactness for industrial tasks, and the combination of which may not always be directly additive in terms of the smooth continuous motion pattern used in these tasks.

Activity ratio studies are based upon a series of snap observations of activities and require neither the timing nor the rating of the operator. These studies are made by recording a sufficient number of occurrences on a large enough sample of machines or operators, or both, so that the ratio between the different types of activities involved in the work cycle, and also between activities and stoppages for different causes, can be determined within specified limits of accuracy. When this procedure is properly used, the distribution of activities of operators and machines over the working shift or the working week can be determined within limits of accuracy which can be improved to any desired extent by increasing the number of observations made.¹

Where standard times are required for non-repetitive jobs of short duration such as repair work, erection, etc., careful use of analytical estimation and of synthetic time values enables standard times to be determined which are sufficiently accurate to be used as a basis for satisfactory production scheduling and for payment by results.

¹ The use of statistical methods such as these has been developed in recent years following upon Tippett's original work using snap readings (or observations taken on a random distribution basis) on the activity, or causes of stoppage, of machines and of operatives in textile mills. Cf. L. H. C. Tippett: "A Snap Reading Method of Making Time Studies of Machines and Operatives in Factory Surveys", in Journal of the Textile Institute (Manchester), Vol. 26, 1935.
The various work measurement procedures are used broadly as follows:

**WORK MEASUREMENT PROCEDURES**

<table>
<thead>
<tr>
<th>Work measurement method</th>
<th>Procedure</th>
<th>Used where economical for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time study . . .</td>
<td>Observe and record all relevant facts. Break task into work elements. Rate and time each element. Level the observed times. Repeat study over range of operators and working conditions. Summarise element times and select normal time for each element. Apply fatigue allowance to each element. Determine standard work unit value. Add other justified allowances. Establish the allowed time for the defined task.</td>
<td>Repetitive work.</td>
</tr>
<tr>
<td>Synthesis . . .</td>
<td>Similar procedure using established elemental value.</td>
<td>Non-repetitive work and in plant layout and product design studies.</td>
</tr>
<tr>
<td>Analytical estimation . . . . .</td>
<td>Similar procedure using established elemental values where available and estimating others.</td>
<td>Ditto</td>
</tr>
<tr>
<td>Methods-time and motion-time measurement .</td>
<td>Similar procedure using detailed breakdown of basic movements involved in task and using predetermined elemental time data.</td>
<td>Ditto</td>
</tr>
<tr>
<td>Activity ratio studies . . . .</td>
<td>Statistical sampling of activities of operators and machines.</td>
<td>Estimation of machine and labour utilisation for determination of allowances for machine delays, material variances, operator fatigue and other factors affecting output.</td>
</tr>
</tbody>
</table>

A variety of work measurement procedures have thus been developed as acceptable methods for the assessment of the human work involved in any task. The work unit values determined by such work measurement provide a suitable basis for systems of payment by results designed to relate earnings directly to work units produced. In many cases, however, other factors such as quality, defective work and savings in scrap and material usage are used, in conjunction with performance expressed in work units, as the basis of a system of payment by results. Even where
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payment is based upon output alone, it is customary to set up quality control limits within which production is regarded as good and outside of which it is regarded as scrap or subject to re-working and is deductible in the measurement of output achieved.

All forms of work measurement, it should be noted, depend for accuracy and continued success, among other things, upon the correct selection of the operator and the conditions under which measurement is carried out and upon the correct computation of average values, using sound statistical methods. It is obvious, for example, that a task with a high inherent variability from work cycle to work cycle will require a much longer study than a task in which conditions are highly stable, if it is desired that the work value should be established with the same order of accuracy in each case.

JOB EVALUATION AND THE DETERMINATION OF PIECE AND BONUS RATES

The introduction of a system of payment by results in a firm or industry employing widely differing categories of skilled and unskilled workers may cause a number of difficulties. For example, semi-skilled machine operators on piece-work may earn considerably more than skilled machine setters and tool room craftsmen who are responsible for the preparation and maintenance of their machines and who continue to be paid at time rates. Wage anomalies of this type may be a serious cause of disagreement. Although such anomalies can often be largely eliminated by the extension of payment by results to all direct and indirect workers, many firms which employ different categories of skilled tradesmen and semi- and unskilled workers find it desirable to develop a scale of job classifications and rates by applying a system of job evaluation acceptable to the workers concerned.¹

¹ At the third session (November 1949) of the Metal Trades Committee of the I.L.O. a resolution was adopted concerning systems of wage calculation in the metal trades which recommended, inter alia, that “a classification of jobs in each branch of the metal trades should, in each case where it is possible, be made and these jobs should be placed in a limited number of separate wage-rate categories on a plant-to-plant basis by agreement between employers and workers concerned, and on a regional or national basis by agreement between organisations of employers and workers. A minimum rate should be established and secured for each category”. The Committee had, before adopting this resolution, considered a report prepared by the International Labour Office entitled Systems of Wage Calculation in the Metal Trades (Geneva, 1949).
Such job evaluation may serve as an important aid to the introduction of a sound system of payment by results, since it provides a logical and acceptable means of simplifying the wage structure and stabilising and improving the relationship between the wages of workers in different job categories in the same undertaking.¹

Aims and Principles of Job Evaluation

The aim of the majority of systems of job evaluation is to establish, on an agreed logical basis, the relative values of different jobs in a given plant or industry. Job evaluation does not, of course, take the place of the established procedures for bargaining between the representatives of the employers and workers; but the use of a system of job evaluation may facilitate the development and maintenance of an equitable relationship among the rates for different jobs.

The principle upon which all job evaluation schemes are based is that of describing and assessing the value of all jobs in the firm in terms of a number of factors, the relative importance of which varies from job to job.

The job factors or characteristics which are commonly used for this purpose fall into four main groups, as follows:

<table>
<thead>
<tr>
<th>LIST OF JOB CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor group</strong></td>
</tr>
<tr>
<td>Requirements to perform the job competently:</td>
</tr>
<tr>
<td>Mental . . . . . . . . . . .</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Physical . . . . . . . . . .</td>
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<tr>
<td></td>
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<tr>
<td>Acquired skills and knowledge . . . . . . . . .</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Working conditions . . . . .</td>
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</table>

¹ Job evaluation can, of course, serve a number of useful and important functions in addition to establishing a logical wage structure on which to base systems of payment by results. For example, the careful and detailed job analysis which has to be carried out and recorded as the basis of the evaluation can be used to assist the employment department to determine whether new
PROCEDURES

While a number of schemes are based upon the ranking or arrangement of jobs in a sequence from the least skilled to the highest ranking job, the great bulk of schemes use point values as a means of adding together the assessments made in respect of different factors. In some successful schemes, only the four main factors are used and assessments are made on a weighted point scale against each, in comparison with values for defined and agreed standard jobs. In other schemes, also operating satisfactorily, up to 20 different sub-factors are assessed separately, for each job, within an empirically established and weighted range of points.

The Setting of Piece or Bonus Rates

When the relative point values of the various jobs have thus been determined it becomes possible to proceed to the setting of average piece or bonus rate scales. These scales are usually set at a level which will enable the workers concerned to earn, on the average, a certain amount or proportion above the guaranteed time rates for the job grades to which they belong. The time rates in turn are normally fixed by collective bargaining.

The various steps in the process may be briefly summarised. First, the various jobs are classified, according to their point values, in an agreed number of grades. For example, in the case illustrated by Chart XV, all jobs having point values of from 140 to 180 would be placed in grade 2. The guaranteed time rate for each grade is then fixed by collective bargaining, and all workers in the same grade are guaranteed the same time rate. Care is taken to ensure that the rates fixed for the different grades are fair in relation to one another, having regard to the value of the jobs in each grade. A stepped curve such as curve B in Chart XV may recruits or workmen seeking promotion have the experience and other qualities required by the job in question.

The same detailed information can be used in drawing up training programmes for new workers and supervisors, and it may reveal the need for improved working conditions and for mechanical aids to production in jobs requiring, for example, the movement of heavy parts or involving severe hazards.

Finally, job evaluation is of direct assistance in deciding whether all workers have been placed to the best advantage in the various jobs available. For more detailed information concerning job evaluation procedures than is given in this chapter see C. Canby BALDERSTON: Wage Setting Based on Job Analysis and Evaluation (New York, Industrial Relations Counsellors, 1943); Jay L. Otis and Richard H. LUKART: Job Evaluation—A Basis for Sound Wage Administration (New York, Prentice-Hall, Inc., 1948); and J. A. PATTON and Reynold S. SMITH, Jr.: Job Evaluation (Chicago, Richard D. Erwin, Inc., 1948).
be constructed to illustrate graphically the nature of this relationship; and when the current wages of individual employees in different job grades are plotted on the same graph, any anomalies will show up as points either considerably above or below the stepped curve.

**CHART XV. TYPICAL STEPPED CURVE RELATING POINT VALUES ASSESSED BY JOB EVALUATION TO THE WAGE SCALE**

\[
\begin{array}{c|c|c}
\text{Wage scale} & \text{Job grade numbers} & \text{Wage scale} \\
\text{in money units} & \text{Job assessments in points} & \text{in money units} \\
\text{per hour} & \text{per hour} & \\
100 & 1 & 100 \\
90 & 2 & 90 \\
80 & 3 & 80 \\
70 & 4 & 70 \\
60 & 5 & 60 \\
50 & 6 & 50 \\
40 & 7 & 40 \\
30 & & 30 \\
20 & & 20 \\
10 & & 10 \\
\end{array}
\]

\( A = \) Curve of expected average earnings under payment by results.  
\( B = \) Curve of guaranteed minimum rates.

Agreement is then reached on the percentages by which average incentive earnings in the various job grades should normally exceed the guaranteed time rates for those grades. These percentages may or may not be uniform but should bear an equitable relationship to one another. This relationship may be illustrated by a stepped curve such as curve \( A \) in Chart XV; here again gradualness in the slope of the curve is normally the sign of equity.
PROCEDURES

With the normal average incentive earnings for each grade thus established it becomes possible to estimate the piece-rate or bonus for each job which will be necessary, having regard to the production standard set for the job, in order to yield that level of earnings on the average for the working group of each grade.

Where piece or bonus rates are set in this way it should be possible to develop a sound wage structure with a minimum of anomalies. Anomalies may nevertheless develop for a variety of causes when the system has been in operation for some time. For example, a new wage agreement may raise the time rate of one grade to such an extent as to put it out of line with the rates of adjacent grades. It may, therefore, become advisable to adjust the entire range of time rates to avoid the development of tensions and dissatisfaction within the plant. These adjustments are normally made in agreement with the representatives of the workers concerned.

THE MEASUREMENT OF PERFORMANCE

The evaluation of human work in terms of work units allows simple accounting procedures to be developed for the measurement and control of productivity and production costs. Normally, the following indices of performance are maintained where work is measured in work units:

**INDICES OF OUTPUT**

<table>
<thead>
<tr>
<th>Description</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator work unit hour</td>
<td>Individual performance.</td>
</tr>
<tr>
<td>(determined by converting all output achieved into work units and dividing by clock hours less allowed time lost).</td>
<td></td>
</tr>
<tr>
<td>Department work unit hour</td>
<td>Departmental performance.</td>
</tr>
<tr>
<td>(determined by converting all output achieved into work units and dividing by total clock time).</td>
<td></td>
</tr>
<tr>
<td>Departmental work unit hour ( \times 100 ) operator work unit hour</td>
<td>Supervision performance.</td>
</tr>
</tbody>
</table>

On this basis individual operators and supervisors at different levels can be paid by results expressed in simple, easily understood terms. The measurement of individual and departmental performance using a universal unit of this nature has the additional advantage that it becomes possible to measure the total output of
individuals, departments and entire branch works irrespective of the product and of any changes in product or method during the period, from week to week and from quarter to quarter. This provides a simple basis for payment by results for supervisory and higher executive management staff, who are at the same time enabled to study their rate of progress towards predetermined costs and output targets, and to note rapidly any significant changes in performance levels.

A further important advantage of this type of measurement arises from the necessity to provide individual workers with means for recording time lost, that is, time during which they were prevented from working by occurrences not under their control. The summation of lost time recorded against individuals or departments and against the various causes of lost time provides a ready means of analysis of labour costs in excess of standard, and thus focuses management attention upon the major causes of lost production.

A typical weekly analysis sheet which incorporates both the performance indices and the analysis of excess labour costs due to lost time is shown on pages 47 and 48.\(^1\)

It is customary also to measure performance in terms of total costs. This becomes comparatively simple when the actual labour cost per work unit is determined for any product group or department on a weekly, monthly or annual basis. By establishing a "standard cost" for every product, process and service in a given plant, with which the "actual cost" can be periodically compared, a highly satisfactory basis for executive control of routine production operations can be developed.\(^2\) The ratio of standard cost to actual cost is thus a useful measure of performance. Each standard cost of necessity embodies a technical standard of performance in terms of the raw materials, the labour hours and machine hours, etc., required, either ideally or on the average, per 1,000 items or per ton of finished product.

For this reason, standard and actual costs are not exact measurements; they are essentially a series of agreed conventions which vary in detail from factory to factory. In addition, they reflect the limitations of the organisation and of the detailed

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\(^1\) The column headings will, of course, vary from plant to plant depending upon the causes of lost time which are most common in each case.

\(^2\) It must be recognised, however, that the well-established procedure of standard costing in which the cost accountant and the production eng near join forces to produce an agreed and consistent partial synthesis and partial analysis of operating costs also provides a highly convenient basis for executive control at company, plant and departmental level.
## WEEKLY ANALYSIS SHEET OF LABOUR PERFORMANCE AND COSTS

**Quarter ending . . . . . .**

<table>
<thead>
<tr>
<th>Week</th>
<th>Total workers on payroll</th>
<th>Labour performance</th>
<th>Bonus payment as percentage of base rate</th>
<th>Unit labour cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total output</td>
<td>Average operator performance</td>
<td>Departmental performance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>measured in work units</td>
<td>in work units</td>
<td></td>
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<tr>
<td>1</td>
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<tr>
<td>12</td>
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<td></td>
</tr>
<tr>
<td>Totals and averages for quarter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Taken as minutes of work.
2. Operator performance = total output in work units / total workers x hours on measured work.
3. Departmental performance = total workers x total hours worked / total output.
## Analysis of Labour Costs in Excess of Standard

<table>
<thead>
<tr>
<th>Week</th>
<th>Total Excess</th>
<th>Percentage of Standard Cost</th>
<th>Waiting for Work</th>
<th>Machine Breakdown</th>
<th>Services Breakdown</th>
<th>Power Off</th>
<th>Rework</th>
<th>Overtime Allowance</th>
<th>Other Authorised Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>Total and Averages for Quarter</td>
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</tbody>
</table>
measuring, reporting and accounting procedures used in deriving them. Nevertheless, broad comparisons between the ratios of standard to actual cost in different factory units, and the statistical analysis of the variations occurring in departmental or process group costs from week to week on a control chart basis, can be a useful and effective guide for executive action.

It is an advantage, at this point, to distinguish between the use of measures of performance in terms of costs, primarily designed for the control of routine production operations, and the use of physical measurements and input-output ratios primarily designed for purposes of budgeting and securing increased performance and productivity by means of technical improvements.

Production is normally measured in physical units and it is a great practical advantage to measure as many as possible of the input factors—materials, labour hours, machine hours, and services—in physical units also. On this basis, various indices of performance are derived, such as—

- Material yield (tons of material per ton of product);
- Labour productivity (tons of material per man-hour or man-hours per ton) \(^1\);
- Machine productivity (tons of material per machine hour);
- Machine utilisation (productive machine hours per available machine hours).

The input factors are usually interdependent so that the optimum production cost is secured when either labour or machine productivity is a maximum, but rarely both together.

The order of priority is, of course, established in each case by the cost structure of the product or process, so that it is not unusual to find both the routine control and work study activities being concentrated on machine utilisation where capital charges are a large fraction of the total unit cost, and on labour where costs of materials and on-costs are relatively small.

While the priority may vary from product to product or from process to process, it is possible in mass production industries to develop control indices covering both the current operating performance and the progress being made towards predetermined targets.

\(^1\) Man-hours per ton has the advantage of being additive where a product passes through a sequence of processes.
Typical indices of this type are listed in the following table:

### INDICES OF FACTORY PERFORMANCE AND PROGRESS

<table>
<thead>
<tr>
<th>Performance Index</th>
<th>Showing current monthly position and also progress towards—</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Product design</td>
<td>Simplified and standardised product design.</td>
</tr>
<tr>
<td>2. Product quality</td>
<td>Improved quality standards.</td>
</tr>
<tr>
<td>3. Productivity:</td>
<td></td>
</tr>
<tr>
<td>Labour</td>
<td>Percentage labour effectiveness.²</td>
</tr>
<tr>
<td>Technical</td>
<td>Percentage improvement in methods of production.³</td>
</tr>
<tr>
<td>4. Product cost</td>
<td>Planned reduction in controllable costs.</td>
</tr>
<tr>
<td>5. Production</td>
<td>Forecast, production demand.</td>
</tr>
<tr>
<td>6. Total stock</td>
<td>Predetermined stock levels.</td>
</tr>
</tbody>
</table>

¹ The practical use of these indices was outlined in a paper by A. B. Warin entitled "Industrial Management and the Accountant", in The 1950 Summer Course Proceedings of the Institute of Chartered Accountants of England and Wales.

² Defined as: 
\[ \frac{\text{actual departmental performance}}{\text{expected departmental performance}} \times 100. \]

³ Defined as: 
\[ \frac{\text{expected work units per item at beginning of measurement period}}{\text{expected current work units per item}} \times 100. \]

### REVISION OF WORK UNIT VALUES AND CONTROL OF WORK MEASUREMENT PROCEDURE

In the case of highly repetitive work of a complicated nature such as the skilled assembly of numerous components the comparative ease with which methods changes can be introduced, either by the operator or the supervision, and overlooked, has led some companies to conduct a periodic audit and revision of work unit values. In some cases, for example, it is customary to re-study every job once each year, to re-define the job in terms of the latest method in use and to issue a new work unit value for the job. Where the operator is responsible for the development of an improved method during the course of the year, either the job is re-studied immediately and the operator bought out with a lump sum payment proportional to the annual savings in direct wages, or else the operator is allowed to earn an increased amount until the annual audit is carried out.

In general, however, workers insist and their employers agree that work unit values and rates should be revised only for agreed reasons such as when changes in job content or methods have taken place, when new machinery is introduced, or to correct clerical errors. Some collective agreements even provide that no alteration in rates can be made during the life of the agreement. These provisions are considered necessary as a guarantee against
the indiscriminate rate-cutting by employers which in the past has made workers hostile to any form of payment by results. ¹

In the case of non-repetitive work of a jobbing nature, the necessity for extreme accuracy in work measurement is not so great provided that errors are generally made to the advantage of the worker. There is, of course, no necessity for a periodic review of work unit values in this type of work. The trends of individual and departmental incentive performance are, however, generally reviewed periodically as an index of the continuing accuracy of work measurement procedures on the one hand, and as an index of supervisory effectiveness on the other.

Under a suitable system of payment by results the improvement in performance, expressed in terms of increased output as measured in work units in any given period, is generally expected to average from about one fifth to one third of the normal performance obtained when the operator or department is on a time payment basis. For a large department, the frequency distribution of units of work done by individuals in a given period is usually in the form of a normal Gaussian curve, having a mean value of 20 to 33 1/3 per cent. above the time payment performance and a range from about twice the time payment level of output in the case of a few exceptional men down to the time payment level in the case of a few others. Any major change either in the mean value of this curve or in the range or general shape of the frequency distribution gives a clear indication that changes have occurred in the working conditions or environment, or in methods of working, or in the materials or product, or that the work measurement procedure requires review.

Operating Rules and Grievance Procedures

It has been found desirable in practice to formulate agreed rules in advance to cover the various contingencies which may arise during the operation of a system of payment by results. These rules generally detail the procedures which will be followed in regard to such matters as changes in production standards and rates when methods or processes change, the effect of material shortages, breakdowns in machines, power failures, allowances for waiting time and absenteeism. Such rules are generally promi-

¹ For examples of these provisions and a further discussion of this point see Chapter VII.
nently displayed on notice boards or copies are given to each worker concerned.

Finally, it has been found essential to provide for an agreed grievance procedure for the handling of disputes concerning production standards, piece and bonus rates and other matters relating to the introduction and application of a system.

**Training in Techniques of Work Study and Related Procedures**

While useful results may often be obtained from the application even by untrained personnel of the procedures outlined in the foregoing pages, their most effective use calls for special knowledge and skill. Time and motion study, for example, is a skilled job, calling for technical knowledge and trained judgment. Unfortunately there is in many countries a marked shortage of experts with the various special skills required for the successful introduction and operation of systems of payment by results. The Government of Israel, for example, in replying to the I.L.O. questionnaire on these systems, stated:

The immediate adoption of incentive systems encounters certain technical difficulties which may have far-reaching economic effects; these are the severe shortage of industrial engineers and trained administrators. Also both workers and management have to be educated as to the implication and implementation of such systems, in particular the management being unfamiliar with the modern techniques required of them. Thus, in most cases, time or production standards are based on past performance or negotiated and subject to the bargaining power of the partners concerned, with the effect that both output rates and following wage expenditures can seldom be predicted.

Similarly the Netherlands Board of Government Conciliators has pointed out in a recent report that—

One of the great drawbacks (to systems of payment by results) has always been the shortage of experts in this field who are able to draw up correct rates, a process which takes much time and which is begun by a study of the organisation of the work in the undertaking, efficiency, planning, etc.¹

Similar shortages of trained and experienced personnel are believed to exist in other countries.

These shortages, it may be noted, are a handicap not only to management, which has the ultimate responsibility for introducing and applying a system of payment by results, but also to the workers upon whose understanding and acceptance the system will largely depend. As has been noted, the best results are likely to be achieved when trained representatives of the workers participate at all appropriate stages in the introduction and application of such systems; but if such participation is to be effective, the workers' representatives must themselves have sufficient skill and experience in work study, job evaluation and the other procedures involved to be able to satisfy themselves (and, later, the workers whom they represent) that the methods followed and the results obtained are fair to all concerned.

There is therefore a need for more trained technicians in the ranks of both management and workers; and it may well be that one of the most effective contributions which could be made to the successful application of systems of payment by results would be the development by appropriate national and international bodies of adequate facilities for the training of experts, both from management and from workers' organisations, in modern techniques of work study and job evaluation and in the systematic analysis of work organisation and production methods. Such facilities already exist on a limited scale in certain countries and the International Labour Office has indicated its readiness to provide, under the expanded programme of technical assistance being operated by the United Nations, the I.L.O. and other specialised agencies, such assistance as may be requested by Governments in the holding in appropriate regions of training institutes or seminars for selected persons from management and trade union circles on methods of introducing and applying systems of payment by results and in the making of arrangements for the training of government, management and worker personnel in such methods (including work study, job evaluation, etc.) at appropriate centres.
CHAPTER III

THE EXTENT OF APPLICATION OF VARIOUS SYSTEMS

Any system of wage payment must be judged by how it works in practice. Full information on this subject is extremely difficult to obtain, and what can be obtained is never easy to interpret. The first thing to know, however, is how extensively each system is applied. If a system is widely used, one may reasonably conclude that it works fairly well. Moreover, if a particular system is in common use in a certain industry in one country, other countries, or at least those in which conditions are generally similar, may find it worth while to investigate the possibility of applying that system.

An attempt has been made accordingly to ascertain the extent to which systems of payment by results are in use in different countries and in different industries. The information available is summarised in the present chapter which first surveys the position country by country and then compares the prevalence of payment by results in different countries in certain major industries.

THE POSITION IN VARIOUS COUNTRIES

Certain European Countries

The proportion of hours worked in industry at piece-rates—the commonest type of payment by results—in seven European countries is shown in table I.

It will be seen from this table that the proportion of hours worked at piece-rates has increased considerably in recent years in Hungary, and fairly substantially in Czechoslovakia, Norway and Sweden, but has remained at about the same level in Denmark and the United Kingdom. Piece-work is now widespread in Czechoslovakia, Hungary, Norway and Sweden.
TABLE I. PROPORTION OF HOURS WORKED IN INDUSTRY AT PIECE-RATES IN CERTAIN EUROPEAN COUNTRIES, 1938 AND 1946-1949

<table>
<thead>
<tr>
<th>Country</th>
<th>1938</th>
<th>1946</th>
<th>1947</th>
<th>1948</th>
<th>1949</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czechoslovakia</td>
<td>—</td>
<td>38</td>
<td>48</td>
<td>55</td>
<td>—</td>
</tr>
<tr>
<td>Denmark</td>
<td>41</td>
<td>37</td>
<td>36</td>
<td>40</td>
<td>41</td>
</tr>
<tr>
<td>Western Germany</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>37</td>
</tr>
<tr>
<td>Hungary</td>
<td>—</td>
<td>36</td>
<td>58</td>
<td>73</td>
<td>70</td>
</tr>
<tr>
<td>Norway</td>
<td>39</td>
<td>41</td>
<td>47</td>
<td>50</td>
<td>57</td>
</tr>
<tr>
<td>Sweden</td>
<td>48</td>
<td>52</td>
<td>54</td>
<td>56</td>
<td>58</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>34</td>
<td>—</td>
<td>38</td>
<td>—</td>
<td>38</td>
</tr>
</tbody>
</table>

Source: Research and Planning Division, Economic Commission for Europe: Economic Bulletin for Europe, Vol. 5, No. 2, Second Quarter, 1950, p. 59 (except for the figure for Sweden for 1949 which was supplied to the I.L.O. by the Swedish Confederation of Trade Unions).

The figures do not necessarily correspond to the proportions of establishments which pay their workers by the piece, nor to the proportions of workers paid by the piece in the different countries.

Australia

In Australia, information on the extent to which various financial incentives were used in industry was collected in September 1949 by the Commonwealth Bureau of Census and Statistics. Table II shows the percentage of employees receiving each of the three broad types of incentive payments and those on time rates only.

It will be seen from table II that systems of payment by results are not common in Australia, where most workers are paid by time. Thus, only 10.9 per cent. of the workers in the establishments surveyed were under either piece-work or a bonus system based on output. In some industries, however, the proportion of workers paid by results is fairly substantial, as can be seen from table III.

The survey covered 25 per cent. of employees (excluding rural) in private firms subject to payroll tax. It gave no information about workers employed in small establishments not subject to tax, or those employed by the Commonwealth, State or local governments, or semi-governmental bodies. For the purpose of the survey, financial incentives were classified in three groups: (1) piece-work; (2) bonus and commission based solely on output; and (3) bonuses paid on some other basis. This last group included bonuses paid on (a) the value of the company's total sales; (b) the prices of the company's products; (c) the company's dividends or profits or (d) some other basis.
### TABLE II. PERCENTAGES OF EMPLOYEES IN INDUSTRY PAID BY INCENTIVE SYSTEMS OR BY TIME IN AUSTRALIA, SEPTEMBER 1949

<table>
<thead>
<tr>
<th>Method of payment</th>
<th>Manual workers</th>
<th>Other employees</th>
<th>All employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Piece-rates</td>
<td>5.0</td>
<td>5.4</td>
<td>3.4</td>
</tr>
<tr>
<td>2. Bonus or commission based on output</td>
<td>8.8</td>
<td></td>
<td>7.5</td>
</tr>
<tr>
<td>3. Bonus paid on some other basis</td>
<td>15.0</td>
<td>25.3</td>
<td>18.7</td>
</tr>
<tr>
<td>4. Time rate only</td>
<td>72.5</td>
<td>69.5</td>
<td>71.4</td>
</tr>
<tr>
<td>Total</td>
<td>101.3&lt;sup&gt;1&lt;/sup&gt;</td>
<td>100.2&lt;sup&gt;1&lt;/sup&gt;</td>
<td>101.0&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
</tbody>
</table>


The percentages in this table add up to more than 100 because some workers were classified in more than one group, for example some piece-workers also received a bonus.

### TABLE III. PERCENTAGES OF MANUAL WORKERS PAID BY RESULTS AND BY TIME IN VARIOUS INDUSTRIES IN AUSTRALIA, SEPTEMBER 1949

<table>
<thead>
<tr>
<th>Industry</th>
<th>Piece-rates and bonuses on output</th>
<th>Other types of bonus</th>
<th>Time rates</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering and vehicles</td>
<td>17.0</td>
<td>18.9</td>
<td>66.5</td>
<td>100.4</td>
</tr>
<tr>
<td>Textiles</td>
<td>39.6</td>
<td>23.4</td>
<td>45.4</td>
<td>108.4</td>
</tr>
<tr>
<td>Clothing</td>
<td>25.2</td>
<td>11.9</td>
<td>65.0</td>
<td>102.1</td>
</tr>
<tr>
<td>Food, drink and tobacco</td>
<td>8.0</td>
<td>11.9</td>
<td>80.3</td>
<td>100.2</td>
</tr>
<tr>
<td>Wood, furniture, etc.</td>
<td>10.6</td>
<td>11.0</td>
<td>78.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Paper and printing</td>
<td>9.5</td>
<td>20.8</td>
<td>70.8</td>
<td>101.1</td>
</tr>
<tr>
<td>All other</td>
<td>15.4</td>
<td>18.5</td>
<td>68.7</td>
<td>102.6</td>
</tr>
<tr>
<td>All manufacturing</td>
<td>17.0</td>
<td>16.3</td>
<td>68.2</td>
<td>101.5</td>
</tr>
<tr>
<td>Mining</td>
<td>29.0</td>
<td>17.6</td>
<td>56.7</td>
<td>103.3</td>
</tr>
<tr>
<td>Building</td>
<td>4.9</td>
<td>2.8</td>
<td>92.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Transport</td>
<td>2.7</td>
<td>8.4</td>
<td>90.0</td>
<td>101.1</td>
</tr>
<tr>
<td>Wholesale and retail trade</td>
<td>7.4</td>
<td>23.7</td>
<td>70.3</td>
<td>101.4</td>
</tr>
<tr>
<td>All other</td>
<td>3.1</td>
<td>4.3</td>
<td>92.6</td>
<td>100.0</td>
</tr>
<tr>
<td>All industries</td>
<td>13.8</td>
<td>15.0</td>
<td>72.5</td>
<td>101.3</td>
</tr>
</tbody>
</table>

Source: "Incentive Payments in Australian Industry", op. cit., p. 17. The reason for percentages exceeding 100 in many cases is the same as in the case of table II above.

Payment by results is thus most common in Australia in the textiles, mining, clothing and engineering industries in which the
percentages of manual workers paid under piece-work or under a bonus system based on output were respectively 39.6, 29.0, 25.2 and 17.0.

**Austria**

In Austria, piece-work is applied in mining, in the iron and metal processing industries, and in the textile, ready-made clothing, cement and brick manufacturing industries. In addition, certain operations in the building industry are on piece-work. Taxi-drivers are paid a commission on takings.  

**Belgium**

In Belgium, the Federation of Belgian Industries conducted an enquiry recently into the methods of remuneration in industry. Of the firms which replied, 696 used piece-work; 206, individual production bonuses; 315, team or workshop production bonuses; and 128, factory production bonuses.

Table IV shows the bases of calculation used for the piece-rates or bonuses. The most frequent methods are the fixing of a uniform price for each piece produced or the payment of a bonus according to the quantity produced.

**TABLE IV. BASES OF PAYMENT USED IN A GROUP OF BELGIAN FIRMS**

<table>
<thead>
<tr>
<th>Piece-work:</th>
<th>Number of firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniform rates for each unit produced</td>
<td>214</td>
</tr>
<tr>
<td>Progressive rates</td>
<td>35</td>
</tr>
<tr>
<td>Individual production bonuses:</td>
<td></td>
</tr>
<tr>
<td>Quantity produced</td>
<td>116</td>
</tr>
<tr>
<td>Time saved</td>
<td>53</td>
</tr>
<tr>
<td>Other systems</td>
<td>14</td>
</tr>
<tr>
<td>Team or workshop production bonuses:</td>
<td></td>
</tr>
<tr>
<td>Volume of production</td>
<td>64</td>
</tr>
<tr>
<td>Percentage increase in production</td>
<td>23</td>
</tr>
<tr>
<td>Economy in use of raw materials</td>
<td>7</td>
</tr>
<tr>
<td>Workers' basic wages</td>
<td>38</td>
</tr>
</tbody>
</table>


1 Communication to the I.L.O. from the Government of Austria, 28 Oct. 1950.

2 In the case of firms which paid bonuses based on the operations of the establishment as a whole the bases of calculation were stated to be either the turnover, the volume or tonnage of output or the difference between estimated and actual payrolls; but the numbers using each of these bases were not stated.
**Brazil**

In Brazil, little information is available concerning the number or proportion of workers paid by results. Table V, however, shows that, in 1947-1948, 1,171 establishments in Rio de Janeiro, about 12 per cent., applied systems of payment by results. These systems were most common in the clothing industry and in the spinning and weaving industries.

**TABLE V. ESTABLISHMENTS OPERATING SYSTEMS OF PAYMENT BY RESULTS IN RIO DE JANEIRO, BRAZIL, IN 1947-1948**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Establishments questioned</th>
<th>Percentage operating systems of payment by results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>140</td>
<td>1.4</td>
</tr>
<tr>
<td>Clothing</td>
<td>162</td>
<td>45.0</td>
</tr>
<tr>
<td>Construction and furniture</td>
<td>243</td>
<td>1.0</td>
</tr>
<tr>
<td>Spinning and weaving</td>
<td>91</td>
<td>26.3</td>
</tr>
<tr>
<td>Leather manufacturing</td>
<td>14</td>
<td>14.2</td>
</tr>
<tr>
<td>Chemical and pharmaceutical</td>
<td>169</td>
<td>0.6</td>
</tr>
<tr>
<td>Printing</td>
<td>79</td>
<td>0.1</td>
</tr>
<tr>
<td>Glassware</td>
<td>11</td>
<td>18.1</td>
</tr>
<tr>
<td>Electrical engineering</td>
<td>169</td>
<td>0.5</td>
</tr>
<tr>
<td>Paper, etc.</td>
<td>49</td>
<td>—</td>
</tr>
<tr>
<td>Transport</td>
<td>41</td>
<td>—</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td><strong>All industries</strong></td>
<td><strong>1,171</strong></td>
<td><strong>12.0</strong></td>
</tr>
</tbody>
</table>


In commerce, a survey in 1948 by the *Instituto de Economia* (of the Maua Foundation) of the conditions of work of employees in commerce in Rio de Janeiro found that out of a total of 1,025 employees surveyed, only 76, or 7.41 per cent., received a commission on sales.¹

**Bolivia**

In Bolivia, systems of payment by results are applied extensively in the textile, clothing and homework industries and among

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¹ Communication to the I.L.O. from the *Confederação Nacional do Comércio*, dated 20 Nov. 1950.
skilled workers in the building industry. The mining industry has recently begun to introduce such systems.\footnote{Communication to the I.L.O. from the Government of Bolivia, dated 28 Dec. 1950.}

**Canada**

Although it has not been found possible to express in quantitative terms the extent to which systems of payment by results apply in Canada, it is known that many workers in agriculture, logging, mining, manufacturing, transportation and commerce are paid on a piece-work basis or receive incentive bonuses.

The payment of piece-rates is common in agriculture in harvesting certain specialised crops such as potatoes, sugar beets, tobacco, tree fruits and berries. It is not common among workers employed in other farm activities. In logging payment is by the cord or by some other unit of measurement in the case of about 90 per cent. of the workers who are engaged on pulp wood and sawlog operations in the provinces east of the Rocky Mountains, although the proportion is lower in the Maritime and Western provinces than in Quebec and Ontario. Payment by piece is important but less common in loading and hauling operations. In British Columbia, at least 80 per cent. of the fallers and buckers are paid per 1,000 board feet, but piece-work is of no importance among other logging workers in this province. The majority of miners are paid according to the amount of work performed.

In manufacturing, incentive or production bonus plans are not infrequent. At least 200 firms have plans applying to over 32,000 employees. Industries in which they are most important are iron and steel, and electrical products manufacture; they are somewhat less common in rubber products manufacture, meat packing, fruit canning, paper box making, leather products manufacture, tobacco products manufacture, saw mills, planing mills, and the furniture, confectionery, and pulp and paper industries, in that order.

The number of employees paid on either an individual or group piece-work basis is not known, but it is understood that considerably more workers are paid on this basis than by an incentive bonus. Piece-work is extensive in both the primary textiles and clothing industries as well as in electrical products manufacture. Many foundry moulders in the iron and steel industry, some workers engaged in machining operations and almost all saw filers in saw
mills and planing mills are paid by piece-work. Payment according to freight-miles is common among truck drivers engaged in inter-urban hauling. Two large inter-urban bus lines pay their drivers on a mileage basis. In rail transport some train operating crews are also paid on a mileage basis. Payment by results is, however, not common in other branches of the transport industry. Commission payments are fairly common in wholesale and retail trade, while in construction work, on the other hand, incentive payment is very limited, although bricklayers in a good many speculative house building projects, mostly in the larger cities, are paid according to the number of bricks laid. Roofers and lathers are sometimes paid by the piece, and shovel operators according to the yards of earth removed.¹

Ceylon

In Ceylon, piece-work has been extensively applied for many years on tea and rubber plantations, on certain dock work and to some extent in graphite mines. A bonus system operates in salterns (where salt is produced from the sea by evaporation).²

Denmark

In Denmark, the extent of piece-work differs within the different trades and industries, depending upon whether the nature of the work allows piece-work to be applied. The historical development of some trades has, however, been such as to prevent the adoption of piece-work. A number of trades do not apply it at all or to only a very small extent. On the other hand, there are certain trades where the work is entirely or almost entirely carried out on a piece-work basis. Thus, the following workers work at piece-work for more than 80 per cent. of the total hours of work: skilled cigar workers, chewing-tobacco workers, hatters, glovers, pavers, ships' carpenters, tanners, fur trimmers, stone cutters, glass makers, glass grinders, metal grinders and moulders; certain unskilled male workers in Copenhagen, for example, rope makers, cement founders and coil winders; and such women workers as brewery workers, cigar workers, rope makers and glove makers. Certain workers in the building trades, such as carpenters, brick-

layers, house painters and joiners, carry out about 70-80 per cent. of their work on a piece-work basis.\(^1\)

Table VI shows the number of piece-work hours as a percentage of total hours worked (1) by different workers, and (2) in different branches of industry, in the last quarter of 1949.

### Table VI. Percentage of Total Hours Worked at Piece-Work by Different Groups of Workers and in Different Industries in Denmark in the Last Quarter of 1949

<table>
<thead>
<tr>
<th>Group of Workers</th>
<th>Piece-work hours as a percentage of total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled male workers</td>
<td>47.4</td>
</tr>
<tr>
<td>Unskilled male workers</td>
<td>30.1</td>
</tr>
<tr>
<td>Women workers</td>
<td>48.2</td>
</tr>
<tr>
<td>All workers</td>
<td>39.7</td>
</tr>
<tr>
<td>Clothing industry</td>
<td>37.3</td>
</tr>
<tr>
<td>Textile industry</td>
<td>48.1</td>
</tr>
<tr>
<td>Building trades</td>
<td>52.4</td>
</tr>
<tr>
<td>Printing trades and paper industry</td>
<td>15.4</td>
</tr>
<tr>
<td>Chemical industry</td>
<td>38.6</td>
</tr>
<tr>
<td>Stone, earthenware and glass industries</td>
<td>51.1</td>
</tr>
<tr>
<td>Leather and leatherware industries</td>
<td>50.5</td>
</tr>
<tr>
<td>Metal trades</td>
<td>48.8</td>
</tr>
<tr>
<td>Food, drink and tobacco industries</td>
<td>30.9</td>
</tr>
<tr>
<td>Wood and furniture industries</td>
<td>38.2</td>
</tr>
<tr>
<td>Service industry</td>
<td>44.0</td>
</tr>
<tr>
<td>Transport</td>
<td>22.7</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>0.2</td>
</tr>
<tr>
<td>Drivers, coachmen, stokers, messengers and watchmen</td>
<td>0.0</td>
</tr>
<tr>
<td>All industries covered</td>
<td>39.7</td>
</tr>
</tbody>
</table>


**Egypt**

In Egypt, piece-work is applied in certain industries, mainly the textile, clothing, shoe-making, bakery and transport industries. About four fifths of the workers employed in bakery and shoe-making are paid by piece-work, about 40,000 handweavers in the textile industry are paid by results, and about two thirds of the workers in mechanised textiles are paid by the metre. The rates differ from locality to locality and according to type of

\(^1\) Communication to the I.L.O. from the Confederation of Danish Trade Unions, 27 Jan. 1951.
cloth. Only about 10 per cent. of transport workers are paid by results, and these are mainly truck drivers and porters. No group systems have been introduced as yet in Egypt.\(^1\)

**Finland**

In Finland, systems of payment by results have been increasingly applied in many of the most important industries since the war. They are even applied in some occupations to which they are not quite suited.\(^2\) No statistical information is available as to their extent, although it is known that they are now applied to a majority of the workers.

**France**

Systems of payment by results are extensively applied in France in industries producing and fabricating metals, the textiles industries (except artificial textiles) and the ready-made clothing industry. Systems of this kind are also commonly applied in the glass, stone and pottery industries, the leather and skin industries, and the cardboard industry. They are least common in the food and wood industries and especially in the chemical and building industries and in public works. There is, however, a tendency for group systems to be adopted in the chemical industries.\(^3\)

It has been estimated that in iron ore and coal mining 60 to 85 per cent. of the workers are paid by results, while in the iron and steel industry 80 per cent., in the metal trades 70 to 75 per cent., in the textiles and clothing industries 80 to 100 per cent., and in the heavy chemical industry about 50 per cent., are so paid.\(^4\)

**Greece**

Systems of payment by results are not applied in Greece to any great extent. Some homeworkers engaged in finishing work for the clothing and shoe industries are paid by piece-work. A few workers in the silk, iron and hosiery industries are also paid by results. The available figures are given in table VII.

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\(^1\) Communication to the I.L.O. from the Government of Egypt, 30 Dec. 1950.

\(^2\) Communication to the I.L.O. from the Government of Finland, 1 Oct. 1950.

\(^3\) Communication to the I.L.O. from the Government of France, 18 Jan. 1951.

\(^4\) Communication to the I.L.O. from the Deputy General Secretary, Federation of Metal and Mining Industries, Paris, 12 Apr. 1951.
### TABLE VII. NUMBER OF WORKERS PAID BY RESULTS IN CERTAIN UNDERTAKINGS IN THE SILK, IRON AND HOSIERY INDUSTRIES IN GREECE IN 1950

<table>
<thead>
<tr>
<th>No. of workers</th>
<th>Silk industry</th>
<th>Iron industry</th>
<th>Hosiery industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undertaking</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>356</td>
<td>—</td>
<td>29</td>
</tr>
<tr>
<td><strong>Total...</strong></td>
<td><strong>591</strong></td>
<td><strong>132</strong></td>
<td><strong>187</strong></td>
</tr>
</tbody>
</table>

Source: Communication to the I.L.O.

**India**

In India, systems of payment by results are not common in most industries but are applied in varying degrees in certain industries. They are extensively operated in the textile industry; in some undertakings in the mining industry, in the iron and steel industry and in the metal trades; and to a lesser extent in the building and clothing industries.¹

In July 1950 over 200,000 workers, or 44.9 per cent. of the workers in the cotton textile industry, 33.4 per cent. in the silk industry and 31.0 per cent. in the woollen industry, were paid by results.²

**Ireland**

In Ireland, systems of payment by results are applied to some workers in the metal trades, the textile industry, the clothing industry, the mining industry, in boot and shoe manufacturing, in the brush and broom, sugar confectionery, and boot and shoe repairing trades, and to deep-sea and coal dockers in the port of Dublin.³

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¹ Communication to the I.L.O. from the Hind Mazdoor Sabha, 27 Nov. 1950.
² Communication to the I.L.O. from the Government of India, 9 May 1951.
³ Communication to the I.L.O. from the Government of Ireland, 29 Nov. 1950.
Israel

Up till recently, systems of payment by results were not common in Israel except in the case of a few branches of the manufacturing industry (chiefly in weaving, and for sewing operations in the clothing and footwear industries) and in the building industry.

A survey by the Statistical Department of the General Federation of Jewish Labour, which covered 19,136 workers in 350 industrial enterprises each employing not less than ten workers in November 1949, showed that only 1,412 workers were paid by piece-rates.\(^1\) A later investigation by the Wage Committee of the Productivity Research Institute\(^2\), covering about one third of the workers employed in establishments with ten workers and above, found that about 20 per cent. of these workers were working under incentive systems. At the present time a greater proportion of workers are probably being paid by results in view of the ever-increasing application of such systems in the country.

Payment by results is now applied in varying degree in forestry, citriculture, the stone quarrying industry, the metal industry (in certain branches), and the textile, clothing, footwear, woodworking, building material, and building and construction industries; on road construction, on certain dock work, and on automobile servicing and repair work. Payment by results is not applied in commerce and trade.\(^3\)

Italy

In Italy, the most common forms of payment by results are piece-work and production bonus systems. Piece-work is the form applied in all cases in which it appears desirable and technically possible. The industries in which piece-work ordinarily prevails are the metal trades and the textile, clothing and mining industries. It is applied to a much smaller extent and only for certain jobs in the chemical and building industries.\(^4\)

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\(^2\) This Institute is a semi-public body on which the Government, the Manufacturers’ Association, the General Federation of Jewish Labour, and other interested organisations are represented.

\(^3\) Communication to the I.L.O. from the Government of Israel, 5 Mar. 1951.

\(^4\) Communication to the I.L.O. from the General Confederation of Italian Industry, 28 Oct. 1950.
Luxembourg

In Luxembourg, systems of payment by results are applied mainly in the mines, in the metal trades, in the clothing industry, in the steel industry and in the leather industry.¹

Netherlands

In the Netherlands, payment by results is applied in many industries, including the following: pottery, glass, lime and brick; chemical; wood, cork and straw; clothing, leather, rubber, metal trades, construction, paper textiles and food.²

New Zealand

A recent survey of incentive payment schemes in New Zealand by the Department of Labour and Employment covered 250 incentive payment and profit-sharing schemes. It was not possible to conduct a thorough survey of all industry, so a sample was taken of the types of schemes which were being applied in different industries. Of the 250 different schemes studied it was found that 55 were straight piece-work, 62 were group piece-work, 4 were multiple piece-work and 28 were Halsey schemes. A further 20 bonus schemes were preponderantly of the 100 per cent. gain-sharing type (there were no applications of the Rowan or Barth schemes, nor were there any instances of such differential task bonus schemes as the Gantt or Emerson schemes). Three were points schemes, 32 were bounty schemes (24 rewarded service and merit), 9 were attendance bonus and stint systems and 5 paid a bonus on turnover or sales. The remainder were profit-sharing schemes.³

The total number of workers paid by results is not known. It has, however, been estimated that in the metal trades 50 per cent. are so paid.⁴

² Communication to the I.L.O. from the Government of the Netherlands, 8 Feb. 1951.
³ Communication to the I.L.O. from the Government of New Zealand, 22 Nov. 1950.
⁴ Communication to the I.L.O. from the National Secretary of the New Zealand Engineering, Coachbuilding, Aircraft and Related Trades Industrial Union of Workers, 12 Apr. 1951.
**Norway**

Table VIII shows the extent to which systems of payment by results are applied in different industries in Norway.

**TABLE VIII. PERCENTAGE OF TIME WORKED ON PIECE-RATES BY MEN AND WOMEN IN DIFFERENT INDUSTRIES IN NORWAY IN 1948**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ore and metal production</td>
<td>44.2</td>
<td>19.2</td>
</tr>
<tr>
<td>Earth and stone</td>
<td>48.3</td>
<td>—</td>
</tr>
<tr>
<td>Iron and metal</td>
<td>78.7</td>
<td>75.7</td>
</tr>
<tr>
<td>Chemical and electrochemical</td>
<td>63.2</td>
<td>59.6</td>
</tr>
<tr>
<td>Oil and fat</td>
<td>11.7</td>
<td>25.1</td>
</tr>
<tr>
<td>Wood</td>
<td>50.3</td>
<td>59.7</td>
</tr>
<tr>
<td>Paper</td>
<td>21.2</td>
<td>55.0</td>
</tr>
<tr>
<td>Leather and rubber</td>
<td>58.2</td>
<td>67.0</td>
</tr>
<tr>
<td>Textiles</td>
<td>29.9</td>
<td>60.1</td>
</tr>
<tr>
<td>Clothing</td>
<td>54.5</td>
<td>44.1</td>
</tr>
<tr>
<td>Food</td>
<td>10.4</td>
<td>37.9</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>27.2</td>
<td>44.6</td>
</tr>
<tr>
<td>All industries</td>
<td>52.5</td>
<td>51.3</td>
</tr>
</tbody>
</table>


Table VIII shows that piece-work is most common in the iron and metal industries, the chemical industries (in contrast to the position in most other countries), the leather and rubber industries, the wood industries and the clothing industry. On the average over half of all the men and women workers in the industries surveyed were on piece-work.

It should, however, be noted that some forms of payment which in principle are based on results are only partly classified under piece-work in the table. For these reasons the figures in the table underestimate the extent of application of systems of payment by results in Norway.\(^1\) In the second quarter of 1948 the Norwegian Central Bureau of Statistics undertook a special survey of wages in some industries. This survey had a considerably greater coverage than the previous surveys from which the

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\(^1\) Communication to the I.L.O. from the Government of Norway, 7 Nov. 1950.
statistics reproduced in the above table were obtained and the definition of piece-work was also in some cases broadened to include production bonus systems. The results showed a greater prevalence of payment by results. In the textile industry, for example, the regular quarterly series of statistics for the second quarter in 1948 indicated that 31.9 per cent. of men workers (29.9 per cent. yearly average) and 62.6 per cent. of women workers (60.1 per cent. yearly average) were on piece-work, while the special survey just referred to showed that 50.5 per cent. and 64.6 per cent. respectively were paid by results.\(^1\)

**Pakistan**

Detailed information as to the extent of application of systems of payment by results in Pakistan is not available but it is known that piece-work is applied in certain railway workshops and to the entire mining industry with the exception of underground chrome mines.\(^2\)

**South Africa**

No information is available regarding the number or proportion of workers paid by results in the various South African industries. A large number of agreements made under the Industrial Conciliation Act, 1937, do, however, contain provisions for the application of such systems.\(^3\) Such information as is available indicates that, except in the mining industry and in the iron and steel industry, only a small proportion of workers are paid by results.

**Sweden**

Table IX shows that over half the hours worked in Swedish industry are on piece-work, which is most common in the mining and metal industries, the leather and rubber industries and the textile and clothing industries. It is least common in the food processing industry where only 12.7 of the hours worked are on piece-work.

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\(^2\) Communication to the I.L.O. from the Government of Pakistan, dated 22 Nov. 1950.

\(^3\) Communication to the I.L.O. from the Government of the Union of South Africa, dated 26 Oct. 1950.
TABLE IX. PERCENTAGE OF TIME WORKED ON PIECE-RATES IN DIFFERENT INDUSTRIES IN SWEDEN IN 1948

<table>
<thead>
<tr>
<th>Industry</th>
<th>No. of workers</th>
<th>Percentage of time worked on piece-rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining and metal</td>
<td>202,334</td>
<td>66.3</td>
</tr>
<tr>
<td>Earth and stone</td>
<td>31,241</td>
<td>55.1</td>
</tr>
<tr>
<td>Wood and wood processing</td>
<td>45,349</td>
<td>52.0</td>
</tr>
<tr>
<td>Paper and printing</td>
<td>53,510</td>
<td>46.7</td>
</tr>
<tr>
<td>Food processing</td>
<td>39,166</td>
<td>12.7</td>
</tr>
<tr>
<td>Textiles and clothing</td>
<td>79,397</td>
<td>59.1</td>
</tr>
<tr>
<td>Leather and rubber</td>
<td>23,666</td>
<td>60.3</td>
</tr>
<tr>
<td>Chemical</td>
<td>17,940</td>
<td>49.2</td>
</tr>
<tr>
<td>Building and construction</td>
<td>39,257</td>
<td>48.4</td>
</tr>
<tr>
<td>State factories and construction (mechanical engineering, shipyards, etc.)</td>
<td>37,924</td>
<td>44.9</td>
</tr>
<tr>
<td>Municipal factories and construction</td>
<td>29,346</td>
<td>28.8</td>
</tr>
<tr>
<td>Transport</td>
<td>8,373</td>
<td>46.7</td>
</tr>
<tr>
<td>All industries</td>
<td>607,503</td>
<td>53.1</td>
</tr>
</tbody>
</table>


Switzerland

No information is available regarding the number of workers paid by results in Switzerland. The collective agreements in various industries, however, contain a great variety of provisions relating to the application of such systems and it is known that these systems are applied to some extent in the textile industry, the metal trades, the clothing industry and the transport industry.¹

Turkey

Systems of payment by results are not applied to any great extent in Turkey. They are applied to some extent, however, in some undertakings in the textile and shoe industries.²

United Kingdom

Systems of payment by results are operated in many industries and establishments in the United Kingdom, as will be seen from table X.

² Communication to the I.L.O. from the Government of Turkey, dated 9 Nov. 1950.
TABLE X. PROPORTION OF ESTABLISHMENTS OPERATING PAYMENT BY RESULTS AND THE PROPORTION OF WAGE EARNERS PAID UNDER SUCH SYSTEMS IN THE UNITED KINGDOM IN OCTOBER 1949

<table>
<thead>
<tr>
<th>Industry</th>
<th>Percentage of establishments</th>
<th>Percentage of wage earners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining and quarrying (except coal)</td>
<td>42</td>
<td>30</td>
</tr>
<tr>
<td>Treatment of non-metalliferous mining products other than coal</td>
<td>58</td>
<td>36</td>
</tr>
<tr>
<td>Chemicals and allied trades</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>Metal manufacture</td>
<td>70</td>
<td>55</td>
</tr>
<tr>
<td>Engineering, shipbuilding and electrical goods</td>
<td>41</td>
<td>51</td>
</tr>
<tr>
<td>Vehicles</td>
<td>17</td>
<td>48</td>
</tr>
<tr>
<td>Metal goods not elsewhere specified</td>
<td>55</td>
<td>41</td>
</tr>
<tr>
<td>Precision instruments, jewellery, etc.</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>Textiles</td>
<td>80</td>
<td>48</td>
</tr>
<tr>
<td>Leather, leather goods and fur</td>
<td>51</td>
<td>34</td>
</tr>
<tr>
<td>Clothing</td>
<td>61</td>
<td>40</td>
</tr>
<tr>
<td>Food, drink and tobacco</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Manufactures of wood and cork</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>Paper and printing</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>Building and contracting</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Gas, electricity and water supply</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Transport and communications</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Public administration</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Other services:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laundries</td>
<td>26</td>
<td>18</td>
</tr>
<tr>
<td>Dry cleaning, job dyeing, etc.</td>
<td>31</td>
<td>24</td>
</tr>
</tbody>
</table>


Certain important industries were not covered in the enquiry undertaken in the United Kingdom from which the statistics given in table X were obtained. These industries were agriculture, coal mining, the railway service, the shipping service, port transport (dock labour), the distributive trades, the catering trades, the entertainment industries and domestic service. In agriculture, workers in some areas are often employed on piece-work for short periods on specific tasks, such as singling sugar beet, lifting potatoes and thatching, and some farmers pay special bonuses related to output or for special services. In coal mining in October 1949, about 39 per cent. of male workers (all ages) were employed on piece-work or some other system of payment by results. In the railway service, piece-work is common among the
workshop grades, and various incentive or bonus schemes are operated in goods departments and in the collection and delivery of merchandise. Piece-work is also very common in dock labour (loading and unloading of cargoes and coal trimming). In the other industries mentioned above, however, payment by results is believed not to be extensively used, although it is probable that an appreciable number of workers in the retail distributive trades are paid partly on a commission basis. In regard to the figures given in the table for the building industry and for other services, recent enquiries by the employers' organisations concerned show that the proportion of workers paid by results in the building industry is now considerably in excess of the 6 per cent. shown in the table and that in the laundry industry about 50 per cent. of adult female full-time workers are paid by results.¹

Payment by results is most common in the textiles, metal manufacturing, and clothing industries, in which the proportions of establishments operating systems of this kind were 80, 70 and 61 per cent. respectively and the proportions of workers paid by results were 48, 55, and 40 per cent. This method of payment is also quite common in many other groups of industries, notably the engineering, shipbuilding and electrical goods industries, where 51 per cent. of the workers were paid by results. On the other hand only 1 per cent. of workers in transport and communications, public administration, and the gas, electricity and water supply industries were paid by results.²

Table XI shows that systems of payment by results tend to be applied more extensively in the larger than in the smaller establishments. Thus, no less than 72 per cent. of establishments with 1,000 or more wage earners applied such systems, as compared with 10 per cent. of establishments with under 11 wage earners. Payment by results was applied in only 33 per cent. of all the establishments surveyed and to 31 per cent. of all workers in these establishments. It has, however, been estimated that this last percentage would have been reduced to 29 if all industries had been equally represented in the returns obtained.³

² More detailed information on the prevalence of systems of payment by results within the different industry groups is given below (see pp. 78, 79, 81, 85, 87 and 89).
TABLE XI. PROPORTION OF ESTABLISHMENTS WITH PAYMENT BY RESULTS SCHEMES AND PROPORTION OF WORKERS PAID BY RESULTS IN THE UNITED KINGDOM IN OCTOBER 1949, ACCORDING TO SIZE OF ESTABLISHMENT

<table>
<thead>
<tr>
<th>Size of establishment (number of wage earners)</th>
<th>Percentage of establishments</th>
<th>Percentage of wage earners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 11</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>11-24</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>25-49</td>
<td>31</td>
<td>15</td>
</tr>
<tr>
<td>50-99</td>
<td>43</td>
<td>21</td>
</tr>
<tr>
<td>100-249</td>
<td>54</td>
<td>27</td>
</tr>
<tr>
<td>250-499</td>
<td>62</td>
<td>32</td>
</tr>
<tr>
<td>500-999</td>
<td>69</td>
<td>35</td>
</tr>
<tr>
<td>1,000 or more</td>
<td>72</td>
<td>41</td>
</tr>
<tr>
<td>All groups</td>
<td>33</td>
<td>31</td>
</tr>
</tbody>
</table>


United States

About 30 per cent. of the plant workers in the manufacturing industries in the United States surveyed by the United States Bureau of Labor Statistics in 1945 and 1946 were paid on an incentive basis. Altogether 56 manufacturing industries covering 34,000 establishments with about 5.5 million workers, and 8 non-manufacturing industries covering 21,000 establishments with about 1.5 million employees were surveyed. The results of the survey are summarised in table XII.

As will be seen from table XII, incentive plans were most common in the apparel industry (65 per cent. of all employees paid by results), the textile industry (39 per cent.), automobile repair shops (37 per cent.), clothing stores (34 per cent.), department stores (28 per cent.) and bituminous coal mining (22 per cent.). Payment by results was least common in the chemical industry and limited-price variety stores where only 7 and 3 per cent. respectively of the workers were so paid. In establishments where incentive pay schemes were operated, by far the greatest majority of the workers were paid by individual

---

<table>
<thead>
<tr>
<th>Item</th>
<th>Manufacturing</th>
<th>Non-manufacturing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total plants studied</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apparel</td>
<td>Chemicals</td>
<td>Metal-working</td>
</tr>
<tr>
<td>Percentage of all employees studied paid on an incentive basis . .</td>
<td>30</td>
<td>65</td>
<td>7</td>
</tr>
<tr>
<td>Percentage of establishments:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With incentive systems for plant workers . .</td>
<td>34</td>
<td>85</td>
<td>66</td>
</tr>
<tr>
<td>Predominantly piece-rate . .</td>
<td>29</td>
<td>82</td>
<td>2</td>
</tr>
<tr>
<td>Individual . .</td>
<td>28</td>
<td>81</td>
<td>2</td>
</tr>
<tr>
<td>Group . .</td>
<td>1</td>
<td>1</td>
<td>(2)</td>
</tr>
<tr>
<td>Predominantly bonus . .</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Individual . .</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Group . .</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>With no incentive system . .</td>
<td>66</td>
<td>15</td>
<td>94</td>
</tr>
<tr>
<td>Information not available . .</td>
<td>(2)</td>
<td>—</td>
<td>(2)</td>
</tr>
<tr>
<td>All establishments studied .</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Number of establishments studied .</td>
<td>15,636</td>
<td>2,261</td>
<td>999</td>
</tr>
</tbody>
</table>

piece-work. Group piece-work and bonus systems were least common.

Table XIII shows the results of a survey in 1947 in the State of Wisconsin which covered 163 companies employing 128,252 production workers.

TABLE XIII. PERCENTAGES OF WORKERS RECEIVING INCENTIVE WAGES IN REPORTING COMPANIES IN WISCONSIN, BY INDUSTRIES, 1947

<table>
<thead>
<tr>
<th>Industry classification</th>
<th>Workers receiving incentive wages as a percentage of all workers employed by all reporting companies</th>
<th>All workers employed by companies using incentive-wage plans as a percentage of all workers employed by all reporting companies</th>
<th>Workers receiving incentive wages as a percentage of all workers employed by companies using incentive-wage plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>All industries</td>
<td>54</td>
<td>76</td>
<td>72</td>
</tr>
<tr>
<td>Textiles and apparel</td>
<td>91</td>
<td>100</td>
<td>91</td>
</tr>
<tr>
<td>Furniture and wood products</td>
<td>77</td>
<td>86</td>
<td>89</td>
</tr>
<tr>
<td>Leather and its products</td>
<td>73</td>
<td>100</td>
<td>73</td>
</tr>
<tr>
<td>Automobiles and auto equipment</td>
<td>72</td>
<td>100</td>
<td>72</td>
</tr>
<tr>
<td>Electrical machinery</td>
<td>72</td>
<td>100</td>
<td>72</td>
</tr>
<tr>
<td>Iron and steel</td>
<td>68</td>
<td>90</td>
<td>76</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>63</td>
<td>83</td>
<td>76</td>
</tr>
<tr>
<td>Non-ferrous metal</td>
<td>59</td>
<td>81</td>
<td>73</td>
</tr>
<tr>
<td>Machinery</td>
<td>57</td>
<td>83</td>
<td>69</td>
</tr>
<tr>
<td>Lumber</td>
<td>52</td>
<td>72</td>
<td>71</td>
</tr>
<tr>
<td>Food and beverages</td>
<td>18</td>
<td>25</td>
<td>73</td>
</tr>
<tr>
<td>Paper and allied products</td>
<td>5</td>
<td>26</td>
<td>19</td>
</tr>
</tbody>
</table>


Payment by results in Wisconsin was most common in the textiles and apparel industries. The proportions of workers receiving incentive wages ranged from over 70 per cent. in the textiles and apparel, furniture and wood products, leather, electrical, and automobile and auto equipment industries to 5 per cent. in the paper and allied industries. Straight piece-work, which constituted 57 per cent. of the total number of systems currently in operation, was the most dominant type.1 Chart XVI,

showing the numbers and percentages of different types of incentive-wage schemes from 1897 to 1947, indicates, however, that the relative popularity of the standard hour system has increased considerably, while that of straight piece-work has decreased.¹

**Uruguay**

Payment by results is applied in Uruguay mainly in the textile industry and in commerce, to only a small extent in the building, clothing and transport industries and not at all in other industries.²

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¹ It should be noted that all the various differential piece-rate plans were grouped with straight piece-work systems. The standard hour group included also the Halsey, Bedaux and Haynes' "Manit System". Various types of group production bonus plans were included in the production bonus category.

THE POSITION IN PARTICULAR INDUSTRIES

Building

Systems of payment by results are applied in the building industry chiefly in certain European countries. In Australia, Belgium, New Zealand, South Africa, Switzerland and the United States, building workers are generally paid by the hour. Indeed, collective agreements and orders of wage-determining authorities for the building industry sometimes specifically prohibit piece-work, as, for example, in Australia and South Africa. In other countries, as, for example, in New Zealand, such agreements and orders provide that a piece-work system can only be introduced by agreement between the employers and workers concerned.
Systems of payment by results are, however, applied in the industry in varying degrees in Bulgaria, Czechoslovakia, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Norway, Poland, Sweden, Switzerland and the United Kingdom. They are applied to only a small extent in Germany, France, Italy and Switzerland, while in Denmark, on the other hand, about 70 per cent. of all work in the towns and about 35 per cent. of the work in rural districts is performed by piece-work. Systems of payment by results are also widely applied in the other Scandinavian countries, in Bulgaria, Czechoslovakia and Poland. In the United Kingdom, in the case of houses constructed for local authorities, they were operated "on about one contract in three but on . . . about half the houses completed in October 1949".\(^1\)

Tables XIV-XVII give more precise information as to the extent of application of systems of payment by results in the building industry in Denmark, Sweden, Norway and the United Kingdom.

### TABLE XIV. PERCENTAGE OF PIECE-WORK HOURS TO TOTAL HOURS IN THE BUILDING AND CONSTRUCTION INDUSTRY IN DENMARK, FIRST QUARTER, 1950

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number of workers</th>
<th>Percentage of total hours on piece-work</th>
<th>Number of workers</th>
<th>Percentage of total hours on piece-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled male workers:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joiners</td>
<td>1,110</td>
<td>67.8</td>
<td>1,051</td>
<td>43.3</td>
</tr>
<tr>
<td>Carpenters</td>
<td>1,393</td>
<td>68.3</td>
<td>3,405</td>
<td>44.8</td>
</tr>
<tr>
<td>Masons</td>
<td>2,202</td>
<td>75.6</td>
<td>3,250</td>
<td>54.2</td>
</tr>
<tr>
<td>Electricians</td>
<td>1,532</td>
<td>30.9</td>
<td>1,933</td>
<td>22.6</td>
</tr>
<tr>
<td>Painters</td>
<td>1,660</td>
<td>78.2</td>
<td>1,873</td>
<td>70.4</td>
</tr>
<tr>
<td>Unskilled male workers:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth and concrete workers</td>
<td>4,499</td>
<td>65.2</td>
<td>5,544</td>
<td>32.2</td>
</tr>
<tr>
<td>Bricklayers</td>
<td>1,713</td>
<td>62.0</td>
<td>4,481</td>
<td>37.9</td>
</tr>
<tr>
<td>Bridge builders</td>
<td>103</td>
<td>79.7</td>
<td>16</td>
<td>28.7</td>
</tr>
<tr>
<td>Planers</td>
<td>113</td>
<td>81.2</td>
<td>77</td>
<td>46.2</td>
</tr>
<tr>
<td>Other building workers</td>
<td>145</td>
<td>11.3</td>
<td>245</td>
<td>12.3</td>
</tr>
</tbody>
</table>


\(^1\) Cf. "Payment by Results in the Building Industry", in *International Labour Review*, Jan. 1951, pp. 64-78.
Information collected recently by the National Federation of Building Trades Employers indicates, however, that the number of workers who are paid by results in the building industry as a whole in the United Kingdom is now considerably in excess of the 6 per cent. given in table XVII.

### TABLE XV. PERCENTAGE OF PIECE-WORK HOURS TO TOTAL HOURS IN THE BUILDING AND CONSTRUCTION INDUSTRY IN SWEDEN, 1948

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of workers</th>
<th>Percentage of total hours on piece-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private building activity in general</td>
<td>39,257</td>
<td>48.4</td>
</tr>
<tr>
<td>Building operations</td>
<td>26,406</td>
<td>46.1</td>
</tr>
<tr>
<td>Installation work</td>
<td>10,966</td>
<td>50.0</td>
</tr>
<tr>
<td>Painting</td>
<td>1,885</td>
<td>73.6</td>
</tr>
<tr>
<td>State building and construction</td>
<td>10,404</td>
<td>28.5</td>
</tr>
<tr>
<td>Municipal building and construction</td>
<td>12,722</td>
<td>44.2</td>
</tr>
</tbody>
</table>


### TABLE XVI. PERCENTAGE OF PIECE-WORK HOURS TO TOTAL HOURS IN THE BUILDING INDUSTRY IN NORWAY, FOURTH QUARTER, 1948

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total number of hours</th>
<th>Percentage of total hours on piece-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron platers: skilled</td>
<td>46,963</td>
<td>58.1</td>
</tr>
<tr>
<td>unskilled</td>
<td>6,456</td>
<td>29.2</td>
</tr>
<tr>
<td>Building workers and carpenters:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>skilled</td>
<td>636,079</td>
<td>51.2</td>
</tr>
<tr>
<td>unskilled</td>
<td>104,949</td>
<td>70.8</td>
</tr>
<tr>
<td>Painters: skilled</td>
<td>429,546</td>
<td>68.3</td>
</tr>
<tr>
<td>unskilled</td>
<td>12,335</td>
<td>38.9</td>
</tr>
<tr>
<td>Plumbers: skilled</td>
<td>580,086</td>
<td>40.4</td>
</tr>
<tr>
<td>unskilled</td>
<td>187,657</td>
<td>39.0</td>
</tr>
<tr>
<td>Masons: skilled</td>
<td>273,961</td>
<td>85.9</td>
</tr>
<tr>
<td>unskilled</td>
<td>279,075</td>
<td>83.1</td>
</tr>
<tr>
<td>All building trades: skilled</td>
<td>1,966,635</td>
<td>56.8</td>
</tr>
<tr>
<td>unskilled</td>
<td>590,472</td>
<td>65.4</td>
</tr>
</tbody>
</table>

Source: Arbeidslønnings, 1948, op. cit., pp. 68, 70 and 74.

TABLE XVII. PROPORTION OF ESTABLISHMENTS WHICH OPERATED SYSTEMS OF PAYMENT BY RESULTS AND THE PROPORTION OF WORKERS WHO WERE PAID BY RESULTS IN THE BUILDING AND CONTRACTING INDUSTRIES IN THE UNITED KINGDOM IN OCTOBER 1949

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of establishments with payment by results schemes (including straight piece-work)</th>
<th>Percentage of wage earners paid under payment by results systems (in all establishments)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Electric wiring and contracting</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Civil engineering contracting</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>


Clothing

Information regarding the extent to which systems of payment by results are applied in the clothing industry is somewhat limited.

Table XVIII shows the proportion of hours worked at piece-rates in the industry in five countries.

TABLE XVIII. PERCENTAGES OF HOURS WORKED AT PIECE-RATES BY MEN AND WOMEN WORKERS IN THE CLOTHING INDUSTRY IN FIVE COUNTRIES

<table>
<thead>
<tr>
<th>Sex</th>
<th>Denmark 1938</th>
<th>Hungary 1938</th>
<th>Norway 1938</th>
<th>Sweden 1938</th>
<th>United Kingdom 1938</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>27</td>
<td>69</td>
<td>76</td>
<td>54</td>
<td>49</td>
</tr>
<tr>
<td>Women</td>
<td>20</td>
<td>25</td>
<td>34</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>


1 Skilled male workers in Copenhagen, first quarter in 1950. For the rest of the country the corresponding percentage is 3.9.
It will be noted from the table that piece-work is most common in Hungary and that in the case of Sweden and the United Kingdom a larger proportion of women than of men are working on piece-rates.

In Denmark over three quarters of the total hours were worked on piece-work by hat workers and glove-makers in Copenhagen in the first quarter of 1950.\(^1\) In Norway in the fourth quarter of 1948 the percentages were 68.3, 57.0 and 34.8 for adult male, and 46.9, 57.8 and 45.2 for adult female hat workers, glove-makers and ready-made clothing workers respectively.\(^2\) In Sweden in 1948 the percentages were 54.6 for workers in tailoring and ready-made clothing workshops, and 46.3 in hat factories.\(^3\)

Table XIX shows the extent to which workers in the different branches of the industry are paid by results (which includes bonus systems as well as piece-work) and the proportion of clothing establishments which operate such systems in the United Kingdom.

**TABLE XIX. PROPORTION OF ESTABLISHMENTS WHICH OPERATED SYSTEMS OF PAYMENT BY RESULTS AND THE PROPORTION OF WORKERS PAID BY RESULTS IN THE CLOTHING INDUSTRY IN THE UNITED KINGDOM IN OCTOBER 1949**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Percentage of establishments with payment by results schemes (including straight piece-work)</th>
<th>Percentage of wage earners paid by results (in all establishments)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tailoring</td>
<td>57</td>
<td>35</td>
</tr>
<tr>
<td>Dressmaking</td>
<td>57</td>
<td>37</td>
</tr>
<tr>
<td>Overalls, shirts, underwear, etc.</td>
<td>80</td>
<td>45</td>
</tr>
<tr>
<td>Hats, caps and millinery</td>
<td>58</td>
<td>37</td>
</tr>
<tr>
<td>Other dress industries</td>
<td>74</td>
<td>49</td>
</tr>
<tr>
<td>Manufacture of boots, shoes, slippers, clogs (excluding rubber)</td>
<td>83</td>
<td>49</td>
</tr>
<tr>
<td>Repair of boots and shoes</td>
<td>48</td>
<td>23</td>
</tr>
<tr>
<td>Group total</td>
<td>61</td>
<td>40</td>
</tr>
</tbody>
</table>


\(^1\) *Statistiske Efterretninger* (Copenhagen), 21 Oct. 1950, pp. 465-468.

\(^2\) *Arbeidslønninger, 1948* (Oslo, 1950), pp. 46, 51 and 52.

Table XX shows that systems of payment by results are extensively applied in the clothing industry in the United States.

**TABLE XX. EXTENT OF INCENTIVE PLANS FOR WORKERS IN THE APPAREL INDUSTRY IN THE UNITED STATES, 1945-1946**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of plants studied</th>
<th>Percentage of plants with incentive systems</th>
<th>Percentage of workers on incentive pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knit outer-wear</td>
<td>253</td>
<td>64</td>
<td>67</td>
</tr>
<tr>
<td>Knit underwear</td>
<td>161</td>
<td>94</td>
<td>44</td>
</tr>
<tr>
<td>Men’s and boys’ dress shirts and nightwear</td>
<td>220</td>
<td>88</td>
<td>74</td>
</tr>
<tr>
<td>Overalls and industrial garments</td>
<td>132</td>
<td>86</td>
<td>70</td>
</tr>
<tr>
<td>Women’s and misses’ dresses</td>
<td>976</td>
<td>92</td>
<td>69</td>
</tr>
<tr>
<td>Women’s and misses’ suits and coats</td>
<td>305</td>
<td>67</td>
<td>44</td>
</tr>
<tr>
<td>Work pants, cotton</td>
<td>155</td>
<td>89</td>
<td>67</td>
</tr>
<tr>
<td>Work shirts</td>
<td>59</td>
<td>88</td>
<td>80</td>
</tr>
</tbody>
</table>


**Iron and Steel**

Information in regard to the extent of application of systems of payment by results in the iron and steel industry is confined to a few countries. In Norway the percentage of total hours worked on piece-work in the fourth quarter in 1948 was, in the case of adult male workers, 57 for mining and blast furnaces, and 41.8 for electrical furnaces, or 47.5 altogether; and in the case of adult female workers, 13.7 for mining and blast furnaces.¹ In Sweden in 1948, 82 per cent. of the total hours worked by all workers in the industry were piece-work hours.² Table XXI shows the extent of application in the industry in the United Kingdom. It will be seen that all tinplate manufacturing establishments applied a system of payment by results, and that over half of the workers in each of the different branches of the industry were paid by results.

¹ *Arbeidslönninger, 1948, op. cit.,* pp. 43 and 49.
² *Lönestatistik Årsbok för Sverige, 1948, op. cit.,* p. 84.
TABLE XXI. PROPORTION OF ESTABLISHMENTS WHICH OPERATED SYSTEMS OF PAYMENT BY RESULTS AND THE PROPORTION OF WORKERS PAID BY RESULTS IN THE IRON AND STEEL INDUSTRY IN THE UNITED KINGDOM IN OCTOBER 1949

<table>
<thead>
<tr>
<th>Branch of the industry</th>
<th>Percentage of establishments with payment by results schemes (including straight piece-work)</th>
<th>Percentage of wage earners paid by results (in all establishments)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blast furnaces</td>
<td>90</td>
<td>51</td>
</tr>
<tr>
<td>Iron and steel melting, rolling, etc.</td>
<td>84</td>
<td>61</td>
</tr>
<tr>
<td>Steel sheet manufacture</td>
<td>95</td>
<td>52</td>
</tr>
<tr>
<td>Tinplate manufacture</td>
<td>100</td>
<td>57</td>
</tr>
<tr>
<td>Iron and steel tubes (including melting and rolling in integrated works)</td>
<td>74</td>
<td>54</td>
</tr>
</tbody>
</table>


Metal Trades

The extent of application of systems of payment by results in the metal trades varies from country to country. Payment by results is most common in France, Norway, Sweden and the United Kingdom.

In Belgium, systems of payment by results are commonly applied, particularly in undertakings with more than 50 workers. Undertakings with less than 50 workers usually pay their employees by time. An enquiry conducted by the Belgian Industries Federation in undertakings with 50 or more workers found that 350 out of about 400 undertakings applied the following special methods of remuneration including various systems of payment by results:

Number of undertakings

<table>
<thead>
<tr>
<th>Method</th>
<th>Number of undertakings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piece-rates</td>
<td>57</td>
</tr>
<tr>
<td>Individual production bonuses</td>
<td>170</td>
</tr>
<tr>
<td>Gang or workshop production bonuses</td>
<td>105</td>
</tr>
<tr>
<td>Collective production bonuses (by factory)</td>
<td>55</td>
</tr>
<tr>
<td>Monthly or yearly participation in profits</td>
<td>82</td>
</tr>
<tr>
<td>Stock ownership</td>
<td>3</td>
</tr>
<tr>
<td>Proportional wage system (salaire proportionnel)</td>
<td>8</td>
</tr>
<tr>
<td>Bonuses for punctuality</td>
<td>288</td>
</tr>
<tr>
<td>Bonuses for loyalty or seniority</td>
<td>129</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>17</td>
</tr>
</tbody>
</table>

1 Communication to the I.L.O. from the Fédération des Entreprises de l'Industrie des Fabrications métalliques, 30 Apr. 1949.
It will be noted that individual production bonuses were applied in 170 undertakings, collective factory production bonuses in 55 undertakings and piece-work in 57 undertakings.

In Canada, an examination of a large number of recent collective agreements relating to the aircraft, automobile, electrical equipment, general engineering and shipbuilding industries shows that nearly all workers in these industries are paid by time. Piece-work is applied extensively in electrical products manufacture and to foundry moulders and machinists.¹

In Finland, straight piece-work and a special kind of contract system are quite common. The fixing of piece-rates is usually based on time studies or past experience. The contract system bases the payment to the worker on the time required to perform a certain job after the physical and mental strain involved in the performance, the time required for the preparation of the work and certain other factors have been taken into consideration.²

In France, according to a survey conducted in July 1946, 39 per cent. of all workers in the metal trades were paid by results and 28.8 per cent. by the hour plus a bonus. A large number of different systems is in use, the most common being the Bedaux, Rowan, Halsey and Gantt and straight piece-work systems.³

In India, only about 14.1 per cent. of the total labour force in the engineering industries was on piece-work in 1944 and of this percentage by far the biggest proportion was in ordnance factories. In the other engineering industries, piece-work was not common.⁴

Workers in the Italian metal trades commonly receive an output bonus in addition to their basic wage. The bonuses are fixed by each undertaking according to the type of work performed by the worker and his productive capacity and the time needed to perform a given task. The bonuses must be fixed at a rate which will enable the worker to earn, under normal conditions of capacity and productivity, a bonus of not less than 20 per cent. of his contractual minimum hourly wage.

Most of the workers in the metal trades in the Scandinavian countries are paid by results. Agreements concerning piece-work

² Communication to the I.L.O. from the Finnish Metal Industries Employers' Federation, 5 July 1948.
³ Communication to the I.L.O. from the Government of France.
### TABLE XXII. PERCENTAGE OF PIECE-WORK HOURS TO TOTAL HOURS IN THE METAL TRADES IN DENMARK, FIRST QUARTER, 1950

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number of workers</th>
<th>Percentage of total hours on piece-work</th>
<th>Number of workers</th>
<th>Percentage of total hours on piece-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled male workers: Smiths and machine workers</td>
<td>14,250</td>
<td>48.5%</td>
<td>14,517</td>
<td>52.3%</td>
</tr>
<tr>
<td></td>
<td>420</td>
<td>85.0%</td>
<td>168</td>
<td>64.3%</td>
</tr>
<tr>
<td></td>
<td>55</td>
<td>66.1%</td>
<td>22</td>
<td>79.7%</td>
</tr>
<tr>
<td></td>
<td>439</td>
<td>79.0%</td>
<td>645</td>
<td>66.4%</td>
</tr>
<tr>
<td>Unskilled male workers</td>
<td>11,825</td>
<td>41.8%</td>
<td>11,744</td>
<td>40.4%</td>
</tr>
<tr>
<td>Female workers</td>
<td>4,753</td>
<td>69.9%</td>
<td>1,853</td>
<td>60.9%</td>
</tr>
</tbody>
</table>


### TABLE XXIII. PERCENTAGE OF PIECE-WORK HOURS TO TOTAL HOURS IN THE METAL TRADES IN SWEDEN, 1948

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of workers</th>
<th>Percentage of total hours on piece-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron and steel fabrication</td>
<td>23,370</td>
<td>63.5%</td>
</tr>
<tr>
<td>Mechanical engineering workshops</td>
<td>102,191</td>
<td>64.6%</td>
</tr>
<tr>
<td>Shipyards</td>
<td>17,646</td>
<td>83.8%</td>
</tr>
<tr>
<td>Automobile production</td>
<td>5,581</td>
<td>62.3%</td>
</tr>
<tr>
<td>Repair shops</td>
<td>6,551</td>
<td>10.9%</td>
</tr>
<tr>
<td>Other mechanical engineering shops</td>
<td>72,413</td>
<td>64.8%</td>
</tr>
<tr>
<td>Electro-chemical industry</td>
<td>23,959</td>
<td>56.2%</td>
</tr>
<tr>
<td>Other metal processing</td>
<td>11,859</td>
<td>52.9%</td>
</tr>
<tr>
<td>State-owned mechanical engineering workshops, electrical workshops and shipyards</td>
<td>14,640</td>
<td>64.6%</td>
</tr>
</tbody>
</table>


Rates are made chiefly between the parties concerned in each plant and generally on the basis of time studies according to rules fixed by the central organisations. In a few cases premium and bonus systems are in use where operations are difficult to measure or...
where piece-rates would vary considerably because of the nature of the work or materials. Tables XXII, XXIII and XXIV show the percentages of piece-work hours worked in the metal trades in these countries in recent years. It will be noticed that most hours worked in the various branches of the industry were piece-work hours except in the case of automobile workshops in Norway and repair shops in Sweden, where in 1948 such hours amounted to only 7.7 and 10.9 per cent. of total hours respectively. In mechanical engineering workshops in Norway, no less than 95.7 per cent. of the total hours worked by adult male workers were piece-work hours.

Most workers in the Swiss metal trades are also paid by results, in some cases entirely and in others partly by the hour and partly by results. Group systems of payment by results are very little used. Most systems are based on the output of the individual workers.¹

### Table XXIV. Percentage of Piece-Work Hours to Total Hours in the Metal Trades Industry in Norway, Fourth Quarter, 1948

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total number of hours</th>
<th>Percentage of total hours on piece-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult male workers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical engineering workshops¹</td>
<td>14,744,129</td>
<td>95.7</td>
</tr>
<tr>
<td>Other mechanical engineering workshops²</td>
<td>1,512,998</td>
<td>48.5</td>
</tr>
<tr>
<td>Electrical engineering industry</td>
<td>913,688</td>
<td>57.8</td>
</tr>
<tr>
<td>Automobile workshops</td>
<td>622,458</td>
<td>7.7</td>
</tr>
<tr>
<td>Canister-making</td>
<td>202,663</td>
<td>36.7</td>
</tr>
<tr>
<td>All metal trades</td>
<td>17,995,936</td>
<td>86.1</td>
</tr>
<tr>
<td>Adult female workers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical engineering workshops¹</td>
<td>510,255</td>
<td>90.0</td>
</tr>
<tr>
<td>Other mechanical engineering workshops²</td>
<td>256,780</td>
<td>72.1</td>
</tr>
<tr>
<td>Canister-making</td>
<td>159,613</td>
<td>62.2</td>
</tr>
<tr>
<td>All metal trades</td>
<td>926,648</td>
<td>80.3</td>
</tr>
</tbody>
</table>

Source: *Arbeidslönninger, 1948*, op. cit., pp. 43, 44 and 49.

¹ Workshops belonging to the trade association. ² Workshops not belonging to the trade association.

¹ Communication to the I.L.O. from the Association patronale suisse des constructions de machines et industriels en métallurgie, and the Fédération suisse des ouvriers sur métaux et horloges, 2 Aug. 1948, and from the Association patronale suisse des constructions de machines et industriels en métallurgie, 10 May 1949.
# Extent of Application of Various Systems

## Table XXV. Proportion of Establishments with Systems of Payment by Results and Proportion of Wage Earners Paid Under Systems of Payment by Results in the Metal Trades in the United Kingdom, October 1949

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of Establishments with Payment by Results Schemes (Including Straight Piece-work)</th>
<th>Percentage of Wage Earners Paid by Results (In All Establishments)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering, shipbuilding and electrical goods:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shipbuilding and ship repairing</td>
<td>41</td>
<td>54</td>
</tr>
<tr>
<td>Marine engineering</td>
<td>56</td>
<td>49</td>
</tr>
<tr>
<td>Agricultural machinery (excluding tractors)</td>
<td>16</td>
<td>23</td>
</tr>
<tr>
<td>Boilers and boilerhouse plant</td>
<td>42</td>
<td>50</td>
</tr>
<tr>
<td>Machine tools</td>
<td>47</td>
<td>51</td>
</tr>
<tr>
<td>Stationary engines</td>
<td>71</td>
<td>63</td>
</tr>
<tr>
<td>Textile machinery and accessories</td>
<td>50</td>
<td>52</td>
</tr>
<tr>
<td>Ordnance and small arms</td>
<td>64</td>
<td>57</td>
</tr>
<tr>
<td>Constructional engineering</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td>Other non-electrical engineering</td>
<td>41</td>
<td>48</td>
</tr>
<tr>
<td>Electrical machinery</td>
<td>52</td>
<td>59</td>
</tr>
<tr>
<td>Electrical wires and cables</td>
<td>45</td>
<td>58</td>
</tr>
<tr>
<td>Telegraph and telegraph apparatus</td>
<td>67</td>
<td>62</td>
</tr>
<tr>
<td>Wireless apparatus (excluding valves and gramophones)</td>
<td>36</td>
<td>56</td>
</tr>
<tr>
<td>Wireless valves and electric lamps</td>
<td>53</td>
<td>40</td>
</tr>
<tr>
<td>Batteries and accumulators</td>
<td>56</td>
<td>63</td>
</tr>
<tr>
<td>Other electrical goods</td>
<td>41</td>
<td>50</td>
</tr>
<tr>
<td>Group total</td>
<td>41</td>
<td>51</td>
</tr>
<tr>
<td>Vehicles:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacture of motor vehicles and cycles</td>
<td>32</td>
<td>56</td>
</tr>
<tr>
<td>Motor repairers and garages</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Manufacture and repair of aircraft</td>
<td>59</td>
<td>54</td>
</tr>
<tr>
<td>Manufacture of parts and accessories for motor vehicles and aircraft</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>Locomotive manufacture</td>
<td>85</td>
<td>67</td>
</tr>
<tr>
<td>Manufacture and repair of railway carriages and wagons and trams</td>
<td>71</td>
<td>58</td>
</tr>
<tr>
<td>Carts, perambulators, etc.</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>Group total</td>
<td>17</td>
<td>48</td>
</tr>
<tr>
<td>Metal goods not elsewhere specified:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tools and cutlery</td>
<td>62</td>
<td>39</td>
</tr>
<tr>
<td>Bolts, nuts, screws, rivets, nails, etc.</td>
<td>87</td>
<td>53</td>
</tr>
<tr>
<td>Iron and steel forgings not elsewhere specified</td>
<td>49</td>
<td>45</td>
</tr>
<tr>
<td>Wire and wire manufactures</td>
<td>63</td>
<td>45</td>
</tr>
<tr>
<td>Hollow-ware</td>
<td>60</td>
<td>28</td>
</tr>
<tr>
<td>Brass manufactures</td>
<td>57</td>
<td>40</td>
</tr>
<tr>
<td>Metal industries not elsewhere specified</td>
<td>49</td>
<td>42</td>
</tr>
<tr>
<td>Group total</td>
<td>55</td>
<td>41</td>
</tr>
</tbody>
</table>

Table XXV shows the proportion of establishments which operate systems of payment by results and the proportion of wage earners paid under such systems in the various branches of the metal trades of the United Kingdom. It will be noticed from the table that payment by results is quite extensively applied in all branches of the metal trades, except in agricultural machinery (excluding tractors) and in motor repairing and garages where only 23 and 6 per cent. of the workers respectively are so paid.

In the United States the percentages of workers in the metal trades on incentive pay in 1945 and 1946 ranged from 66 in copper alloying, rolling and drawing factories to 2 in tool and die jobbing shops. In most branches of the industry, however, only about a fifth to a third of the workers were on incentive pay, as can be seen from table XXVI.

### Table XXVI. Extent of Incentive Plans for Plant Workers in Metal-Working Industries in the United States, 1945-1946

<table>
<thead>
<tr>
<th>Percentage of workers on incentive pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft engines and engine parts</td>
</tr>
<tr>
<td>Aluminum ware</td>
</tr>
<tr>
<td>Communication equipment</td>
</tr>
<tr>
<td>Copper alloying, rolling and drawing</td>
</tr>
<tr>
<td>Electro-plating, plating and polishing</td>
</tr>
<tr>
<td>Fabricated structural steel</td>
</tr>
<tr>
<td>Foundries, ferrous</td>
</tr>
<tr>
<td>Foundries, non-ferrous</td>
</tr>
<tr>
<td>Iron and steel forgings</td>
</tr>
<tr>
<td>Machine tool accessories</td>
</tr>
<tr>
<td>Machine tools</td>
</tr>
<tr>
<td>Machinery</td>
</tr>
<tr>
<td>Oil burners, hot water and steam heating apparatus</td>
</tr>
<tr>
<td>Power boilers and associated products</td>
</tr>
<tr>
<td>Radios, radio equipment (except tubes) and phonographs</td>
</tr>
<tr>
<td>Sheet metal</td>
</tr>
<tr>
<td>Small arms</td>
</tr>
<tr>
<td>Stamped and pressed metal</td>
</tr>
<tr>
<td>Stoves and ranges</td>
</tr>
<tr>
<td>Tanks</td>
</tr>
<tr>
<td>Tool and die jobbing shops</td>
</tr>
</tbody>
</table>


### Mining

Statistical information regarding the extent of payment by results in the mining industry is available only in respect of...
Sweden, the United Kingdom and the United States. It is known, however, that the great majority of miners in Canada are paid in direct relation to the amount of work performed. In coal mining, contract payments are common but are generally restricted to workers at the coal face, whereas in metal mining, incentive bonus plans are applied to the majority of workers engaged in underground operations. A similar position exists in Pakistan where piece-work is applied to the whole industry except in the case of underground chrome mines. In Sweden, 81.9, 62.8 and 60.7 per cent. of total hours were worked on piece-work in metal ore mining, coal mining and quarrying respectively.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Percentage of establishments with payment by results schemes (including straight piece-work)</th>
<th>Percentage of wage earners paid by results (in all establishments)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron ore mining and quarrying</td>
<td>74</td>
<td>37</td>
</tr>
<tr>
<td>Stone quarrying and mining</td>
<td>43</td>
<td>20</td>
</tr>
<tr>
<td>Slate quarrying and mining</td>
<td>71</td>
<td>65</td>
</tr>
<tr>
<td>Clay, sand, gravel and chalk pits</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Other mining and quarrying</td>
<td>51</td>
<td>28</td>
</tr>
<tr>
<td>Group total</td>
<td>42</td>
<td>30</td>
</tr>
</tbody>
</table>


It will be observed that systems of payment by results are applied more extensively in iron ore quarrying and mining than in other mining operations in the United Kingdom. In the coal mining industry in October 1949, 39 per cent. of all male workers were employed on piece-work or on other systems of payment by results.

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1 Communication to the I.L.O. from the Government of Canada, 2 Jan. 1951.
2 Communication to the I.L.O. from the Government of Pakistan, 22 Nov. 1950.
3 Länestatsistik Årsbok för Sverige, 1948, pp. 84-85.
4 Communication to the I.L.O. from the Government of the United Kingdom, 1 Dec. 1950.
In the case of the United States a survey in 1945-1946 found that 22 per cent. of workers in the bituminous coal (underground) mining industry were paid on an incentive basis. Sixty-one per cent. of all the undertakings studied in this industry operated various systems of payment by results, the most common being individual piece-work, as no less than 58 per cent. out of the 61 per cent. applied this system.¹

Textiles

Piece-work is the principal method of payment in the textile industry in Belgium, Denmark, Hungary, the Netherlands, Norway, Sweden, Switzerland and the United Kingdom. In some cases a bonus system is also applied, chiefly in the finishing and dyeing sections of the industry. In the Netherlands at least 90 per cent. of the industry works on the basis of a tariff rate or bonus, the latter particularly in the finishing section. The spinning, knitting and weaving sections of the wool and cotton industries work nearly without exception on the basis of tariff rates. In the jute and flax industry in the United Kingdom bonus systems have been introduced in the last few years on the latest type of spinning frames.²

Table XXVIII shows the percentages of men and women workers on piece-work in the textile industry in certain countries.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Denmark</th>
<th>Hungary</th>
<th>Norway</th>
<th>Sweden</th>
<th>United Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>79</td>
<td>82</td>
</tr>
<tr>
<td>Women</td>
<td>58</td>
<td>55</td>
<td>54</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>


¹ Monthly Labor Review, loc. cit., p. 536.
² Cf. Questionnaire sent out by the International Federation of Textile Workers' Associations, Manchester, and Answers Submitted by Affiliated Organisations (Manchester, 1948), paragraph 16; and supplement (the Netherlands), p. 4.
TABLE XXIX. PROPORTION OF ESTABLISHMENTS WHICH OPERATED SYSTEMS OF PAYMENT BY RESULTS AND THE PROPORTION OF WORKERS WHO WERE PAID BY RESULTS IN THE TEXTILES INDUSTRIES IN THE UNITED KINGDOM IN OCTOBER 1949

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of establishments with payment by results schemes (including straight piece-work)</th>
<th>Percentage of wage earners paid under payment by results systems (in all establishments)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton spinning, doubling, etc.</td>
<td>93</td>
<td>42</td>
</tr>
<tr>
<td>Cotton weaving, etc.</td>
<td>93</td>
<td>63</td>
</tr>
<tr>
<td>Woollen and worsted</td>
<td>83</td>
<td>42</td>
</tr>
<tr>
<td>Rayon, nylon, etc., production</td>
<td>71</td>
<td>40</td>
</tr>
<tr>
<td>Rayon, nylon, etc., weaving and silk</td>
<td>84</td>
<td>54</td>
</tr>
<tr>
<td>Linen and soft hemp</td>
<td>89</td>
<td>36</td>
</tr>
<tr>
<td>Jute</td>
<td>96</td>
<td>33</td>
</tr>
<tr>
<td>Rope, twine and net</td>
<td>48</td>
<td>40</td>
</tr>
<tr>
<td>Hosiery, and other knitted goods</td>
<td>91</td>
<td>70</td>
</tr>
<tr>
<td>Lace</td>
<td>81</td>
<td>45</td>
</tr>
<tr>
<td>Carpets</td>
<td>81</td>
<td>59</td>
</tr>
<tr>
<td>Narrow fabrics</td>
<td>79</td>
<td>43</td>
</tr>
<tr>
<td>Made-up textiles</td>
<td>56</td>
<td>36</td>
</tr>
<tr>
<td>Textile finishing, etc.</td>
<td>59</td>
<td>46</td>
</tr>
<tr>
<td>Other textile industries</td>
<td>52</td>
<td>41</td>
</tr>
<tr>
<td>Group total</td>
<td>80</td>
<td>48</td>
</tr>
</tbody>
</table>


TABLE XXX. EXTENT OF INCENTIVE PLANS FOR PLANT WORKERS IN THE TEXTILES INDUSTRIES IN THE UNITED STATES, 1945-1946

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of workers on incentive pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton textiles</td>
<td>35</td>
</tr>
<tr>
<td>Hosiery, fully fashioned</td>
<td>73</td>
</tr>
<tr>
<td>Hosiery, seamless</td>
<td>68</td>
</tr>
<tr>
<td>Rayon and silk textiles</td>
<td>35</td>
</tr>
<tr>
<td>Textile dyeing and finishing</td>
<td>22</td>
</tr>
<tr>
<td>Woollen and worsted textiles</td>
<td>34</td>
</tr>
</tbody>
</table>


More detailed information in regard to the extent of application of systems of payment by results in the different branches of the textile industry is given in tables XXIX and XXX. In respect of the United Kingdom and the United States it will be noticed that systems of payment by results are extensively applied in the
industry in the United Kingdom but that in the United States, with the exception of hosiery factories, only about one third of the workers in the cotton, rayon, silk and woollen industries are on incentive pay.

Transport

Systems of payment by results are applied to only a small extent in the transport industry in most countries. In the Scandinavian countries, on the other hand, they are quite extensively applied. In these and certain other countries workers in railway and other transport workshops and workers on the docks are frequently paid by piece-rates. For example, repair and construction workshop employees are so paid in Denmark, Finland, Norway, Pakistan and Sweden, while certain dock workers are on piece-work in Denmark, Ireland, New Zealand and the United Kingdom. Truck and bus drivers are sometimes paid on a mileage basis, as in some areas in Canada. In Denmark in the first quarter in 1950, the percentages of total hours worked on piece-work by unskilled male warehouse workers and dock workers amounted to 4 and 68 respectively in Copenhagen, and 8.5 and 65.1 respectively in the rest of the country.\(^1\) In Sweden in 1948 the percentages of total hours worked on piece-work in private and municipal transport amounted to 46.7 and 5.6 respectively.\(^2\)

Other Industries

Payment by results is also applied in some countries in varying degree in certain industries other than those mentioned above. For example, it is applied in the chemical, food, furniture, leather and rubber products and paper industries to some extent in Australia, Canada, Italy, the Scandinavian countries, the United Kingdom and the United States; and quite extensively on tea, rubber and other plantations in Ceylon and some other countries.

Summary

While the majority of workers in most countries are paid by time, substantial numbers in many countries are paid by results.

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Thus, the percentage of total hours worked on piece-work in certain recent years in the industries surveyed was 70.0 in Hungary, 58.0 in Sweden, 52.5 and 51.3 in the case of men and women workers respectively in Norway, 39.7 in Denmark and 37.0 in Western Germany. In the United States 30 per cent. of the workers in plants surveyed in certain manufacturing and non-manufacturing industries were found to be on incentive pay in 1945-1946, while in the United Kingdom 29 per cent. of the workers in establishments surveyed in October 1949 were paid by results. In Israel a recent survey covering about one third of the workers employed in establishments with ten workers and above found that about 20 per cent. of these workers were under incentive schemes. In Australia, in September 1949, a sample survey showed 10.9 per cent. of employees in private firms (excluding rural and small firms) as under piece-work or under a bonus system based on output. Though corresponding statistics are lacking, the information available indicates that many workers in certain countries, such as Czechoslovakia, Finland, France and the Netherlands, are paid by results but that few workers are so paid in many other countries, such as Brazil, Greece, India, Pakistan, Turkey and Uruguay.

But even in some countries where payment by results is not common a large proportion of the workers in certain industries are paid by results. For example, in Australia, although only 10.9 per cent. of the employees in the establishments surveyed in September 1949 were paid by results, no less than 39.6, 29.0, 25.2 and 17.0 per cent. of the manual workers in the textiles, mining, clothing and engineering industries, respectively, were so paid.

In most countries systems of payment by results are most extensively applied in the textiles, clothing and metal trades; to a moderate extent in the leather and rubber products, and mining industries, and in commerce; and generally only to a small extent in the chemical, building, paper and transport industries. In a few countries, however, such systems are applied extensively in the building, chemical and paper industries or on plantations.

Generally speaking, skilled workers are paid more frequently by results than unskilled workers and women more frequently than men.

The number of workers paid by results generally increases with the size of the undertaking—possibly because the larger undertakings are engaged in mass production operations which are suited to the introduction of such systems and possibly because these undertakings are more able to afford the employment of the
administrative and engineering staff which is necessary to the successful operation of these systems.

Piece-work on either a money or a time basis is by far the most common of the various systems in use. While money piece-work is still the more generally used, there appears to be an increasing tendency for firms which are introducing payment by results for the first time to prefer time piece-work.
CHAPTER IV

EXAMPLES OF SYSTEMS APPLIED IN CERTAIN INDUSTRIES

Apart from the information given in the preceding chapter concerning the relative prevalence of straight piece-work as compared with all other systems of payment by results taken together, little is known of the relative frequency of use of the different types of systems. Still less is known of the detailed variations which particular firms commonly introduce in order to adapt the standard systems to their own special requirements. In selecting examples of the systems used in different industries, it is consequently not possible to indicate to what extent such examples may be representative of current practice in these industries. Information on this point would of course be of considerable assistance to employers and workers who are considering the advisability of adopting or retaining a particular system; and it is to be hoped that Governments will find it possible to give effect to the suggestion of the I.L.O. Meeting of Experts on Systems of Payment by Results that they should collect statistics on the respective use of payment by time and payment by results, and that in doing so they will find it possible to collect information on the relative frequency of use of different systems of payment by results in particular industries.

For convenience of reference the examples described below are classified in each case, as were the systems described in Chapter I, in four groups, according to the way in which the workers' earnings vary in relation to output. The use of this criterion for purposes of classification does not imply any judgment as to the importance which should be attached to it in any particular case: as is emphasised elsewhere in the report\(^1\), a variety of considerations need to be taken into account in choosing a system of payment by results.

\(^1\) See pp. 180-181, paragraphs 21-27.
A description of systems of payment by results used in the building industry in various countries was given in an article in the International Labour Review.\(^1\) A description follows of two systems which were not included in this article, the first in South Africa and the second in the United Kingdom.

**A System with Earnings Varying in the Same Proportion as Output—South Africa**

The management of a South African building firm first of all calculates the average output which a man ordinarily attains per day and then adds a small percentage to this output. The time to be allowed on each particular job is then determined. Extra pay is earned every time any worker does the job in less than the time thus allowed.

In the case of bricklaying, the management calculated that the average bricklayer normally laid about 400 bricks per day. The number which was fixed by the management to be laid under the bonus system was 625 per day. Since the introduction of this scheme the average number of bricks laid per day has been 800 to 900 and in some cases as many as 1,000 a day. Consequently, the bricklayers have saved approximately a day a week on the time allowed by the management. If a day per week is saved, the worker draws an extra day's pay in addition to his weekly wage.\(^2\)

**A System with Earnings Varying Proportionally Less than Output—United Kingdom**

The following are the provisions of a bonus scheme operated by a builder in the United Kingdom on all types of work.

*Part 1.*

1. A schedule will be prepared for all general building operations giving the estimated labour costs without travelling expenses, insurances or other extras, reduced to a price per unit. This will be the target on which all bonusing will be based.

2. Any work which cannot be measured will be given a target, probably from the original estimate, if any, before the work is commenced.

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\(^1\) See "Payment by Results in the Building Industry", Vol. LXIII, No. 1, Jan. 1951, pp. 64-78.

(3) The above schedule will be subject to the addition or deduction of a percentage to make it fit in with each particular contract or job, according to quantity or condition of the work. This percentage will be set before work is commenced. The schedule will be subject to revision up or down from time to time.

(4) For the purpose of bonusing, the men will be split up into gangs, probably one gang to each contract or job.

(5) Each week a surveyor will measure the quantity of work done by each gang, and will estimate the target figure from the schedule, making the necessary percentage adjustments. Any saving between this and the labour costs of the gang for that week will be split up as follows:

- Men, for immediate distribution: 50 per cent.
- Contribution from the Company as set out in para. (7): 10 per cent.
- To pay the cost of operating the scheme and reduce the cost of building operations: 40 per cent.

(6) The payments to each gang will be split up as follows and included with the wages for the following week:

- General foreman: 7 parts each man
- Foreman and chargehands: 6
- Tradesmen and gangers in charge of men: 5
- Labourers and trainees: 4
- Apprentices: 3
- Boys under 18 years of age: 2

(7) An amount equal to 20 per cent. of each man's weekly bonus payments will be credited to the workman's bonus account, being a contribution from the Company towards the following:

- (A) The cost of rectifying any bad or inferior workmanship executed by the particular man, up to a maximum of the total of this contribution standing to this man's credit at any particular time.
- (B) Any amount over £5 will be used to make up the weekly pay when no bonus has been earned, through circumstances beyond the man’s control.
- (C) Any amount over £5 will be paid to the man immediately before his annual holiday.
- (D) A man being discharged by the Company other than through misconduct shall be paid the whole of the amount standing to his credit in this fund.
- (E) A man who is discharged through misconduct will not be entitled to any payment from this fund.
- (F) This fund to be treated entirely as a contribution from the Company and no employees will be legally entitled to draw from it. All payments to be made at the discretion of the Directors.

(8) The office staff will not take part in this scheme, but to provide for the non-producers working from the yard the following scheme will be in force:

- A sum equal to 4 per cent. of the total bonus earned on all jobs will be split up weekly as follows:
  - Storekeeper: 5 parts
  - Drivers: 3
  - Yard boy: 1

which will ensure that the bonus paid to them is related to output.
(9) A workmen's committee will be formed to thrash out any difficulties or dispute which may arise through this scheme.

Part 2.

The general principles in the bonus scheme as set out in Part 1 above are used for all classes of work. Wherever possible, work is measured on completion even down to the smallest job and a suitable percentage added to suit the particular work done.

Generally speaking, this system of measurement is used for all work in excess of one day's duration, but for minor jobbing, such as roof repairs, tap washers, drain clearing, etc., the following system is resorted to.

Immediately instructions are received from the customer for this type of work, it is entered in the firm's jobbing book by a responsible person, who at the same time assesses the probable hours required by the man or men who will carry out this work; this is entered in a separate column on the side, also on the jobbing sheet which is handed to the workman. This number of hours forms the target for the workman to compete against and any saving is split up in the same manner as the saving on the other work.

Should, however, the man fail to beat the target but give a satisfactory reason for this together with a detailed explanation of the work he did, the target figure may be increased if the person in charge considers the work has been done within a reasonable time and that the man is entitled to some bonus recognition. As an example, the plumber may be given five addresses where tap washers are required and is allowed one hour for each. He may complete the work in three hours, thereby saving two hours on his total target.¹

Chemical Industry

A System with Earnings Varying Proportionally Less than Output—Italy

In the Italian chemical industry systems of payment by results are used chiefly in the production of artificial fibres. An agreement concluded on 14 January 1948 by an Italian firm, Montecatini and Associates, with the trade union concerned provides that under certain conditions a bonus is to be paid when a specified level of production is reached. The bonus is proportionate to the level of production achieved and the productivity of labour. The formula according to which this principle is applied is as follows:

\[ P = B \times ip \times ir, \]

where \( P \) is the bonus expressed as a percentage of the basic wage or salary;

\( B \) is the coefficient to be applied when equipment is used 100 per cent., and when the productivity of labour is 100 per cent. (this coefficient

was originally fixed at 16 per cent., but was raised to 26 per cent. from 1 January 1950);

\( ip \) is the degree of utilisation of equipment as measured by the ratio of actual output to maximum possible output;

\( ir \) is the productivity of labour, as measured by the ratio of the number of hours technically necessary to the number of hours actually worked.

According to the agreement of 24 March 1948 which was concluded between the Company and the Central Works Committee and the Central Management Council, \( ip \) and \( ir \) are to be determined by the management in agreement with the representatives of the workers.

The following examples show the manner in which the bonus is calculated:

1. \( B = 26 \text{ per cent. (as agreed)}; \)
   \( ip = 1 \) (when the utilisation of equipment is 100 per cent.);
   \( ir = 1 \) (when the productivity of labour is 100 per cent.);
   \( P = (26 \times 1 \times 1) \text{ per cent.} = 26 \text{ per cent.} \)

2. \( B = 26 \text{ per cent.}; \)
   \( ip = 0.8; \)
   \( ir = 0.9; \)
   \( P = (26 \times 0.8 \times 0.9) \text{ per cent.} = 18.72 \text{ per cent.} \)

The workers would, therefore, receive bonuses of 26 and 18.72 per cent. of their minimum contractual basic pay in these two cases.\(^1\)

**A System with Earnings Varying Proportionally More than Output—Israel**

A group piece-work system with guaranteed minimum wage has been in use for a long time at the Portland Cement Factory in Israel in the shipping department of the factory. Each group consists of the man who operates the bag filling and closing machine and of three or four porters who forward the bags from the landing point of the chute to the delivery truck or the railway wagon. Each member of the group operates the filling machine in turn, thus maintaining equal effort and justifying equal pay within the group. In view of the physically fatiguing character of the job, working time is fixed at six hours including 1 1/4 hours for rest periods and showers. The group is given a production standard for this length of time which corresponds to roughly 85 per cent. utilisation of the machine capacity (or 66 per cent. of over-all time). Any production above this rate is paid at 125 per

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\(^1\) Communication to the I.L.O. from the Italian Confederation of Trade Unions, affiliated to the International Confederation of Free Trade Unions, 10 Nov. 1950.
cent. of the time saved, on the assumption that the time necessary to produce the additional output would, at normal speed, require overtime incurring 25 per cent. overtime pay. Work interruptions are paid on an hourly basis at about 85 per cent. of the hourly rate.¹

Systems with Earnings Varying in Proportions which Differ at Different Levels of Output—A Firm in Norway

A Norwegian firm (Norsk Siporex Fabrik) producing prefabricated reinforced concrete slabs operates a group piece-work system with progressively increasing piece-rates. The higher the rate of output of a product per week, the greater is the payment per unit. An example of the rates applied is given in the following table.

<table>
<thead>
<tr>
<th>No. of units per week</th>
<th>Kroner per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1,990</td>
<td>0.45</td>
</tr>
<tr>
<td>1,991-2,490</td>
<td>0.47</td>
</tr>
<tr>
<td>2,491-2,990</td>
<td>0.55</td>
</tr>
<tr>
<td>2,991-3,490</td>
<td>0.59</td>
</tr>
<tr>
<td>3,491-3,990</td>
<td>0.63</td>
</tr>
<tr>
<td>3,991-4,990</td>
<td>0.87</td>
</tr>
</tbody>
</table>

Each worker receives remuneration in proportion to the number of hours worked during the week. A guaranteed minimum wage is paid.²

A similar system is operated by A/S Christiania Portland Cementfabrik (Norway).³ A bonus is paid when production exceeds 16,000 tons per month. The bonus is calculated as follows:

<table>
<thead>
<tr>
<th>Output in tons</th>
<th>Kroner per ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>16,001 to 17,000</td>
<td>1.50</td>
</tr>
<tr>
<td>17,001 to 18,000</td>
<td>2.50</td>
</tr>
<tr>
<td>18,001 to 19,000</td>
<td>3.50</td>
</tr>
<tr>
<td>19,001 to 20,000</td>
<td>4.50</td>
</tr>
<tr>
<td>Above 20,000</td>
<td>5.50</td>
</tr>
</tbody>
</table>

The premium is distributed among the workers engaged in direct production in proportion to the number of hours worked. In the same factory a group of four shift workers receives an additional premium according to an accelerating scale based upon the yearly production as long as the factory operates four shifts and the yearly production exceeds 200,000 tons.

¹ Communication to the I.L.O. from the Government of Israel, 5 Mar. 1951.
Clothing Industry

A System with Earnings Varying Proportionally Less than Output—South Africa

Details of a system which is applied in a clothing firm in South Africa are given below.

Each garment is given a number of points. For instance, a very high quality garment is given 40 points. This means that there are 40 different operations performed on this particular garment before it is completed. Less complicated garments would have fewer operations and fewer points.

The time spent on each operation is studied for each pay group and a weekly number of points is then fixed. In the time study of these operations an average worker is used and the worker concerned agrees to her basic allocation.

As a consequence of discussions with the employees the following basis was agreed upon:

<table>
<thead>
<tr>
<th>Basic wage and cost-of-living allowance per week</th>
<th>Total points per week to earn these amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>£  s.  d.</td>
<td></td>
</tr>
<tr>
<td>2   5  0</td>
<td>395</td>
</tr>
<tr>
<td>2   12 6</td>
<td>475</td>
</tr>
<tr>
<td>2   16 3</td>
<td>520</td>
</tr>
<tr>
<td>3   0  0</td>
<td>560</td>
</tr>
<tr>
<td>3   11 3</td>
<td>685</td>
</tr>
<tr>
<td>3   15 0</td>
<td>725</td>
</tr>
<tr>
<td>4   2  6</td>
<td>800</td>
</tr>
<tr>
<td>4   10 0</td>
<td>890</td>
</tr>
<tr>
<td>4   19 6</td>
<td>970</td>
</tr>
<tr>
<td>5   8  9</td>
<td>1,060</td>
</tr>
<tr>
<td>above 5  8  9</td>
<td>1,080</td>
</tr>
</tbody>
</table>

The worker is paid extra for each point above the basic total, but no deduction is made from her wage should she not produce her basic total.

Employees are arranged in groups of three. A beginner (in the £2 5s. Od. per week class) is teamed with a worker in the £3 7s. 6d. to £4 2s. 6d. per week group and with one in the £5 8s. 9d. or over group. For example, the first worker on a garment (the beginner) may perform approximately eight operations, the second worker approximately 12 operations and the third worker about 20 operations to complete the type of garment mentioned above. At the end of the week, the garments produced by the team are multiplied by the number of points applicable to get the total number of points produced by the team. Each employee in the team is then allocated her personal number of points according to the
rates fixed for the team, in this instance, in the ratio of 8 : 12 : 20. Each worker is paid one penny per point for every point she has earned over her basic number.¹

A System with Earnings Varying in Proportions which Differ at Different Levels of Output—Israel

In one large factory in Israel producing working and sports clothes the following bonus system is used:

A minimum daily output bonus is fixed for all sewing jobs, thereby guaranteeing minimum daily earnings. For outputs above minimum a bonus is paid. The bonuses paid for mounting back pockets on long trousers illustrate the method of application of the system.

### OUTPUT AND BONUS RATES PER DAY OF EIGHT HOURS

<table>
<thead>
<tr>
<th>Output</th>
<th>Bonus in mils</th>
<th>Accumulated bonus in mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 195 pieces</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Every additional 15 pieces up to 285</td>
<td>10</td>
<td>up to 120</td>
</tr>
<tr>
<td>Every additional 5 pieces up to 300</td>
<td>5</td>
<td>up to 135</td>
</tr>
<tr>
<td>Every additional 4 pieces up to 312</td>
<td>5</td>
<td>up to 150</td>
</tr>
<tr>
<td>Every additional 3 pieces up to 336</td>
<td>5</td>
<td>up to 190</td>
</tr>
<tr>
<td>Every additional 2 pieces up to 360</td>
<td>5</td>
<td>up to 250, = maximum</td>
</tr>
</tbody>
</table>

¹ 1,000 mils equal one Israeli pound.

Skill allowances were granted to a number of female workers prior to the introduction of the bonus system. Those receiving such allowances are expected to produce at a rate not below the output rate the bonus for which amounts to the same sum as the skill allowance. If they produce at less than this rate they lose both allowance and bonus.

In the period under review, bonuses earned added, on the average, 45 to 50 per cent. to the daily earnings of the sewing girls. Considerable increases in production have taken place since the introduction of the bonus system. In the above operation, for instance, the average daily performance rose from 240 to 345 pieces.²

² Communication to the I.L.O. from the Government of Israel, 5 Mar. 1951.
Iron and Steel Industry

Systems with Earnings Varying in Proportions which Differ at Different Levels of Output

United Kingdom.

In the pig-iron and iron and steel manufacturing industries in the United Kingdom, the payment of nearly all of the production and maintenance workers is related to output either by a straight tonnage rate or by a tonnage bonus addition to a shift rate, and only a small proportion are paid by plain time rates. The output to which payment is related is either that of the section of the works in which the worker is employed, that of the whole department, or that of the whole works.

In the case of bricklayers and masons, for example, wages as regulated by a collective agreement which applies to most of the works in England and Scotland consist of an hourly rate, a fluctuating cost-of-living payment and a tonnage bonus. The tonnage bonus is paid on all output, beginning at the first ton, but the rate per ton increases sharply after a certain standard tonnage has been passed, and continues to increase gradually as the output rises. It is subject to a minimum yield of 10s. a week. The tonnage bonus element was originally formed by converting a sum of 7s. per full normal week into a tonnage rate based upon the average tonnage output for productive shifts of saleable finished material (pig-iron or finished steel) over a period to be agreed upon at each works. This average tonnage output is designated the "standard tonnage". The sum of 7s. divided by the "standard tonnage" gives the standard tonnage bonus rate for all tonnage up to the "standard tonnage". When the "standard tonnage" is exceeded, a basic tonnage bonus rate is ascertained by dividing one shilling by the tonnage represented by the first "step" of 4 per cent. of the "standard tonnage"; and for each subsequent "step" of 4 per cent. over the "standard tonnage" the bonus rate becomes progressive by adding 10 per cent. of the basic tonnage bonus rate. No alteration is to be made in the "standard tonnage" or in the tonnage bonus rates unless sought by either side on the ground that there has been a definite change of practice or an alteration in the working conditions or working appliances so as to affect the facilities for working.1

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1 Communication to the I.L.O. from the Government of the United Kingdom, 1 Dec. 1950.
**Example**

Standard tonnage, say 4,000 tons per normal week.

Standard tonnage bonus rate for all tonnage up to 4,000 tons = \( \frac{7s.}{4,000} = 0.021d. \)

Basic tonnage bonus rate \( \frac{1s.}{4\% \text{ of } 4,000 \text{ tons} = 160 \text{ tons}} = 0.075d. \) per ton.

Progressive bonus rates:

For first 160 tons above "standard tonnage" of 4,000 tons at 0.075d. per ton = 1s.;

For second 160 tons above "standard tonnage" at 0.0825d. per ton = 1s. 1.2d.;

For third 160 tons above "standard tonnage" at 0.090d. per ton = 1s. 2.4d.;

and so on, the tonnage bonus rate rising by 10 per cent. of the basic tonnage bonus rate of 0.075d. for each "step" of 160 tons.

Thus, if the total output in a week is 5,600 tons, the tonnage bonus paid in that week to each man is calculated as follows:

<table>
<thead>
<tr>
<th>Output</th>
<th>Bonus rate per ton</th>
<th>Tonnage bonus paid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 4,000 tons</td>
<td>0.021 d.</td>
<td>7 s. 0 d.</td>
</tr>
<tr>
<td>First 160 tons over 4,000</td>
<td>0.075 d.</td>
<td>1 s. 0 d.</td>
</tr>
<tr>
<td>Second</td>
<td>0.0825 d.</td>
<td>1 s. 1.2 d.</td>
</tr>
<tr>
<td>Third</td>
<td>0.09 d.</td>
<td>1 s. 2.4 d.</td>
</tr>
<tr>
<td>Fourth</td>
<td>0.0975 d.</td>
<td>1 s. 3.6 d.</td>
</tr>
<tr>
<td>Fifth</td>
<td>0.105 d.</td>
<td>1 s. 4.8 d.</td>
</tr>
<tr>
<td>Sixth</td>
<td>0.1125 d.</td>
<td>1 s. 6 d.</td>
</tr>
<tr>
<td>Seventh</td>
<td>0.12 d.</td>
<td>1 s. 7.2 d.</td>
</tr>
<tr>
<td>Eighth</td>
<td>0.1275 d.</td>
<td>1 s. 8.4 d.</td>
</tr>
<tr>
<td>Ninth</td>
<td>0.135 d.</td>
<td>1 s. 9.6 d.</td>
</tr>
<tr>
<td>Tenth</td>
<td>0.1425 d.</td>
<td>1 s. 10.8 d.</td>
</tr>
</tbody>
</table>

Total tonnage bonus paid in the week to each man when the output of the works is 5,600 tons . . . 21 s. 6 d.

**India.**

The Tata Iron and Steel Company Limited, at Jamshedpur, India, operates a plant-wide scheme which applies to all production, maintenance and service workers in the plant, and various departmental schemes which apply to the workers in the different departments.

In the case of the plant-wide scheme, the bonuses payable are based on the average of the production of a 12-month period consisting of the current month's production plus the production of the preceding 11 months. By mutual agreement, and having
regard to past production, a tonnage was agreed upon at which 50 per cent. above basic wages would be paid to all production workers and 40 per cent. to all maintenance and service workers throughout the plant. Higher bonuses are paid for tonnages above, and lower bonuses for tonnages below, this target of 61,200 tons of finished steel per month. The bonus paid to production workers is 10 per cent. higher than that paid to maintenance and service workers.\(^1\)

The bonuses earned under the departmental schemes are in addition to the plant-wide performance bonuses. The departmental bonuses are based on the measurement of the work required to obtain the best production with an adequate number of workers. A bonus of 80 per cent. above the basic wage is paid for reaching 100 per cent. performance. All machines have a capacity output which is expressed as production per hour or per shift. If they are well looked after and worked without loss of time over that allowed for unavoidable delays, the capacity output can be reached and maintained. In determining the capacity output for each of the various machines, detailed time study of all the factors influencing production is made and due allowances for permissible relaxation and personal needs are incorporated in the time standards.

On the basis of these time studies, bonus is paid on the efficiency of equipment utilisation. This bonus is referred to as the "equipment utilisation" bonus and 50 per cent. above the basic wage is paid for reaching capacity output of the equipment.

The Company has pointed out that the workers' capacity to earn more is dependent mainly on their own productivity, but that in comparison with modern steel works elsewhere in the world, the labour force at Jamshedpur is about three times what it should be; allowing for the greater mechanisation of similar plants abroad and for climatic and other factors, there is, in the Company's view, obvious scope for a considerable reduction in manpower and for a corresponding increase in the workers' earning capacity without

\(^1\) At the request of the union, the Company agreed to maintain complete records and to undertake detailed studies in the plant with the object of assessing the working of the performance bonus scheme, as well as the production and employment potential of each department, and of providing correct and reliable data on which to base such modifications of, or additions to, the scheme as may at any time be agreed upon between the Company and the union. The plant-wide performance bonus is a reward for the combined efforts of all the workers throughout the plant and as such measures the plant's over-all efficiency. To give full recognition for individual and group efforts the management agreed to introduce the departmental schemes.
causing any undue strain on them. A labour utilisation bonus is therefore paid in an effort to improve this situation. This bonus amounts to 30 per cent. above the basic wage for 100 per cent. labour utilisation. It is computed by applying to the bonus earned for equipment utilisation a multiplying factor which varies from 1 to 1.6 in accordance with the degree of labour utilisation. For 100 per cent. labour and equipment utilisation the total bonus earned, therefore, is $1.6 \times 50 = 80$ per cent. of the basic wage. This particular part of the scheme is so devised that the greater part of any savings in wages which result from the reduction of the number of men employed goes to the benefit of the remaining employees.

In the major producing units, such as the cogging mill, the sheet, bar and billet mill, and the sheet, plate and rod mills, where the efficiency of equipment utilisation is an important factor, the 80 per cent. bonus above the basic wage which is payable to producing and maintenance labour is split into two parts: an equipment utilisation bonus of 50 per cent. of the basic wage and a labour utilisation bonus of 30 per cent. The bonuses are awarded on the principles mentioned above. In all other units, where the turnover is dependent on manual operations or on machine operations with manual operations predominating, the bonus of 80 per cent. is incorporated in a combined equipment and utilisation bonus.

The following is an account of the way in which the scheme is applied in steel melting shop No. 3 which works three continuous shifts with a standard labour force of 1,655 operating, mechanical and electrical workers.

**Principles of Payment of the Bonus**

The bonus earned by the workers attached to individual furnaces is based on the furnace utilisation index of each furnace. The bonus earned by the workers who are responsible for the mechanical and electrical equipment of the furnaces and accessories is based on shop performance as measured by the shop utilisation index.

**Method of Calculation.**

\[
(a) \text{Furnace utilisation index} = \frac{\text{total standard furnace hours}}{\text{total available furnace hours}} \times 100; \]

\[1\] The standard furnace hours are determined by the application of standards (expressed as tons per furnace hour), furnace by furnace, to the daily production data. The total available furnace hours are determined from the total number of furnace hours in a month, after deducting the hours for which the furnace is under repair.
systems applied in certain industries

(b) Shop utilisation index = \frac{\text{total standard furnace hours in the month}}{2.7 \times 24 \times \text{number of days in the month}}

Method of Awarding Bonus

(a) Each furnace operating staff, including the corresponding gas producer staff, is awarded a bonus according to the furnace utilisation index each month. The bonus percentage earned above basic wage is \frac{3}{2.7} times the bonus as given in the bonus table for furnace equipment utilisation.

(b) The operating staff common to all the furnaces is paid bonus on the bonus of each individual furnace and on the number of shifts.

Example.

<table>
<thead>
<tr>
<th>Furnace</th>
<th>No. of shifts</th>
<th>Bonus</th>
<th>Bonus x number of shifts</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90</td>
<td>25</td>
<td>2,250</td>
</tr>
<tr>
<td>B</td>
<td>90</td>
<td>20</td>
<td>1,800</td>
</tr>
<tr>
<td>C</td>
<td>60</td>
<td>15</td>
<td>900</td>
</tr>
<tr>
<td>D</td>
<td>30</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>270</td>
<td></td>
<td>4,950</td>
</tr>
</tbody>
</table>

The bonus earned by the common operating staff therefore = \frac{4,950}{270} = 18.3 per cent. of the basic wage.

(c) The staff responsible for the mechanical and electrical equipment of the steel melting shops is paid a bonus based on the shop utilisation index.

(d) Supervisors responsible for other departments in addition to the steel melting shop are paid bonus on the degree of responsibility and manpower of the department under their supervision.

Laundry Industry

A System with Earnings Varying in the Same Proportion as Output—United Kingdom

The bonus and control scheme which has been installed in several laundries in the United Kingdom consists primarily in applying bonus incentives to encourage the operatives to increase

1 The factor 2.7 is the average number of furnaces expected to be in operation during a month (at 100 per cent. normal performance).
2 This adjustment is necessary to enable these workers to earn full bonus up to 2.7 average furnaces in operation, that is, 100 per cent. normal performance.
3 Communication to the I.L.O. from the Tata Iron and Steel Company Limited, Jamshedpur, India, Mar. 1951.
their output together with the introduction of control sheets to enable the management to exercise an effective control over labour costs throughout the laundry, thereby keeping costs down to a minimum. The basis of the control and bonus scheme is the establishment of correct standard times for doing each operation throughout the laundry; for this purpose every element in each job is timed by a stop-watch, allowances being made for the varying speeds and effectiveness of the different operators, and a total time is arrived at in which a normal operator can and should perform the operation. This means that the time taken for the job during the study may have to be adjusted by a rating factor, since the time actually taken may not represent the time in which the job could and should be done, and it is the latter which is the basis of the standard time.

The time thus derived is increased by an appropriate percentage to allow for the required amount of rest and relaxation associated with each job and also for any contingencies that may be expected to arise in the normal course of work.

The standard time thus determined can be used as a basis for bonus incentive as it is the time which should be taken by an average operator expending the normal amount of effort expected in return for basic wages, and normal operators working with an incentive can, on average, and without undue stress, beat this time to an extent which enables them to earn a bonus of around 33 per cent. The standard times for the various jobs throughout the laundry are expressed in terms of standard minutes per piece, per pound, per job, etc. For example, in the wash-house, the standard times may be expressed as so many standard minutes per pound (for each class of work and machine) plus so many standard minutes per load. These loads may vary appreciably and it is necessary in establishing standards of output to base them on an index of performance which automatically takes into account variations which occur from time to time in conditions or in the type of articles handled.

Once standard times have been established for every operation and type of article, the output of any operative is expressed in terms of standard minutes of work done in any given time. This is computed by multiplying the number of pieces or pounds handled by the operator by her appropriate standard time per piece or per pound—e.g., if the standard time for a certain job is three standard minutes per piece and if the operator's output is 210 pieces in 9 hours, then the operator's productivity can be
stated as being $210 \times 3$ standard minutes = 630 standard minutes per 9 hours or a performance of 70 standard minutes per hour. This is called the operator's performance or productivity index.

The basis of the standard times is such that the normally skilled operator is able to maintain a performance of 80 standard minutes per hour, this figure being 33 per cent. above 60 minutes per hour. This forms the standard performance against which the day-to-day performances of operators or whole departments can be compared. The bonus scale is as follows:

<table>
<thead>
<tr>
<th>Performance or productivity (standard minutes per hour)</th>
<th>Bonus (expressed as a percentage of the worker's time wage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 (or under)</td>
<td>Nil</td>
</tr>
<tr>
<td>70</td>
<td>16</td>
</tr>
<tr>
<td>80</td>
<td>33</td>
</tr>
<tr>
<td>90</td>
<td>50</td>
</tr>
</tbody>
</table>

### Metal Trades

A summary of the main characteristics of some systems of payment by results which are applied in the metal trades in Belgium, Denmark, Finland, France, Italy, Norway, Sweden, the Union of South Africa, the United Kingdom and the United States is given in a report prepared by the International Labour Office for the Third Session (1949) of the Metal Trades Committee of the I.L.O. A few further examples are given below.

#### Systems with Earnings Varying in the Same Proportion as Output

**South Africa.**

The premium bonus scheme which is operated by a South African engineering company is based on the principle that a fixed price is offered to workers for each of the various operations performed in the factory. In the fixing of prices the following procedure is used: a time study is conducted during which it is essential that the worker should work at a normal speed, and the time study man forms an estimate of the worker's natural efficiency in relation to an average index figure of 60. This estimated figure is then used to "load" the time study time to bring it into

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1 Communication to the I.L.O. from the Institution of British Launderers, 16 Mar. 1951.

line with the efforts of an average worker. For example, supposing that the time for any particular job is ten hours and the efficiency index of the worker engaged on the time study is estimated at 65, i.e., five points above average, the time-study time would then be adjusted as follows:

\[ 10 \times \frac{65}{60} = 10 \text{ hours } 50 \text{ minutes.} \]

Thus the original time obtained from the time study is increased by 50 minutes to bring it into line with the supposed effort of an average workman. On the other hand, if the worker's efficiency index is estimated at 55, the calculation would then be—

\[ 10 \times \frac{55}{60} = 9 \text{ hours } 9 \text{ minutes.} \]

In other words, the original time is reduced by 51 minutes. Subsequent calculations are based on this adjusted time.

A contingency allowance varying from 5 to 10 per cent. to compensate the worker for normal waste of time which did not appear during time study is then added to the adjusted time. For example—

\[ 10 \text{ hours } 50 \text{ minutes } + 5 \text{ per cent. } = 11 \text{ hours } 23 \text{ minutes.} \]

Since the management guaranteed the worker a minimum bonus of 25 per cent., an addition of 25 per cent. is made to the above figure. For example—

\[ 11 \text{ hours } 23 \text{ minutes } + 25 \text{ per cent. } = 14 \text{ hours } 14 \text{ minutes.} \]

If the worker concerned is an artisan and his premium bonus (basic) rate is 3s. 3d. per hour, this time of 14 hours 14 minutes is now converted into money at this rate. For example—

\[ \left(\frac{14}{1} + \frac{14}{60}\right) \times 3s. 3d. = £2 6s. 4d. \]

This is the price for the job. For the convenience of the worker the adjusted time—for example, the 10 hours 50 minutes mentioned above—is always shown on the premium bonus card in addition to the price for the job.

If a worker is offered a price on a job not previously time studied he is under no compulsion to accept if he thinks that it is
too light and he can request that a time study be taken. Wherever possible the worker will be given premium bonus for work done during a time study.1

Australia.

The following is a description of a wage incentive scheme operating in a Melbourne (Victoria) firm engaged in light engineering. The scheme was first introduced in July 1946 and the firm's general policy was to concentrate on incentive payments for individual effort. Group incentives were, however, found to be necessary for most of the indirect workers employed.

The plan for direct production workers provides for extra payment to be made for all production in excess of a predetermined output per hour known as the standard. A standard is set for each job, mainly by time-study methods, and the employee doing the job is paid a bonus at his ordinary award rate of pay for the time saved on standard. Thus, if the standard is 100 per hour, the production of 500 articles in four hours earns the employee one hour's extra pay. If the standard is not exceeded the employee receives only the award pay for the time taken on the job. Failure to reach standard on one job does not affect any bonus earnings on another job. Bonus is calculated weekly, and is paid only on good parts produced; bonus earned during one week is paid the following week.2

Systems with Earnings Varying Proportionally Less than Output

Australia.

In the case of the Australian firm mentioned above, wage incentives for indirect workers are based on a principle relating departmental or factory efficiency to the contribution the indirect worker makes to preventing loss of direct workers' production time. The details of several plans differ slightly from one another, but the principle is illustrated by the following plan covering cleaners and internal transport workers. For a transport worker the first step is to establish a net number of hours to be counted in the

1 Information communicated to the I.L.O. from the Government of the Union of South Africa, 23 Oct. 1950.
calculation of the bonus. A standard time, say 20 hours, is set by time study for his transport work. To ensure that the employee gets a bonus, this standard time is then arbitrarily extended to, say, 22 hours. A record of the total hours spent on transport work is obtained from the job cards. If a total of 26 hours is spent on transport work in the section, the excess of this over 22 hours is taken to be the time spent by direct production workers on transport. This is used as a measure of the extent to which the indirect worker has fallen short of standard, and is subtracted from the standard time of 20 hours to arrive at the number of hours to be counted for bonus purposes. In this example, the number of hours to be counted would be 16.

The second step is to calculate an efficiency ratio for the department in which the indirect worker is engaged, based on a comparison of the actual times recorded by direct production workers in the department and the appropriate standard times. The standard times are totalled and expressed as a percentage of the total of the actual times. The percentage by which this ratio exceeds 100 is then divided by two before the bonus is finally calculated. Thus if the efficiency rating for a department is 150 per cent., the resulting figure is 25 per cent.

In the final calculation of the bonus this percentage is applied to the number of hours counted for bonus purposes, multiplied by the hourly rate of wage. In the example given above, if the hourly wage of the transport worker were 3s. 6d., the calculation would be—

\[
\frac{25}{100} \times 16 \times 3s. 6d. = 14s.
\]

Light Castings Industry in the United Kingdom.

In the light castings industry in the United Kingdom the great majority of the workers are remunerated by piece-work. Some of the piece-rates are specified in nationally agreed piece-work price lists established as a result of negotiations between the National Light Castings Ironfounders' Federation and certain trade unions affiliated to the Joint Committee of Light Metal Trade Unions, whilst other piece-rates have been fixed by mutual

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1 The standards for these indirect production workers are normally set on their whole week's work, so that the arbitrarily extended standard is usually 40 hours, the length of the working week, with the time-study standard of the work arranged for the week somewhat lower. The example used in the text, however, shows the underlying principles more clearly.
agreement in individual firms. There are, however, certain skilled workpeople (e.g., pattern-makers) for whom straight piece-work prices cannot be fixed by reason of the nature of the work involved, and during 1948 agreements were arrived at whereby incentive bonus schemes were introduced to meet the case of such workpeople. Under these schemes times are fixed by agreement between the management and workers for every job. These times must be such as to enable a man of average skill and ability working at piece-work speed to earn 33\(\frac{1}{3}\) per cent. over a new agreed incentive rate, varying in amount for different classes of workers. In addition, a flat-rate bonus of 28s. 6d. for a week of 44 hours is paid. The incentive bonus actually payable is assessed on the principle that time saved is to be compensated in the ratio of time taken multiplied by time saved divided by time allowed, i.e.,

\[
\frac{\text{time taken} \times \text{time saved}}{\text{time allowed}},
\]

or by any other mutually agreed method of assessing the appropriate value of time saved. The above formula is the same as that for the Rowan system.\(^1\) If the time allowed for a particular job is 66 hours, and the time actually taken is 44 hours, the time saved therefore being 22 hours, the additional number of hours to be paid for at the "incentive rate", over and above the 44 hours actually worked, is \(\frac{44 \times 22}{66} = 14\frac{2}{3}\) hours.

If in this case the worker concerned is a day-work moulder, for whom the agreed "incentive rate" is 83s. 1\(\frac{1}{2}\)d. for 44 hours, or 1s. 10\(\frac{2}{3}\)d. an hour, then the make-up of his earnings for the 44-hour period is—

\[
\begin{array}{ll}
\text{Incentive basis rate} & 83 \quad 1\frac{1}{2} \\
\text{Bonus earned (14\frac{2}{3} hours at 1s. 10\frac{2}{3}d.)} & 27 \quad 8\frac{1}{2} \\
\text{Flat-rate bonus payable in addition} & 28 \quad 6 \\
\hline
\text{Total earnings for 44 hours} & 139 \quad 4
\end{array}
\]

The total earnings of 139s. 4d. in this example compare with an agreed rate of 114s. 1\(\frac{1}{2}\)d. inclusive of flat-rate bonus for a week of 44 hours on plain time work.\(^2\)

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\(^1\) See p. 13.
\(^2\) Communication to the I.L.O. from the Government of the United Kingdom, 1 Dec. 1950.
A System with Earnings Varying Proportionally More than Output—Italy

An Italian firm, the O. M. Company in Brescia, applies the following bonus system:

A productivity index on which bonuses are based is constructed having regard to the standard time for the job. An operative working at normal speed who produces in an hour a quantity corresponding to 60 minutes' work receives a productivity index of 60. An operative who produces in an hour a quantity corresponding to 80 minutes' work receives an index of 80, and so on. The productivity index is determined separately for each of the direct workers and depends on their output during hours of attendance less hours on time-work and lost time. The bonuses earned by these workers are as follows:

<table>
<thead>
<tr>
<th>Productivity index</th>
<th>Bonus (percentage of basic pay)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>52</td>
<td>57</td>
</tr>
<tr>
<td>54</td>
<td>64</td>
</tr>
<tr>
<td>56</td>
<td>71</td>
</tr>
<tr>
<td>58</td>
<td>74</td>
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<tr>
<td>60</td>
<td>80</td>
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<tr>
<td>62</td>
<td>85</td>
</tr>
<tr>
<td>64</td>
<td>90</td>
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<tr>
<td>66</td>
<td>95</td>
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<tr>
<td>68</td>
<td>100</td>
</tr>
<tr>
<td>70</td>
<td>105</td>
</tr>
<tr>
<td>72</td>
<td>110</td>
</tr>
<tr>
<td>74</td>
<td>115</td>
</tr>
<tr>
<td>76</td>
<td>120</td>
</tr>
<tr>
<td>78</td>
<td>125</td>
</tr>
<tr>
<td>80</td>
<td>130</td>
</tr>
</tbody>
</table>

For hours of lost time direct workers receive the following bonuses: 10 per cent. of basic pay for lost time not exceeding 10 per cent. of total hours; thereafter 20 per cent., 30 per cent. and finally 40 per cent. of basic pay for lost time exceeding 30 per cent. of total hours.

Indirect workers receive a bonus which is proportionate to the general average earned in the department or establishment concerned. Thus, for workers engaged on work or services contributing to production, the production bonus is equal to 70 per cent. of the average bonus received by direct workers, including hours on time work and lost time, up to a maximum of 70 per cent. of the indirect workers' own basic pay.

For indirect workers engaged in work or general services not directly affecting output, the production bonus is equal to 50 per cent. of the average bonus received by direct workers, including hours on time work and lost time, up to a maximum of 55 per cent. of the indirect workers' own basic pay.¹

¹ Details of the scheme were supplied to the I.L.O. in a communication from the Italian Confederation of Trade Unions affiliated to the International Confederation of Free Trade Unions, 10 Nov. 1950.
Paper Industry

A System with Earnings Varying in Proportions which Differ at Different Levels of Output—Australia

An Australian firm 1 engaged in the manufacture of various paper products in large quantities operates a group bonus scheme which applies to all employees as a single unit. The plan, introduced in August 1946, covers all direct and indirect workers in the establishment. It has since been revised but the basic principle has remained unaltered. This provides for monthly bonus payments in addition to award time wages for production over a calculated factory "standard" output.2

The factory standard is expressed as standard hours of work and is a composite figure based on the ruling standards for the various production operations in the factory. Standard times were worked out on the basis of past experience for each operation involved in the manufacture of the several completed articles, and a total standard time was subsequently determined for each type of production. Thus, the standard time-equivalent of any volume of production of a particular type of article is the product of a number of articles and the standard per article. The sum of these products gives the standard time-equivalent of the total factory production.

Production in excess of standard is first expressed in standard hours of work, and then calculated as a percentage of the net working time paid for. This latter figure excludes all production time lost owing to internal transfers, power failures, and other

---

1 The number of employees is approximately 250; 57 per cent. are males on direct production, 20 per cent. males on non-production work, 4 per cent. males on office work; 15 per cent. are females on direct production, and 4 per cent. females on office work. The work consists of feeding and tending automatic machines and of sorting and packing completed articles. The tasks are relatively simple and highly repetitive, little technical skill being required from the line employees. The factory is divided into six departments. There is a permanent day shift and another two alternating shifts operating between 7 a.m. and midnight, overtime being worked as necessary.

2 Employees have opportunities to increase their earnings besides their time wages and bonus payments. Service payments are made to all adults after the completion of one year's service, and efficiency money is paid to juniors according to their efficiency. There is also a benefit fund designed to provide retiring allowances for all adults who have completed at least four years' service with the Company.
factors beyond the control of employees. The percentage calculated is known as the "bonus percentage".

If this bonus percentage is 16 per cent. or more, individual bonus payments are calculated by taking 16 per cent., or whatever the percentage is, of the whole of the employee's monthly wages. If the bonus percentage is less than 9 per cent., payments are calculated by taking $\frac{17}{25}$, or 68 per cent., of the employee's monthly wages. With bonus percentages between 9 per cent. and 16 per cent. the fraction of the employee's wages used in the calculation varies in accordance with the following scale:

<table>
<thead>
<tr>
<th>Bonus percentage</th>
<th>Fraction of monthly normal wages to which applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 and over</td>
<td>the whole</td>
</tr>
<tr>
<td>15 but under 16</td>
<td>$\frac{24}{25}$</td>
</tr>
<tr>
<td>14 but under 15</td>
<td>$\frac{23}{25}$</td>
</tr>
<tr>
<td>13 but under 14</td>
<td>$\frac{22}{25}$</td>
</tr>
<tr>
<td>12 but under 13</td>
<td>$\frac{21}{25}$</td>
</tr>
<tr>
<td>11 but under 12</td>
<td>$\frac{20}{25}$</td>
</tr>
<tr>
<td>10 but under 11</td>
<td>$\frac{19}{25}$</td>
</tr>
<tr>
<td>9 but under 10</td>
<td>$\frac{18}{25}$</td>
</tr>
<tr>
<td>Less than 9</td>
<td>$\frac{17}{25}$</td>
</tr>
</tbody>
</table>

Employees who lose time without reasonable cause, through absenteeism or lateness, do not participate in the plan for the particular period concerned. Their working time is deducted from the net hours paid for before the bonus percentage is calculated. Thus the remainder of the labour force gets the benefit of an increased bonus percentage. Individual employees' bonuses vary in any one bonus period because of differences in wage rates. For bonus purposes all production time is regarded as normal working hours, irrespective of shift work or overtime hours.¹

Rubber Industry

A System with Earnings Varying in the Same Proportion as Output—Australia

A group incentive plan, designed to include both direct and indirect workers, has been in successful operation for more than

three years in Australia at the works of Kenworth Pty. Ltd., Richmond, Victoria, manufacturers of rubber products.\footnote{The Company manufactures a variety of rubber products, including rubber flooring for public buildings and offices, footwear, garden hoses, automobile parts, industrial wheels, milking machine components and clothes pegs.}

The main feature of the plan is the allocation each month of a lump sum to a bonus pool from which individual bonuses are paid. The amount of the lump sum to be set aside in this manner is calculated on the over-all efficiency of the whole factory.

Under the group scheme, each person participates as a member of a team and not as an individual. There is some variation in the total amount allotted each month for distribution, depending upon the over-all efficiency of the factory. This over-all efficiency is calculated from the difference between standard costs and actual costs or, more correctly, standard times and actual times. Because of the large variety of operations it is not possible to time study every worker. Estimating on the basis of experience is, therefore, used to a large extent. Time study methods are employed wherever possible, the usual basis for calculating piece-work bonuses being used in setting the standard times which are used for standard costs. No production target is set, the aim at all times being to maintain the highest possible efficiency.

Each employee is point rated on the basis of seniority, period of employment, punctuality, quantity of work, quality of work, attitude, dependability, knowledge and cleanliness. In calculating the individual shares and the amount in the bonus pool, the employees are classified in nine groups, according to the number of points they have earned, the employees in each group getting equal amounts from the bonus pool. The total bonus to be distributed is divided by the total number of points for the whole factory. This gives an amount for each point and this is paid to each member of each group on the basis of the number of points assigned to the group in which his point rating enables him to be placed. Females are treated somewhat differently and paid approximately two thirds the male rate per point calculated on the same rating method. The bonuses earned are paid half-yearly in June and December.\footnote{Manufacturing and Management (Melbourne), Vol. I, No. 12, 16 June 1947.}
Systems with Earnings Varying Proportionally More than Output

South Africa.

A rubber-tyre-making factory in South Africa operates an individual high piece-rate system with a guaranteed minimum wage for rates of output below 75 per cent. of standard. The efficiency limit for payment has been set at 125 per cent. of standard. Any production above this top limit is not paid for. A worker who attains 100 per cent. efficiency (that is, standard output) is paid a bonus of $33\frac{1}{3}$ per cent. of his time wage; a bonus of $66\frac{2}{3}$ per cent. of the time wage is paid for 125 per cent. efficiency. Any production above this point is not paid for, in order to prevent a worker driving himself beyond his limit.¹

United Kingdom.

In the United Kingdom, a “time and bonus” system on the following lines has been in operation since 1933, by agreement with the National Union of General and Municipal Workers, at a large establishment in the rubber manufacturing industry. An hourly day-work rate is fixed and this is the minimum that can be earned. In order to provide a bonus over and above this time rate, estimates are agreed, as a result of time studies made from observations by a trained observer of an operative of average ability during normal conditions, as to what should be the time taken to perform a given operation or group of operations. To this time is added an allowance for rest periods, fatigue, stopping and starting delays, personal requirements, etc., and the total time arrived at is called the “minute value”. This “minute value” is taken to represent 100 per cent. efficiency. The efficiency of an operative or group of operatives is arrived at as follows:

\[
\frac{\text{time allowed (minute value)}}{\text{time taken}} \times 100
\]

\[\text{Example}\]

Number of pieces = 148
Time allowed per piece = 4 minutes
Total time allowed = 148 x 4 = 592 minutes
Time taken, say = 570 minutes
Then efficiency attained = \frac{592}{570} \times 100 = 104.

To the efficiency attained is added one quarter (25 per cent.) as an incentive, and the resulting figure is used for reckoning earnings, as follows:

\[
\begin{align*}
\text{Efficiency attained} & = 104 \text{ per cent.} \\
\text{Add } \frac{1}{4} \text{ of } 104 & = 26 \\
\text{Total} & = 130 \text{ per cent.}
\end{align*}
\]

\[
\begin{align*}
\text{Wage rate (say) for female operative} & = 19d. \text{ per hour.} \\
\text{Total earnings} & = 130 \text{ per cent. of } 19d. \\
& = 24.7d. \text{ per hour.}
\end{align*}
\]

An attained efficiency of 80 per cent. is taken to be equivalent to the time rate of wages. Where an efficiency figure of less than 80 per cent. is attained for a week, the difference is made up so that at no time will the operative receive less than the time rate. In the event of any worker being prevented from attaining the efficiency rate owing to circumstances entirely beyond his control, an allowance is given calculated on the time rate.

Differences arising as to timing, minute values, etc., are to be settled according to a defined procedure, with ultimate reference, if necessary, to an outside arbiter. Minute values, once fixed, are not to be altered, except for certain defined reasons, viz. \( (a) \) introduction of new plant, \( (b) \) alteration of method, \( (c) \) change of material or \( (d) \) when a big demand enables work to be carried on without change of appliances in producing articles for which the rate had been fixed on the basis of small production.\(^1\)

**Textile Industry**

*Systems with Earnings Varying in the Same Proportion as Output*

*Australia.*

The following is a summary of the incentive plans of six firms\(^2\) in the textile and clothing trades in Victoria. The firms gene-

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\(^1\) Communication to the I.L.O. from the Government of the United Kingdom, 1 Dec. 1950.

\(^2\) The average number of employees in each of the firms was 663. In half the firms, the systems covered not only purely productive workers but also other employees. The average percentage of purely productive employees working on wage incentives was 56 per cent. of the male workers and 80 per cent. of the female workers. The average plant bonus earned by incentive workers was 36 per cent. of the Award rate, best workers earning as much as double the Award rate.
rally paid the employees 100 per cent. of the time saved as bonuses. All six firms set their incentive tasks or standards for productive workers on the basis of time studies. The incentive payments were made weekly and in most cases the employee could at any time calculate what bonus was due to him. In three firms the incentive was calculated for each day's output separately; in the other three firms for the week's output against a weekly standard. Two firms reduced bonuses as penalties for unpunctuality and for unauthorised absence from work. Four firms did the same for faulty work. In five of the firms it was found that incentive workers tended to set an upper limit on output, that is, a more skilled worker could do more if he really tried, and in five firms the incentive rates changed automatically with changes in Award wage rates.¹

Israel.

A beginning has been made in a few factories in the textile industry in Israel to link quality standards with production standards, as in the case of a rayon weaving factory. The weavers are paid by the 1,000 picks woven at a rate varying with the workload:

<table>
<thead>
<tr>
<th>No. of looms tended by the weaver</th>
<th>Mils per 1,000 picks</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
</tr>
</tbody>
</table>

No daily minimum pay is guaranteed. A bonus is paid in addition to piece-rate earnings for faultless weaving. The amount of this bonus diminishes with the number of faults per unit of length. For each 100 metres of faultless fabric of less than 16 threads weft per cm. a bonus of 164 mils ² is paid. For each fault a deduction of 16.4 mils is made from this bonus and no bonus is paid when the faults number more than nine. When the fabric is of more than 16 threads weft per cm. the corresponding bonus is 330 mils and the deduction therefrom for each fault is 41.25 mils. No bonus is paid when there are more than seven faults. According to the type of fabric woven (that is, average weft structure) during the period under review the full bonus for faultless weaving amounted to 8.7 per cent. of the piece-rate in the case

² 1,000 mils equal one Israeli pound.
of a four-loom tender, to 7.6 per cent. for a three-loom tender and to 6.8 per cent. for a two-loom tender.¹

*Cotton Spinning in Norway.*

In cotton spinning in Norway, straight piece-rates are used for almost all kinds of operations. They are based on the number of kilos of yarn spun or in a few cases on the number of hanks produced by each member of a group of workers. The piece-rates for spooling are based on the number of kilos produced. In weaving, piece-rates are agreed for the various qualities and are expressed in money units per 1,000 or 10,000 picks. In the other departments such as dyeing, bleaching, finishing, etc., a number of bonus rates supplementing the real wages are as a rule agreed upon. The bonus rates are based on the number of kilos or metres produced. In cases where production is of a uniform nature, such as in dyeing, straight piece-rates are used.

In the cleaning and carding sections of the cotton industry it has often proved difficult to introduce straight piece-rates. In these departments a group system is usually applied.

*Wool Carding and Spinning in Norway.*

On the whole, the same conditions as those described above apply to the woollen industry, except that piece-rates are also used in carding and in all work preparatory to spinning. In spinning, the piece-rates are usually based on the number of kilos of yarn spun. Both individual and group systems are used in wool spinning. On other operations the same conditions are found as those applying to cotton.²

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¹ Communication to the I.L.O. from the Government of Israel, 5 Mar. 1951.
² Communication to the I.L.O. from the Norwegian General Confederation of Trade Unions, 14 Nov. 1950.
CHAPTER V

EFFECTS ON EARNINGS, OUTPUT, COSTS,
INDUSTRIAL RELATIONS AND HEALTH

Information concerning experience with systems of payment by results and the effects of the introduction of such systems in particular establishments, was collected during the past year by the International Labour Office from Governments and from employers' and workers' organisations in a number of countries. The information thus received and certain other available information on the effects of payment by results on workers' earnings, output, costs, relations between management and workers, and the health and safety of the workers, is summarised in the present chapter.

EFFECTS ON EARNINGS

Various Governments, employers' and workers' organisations, and other bodies have stated, on the basis of the information at their disposal, that in many industries workers paid by results generally earn more than workers on time work in the same occupation or trade, or that the introduction of systems of payment by results has led to increased earnings for the workers. Among these Governments and organisations are the following:

**Governments:** Brazil, Finland, Sweden, Turkey and the Union of South Africa;

**Employers' organisations:** the Finnish Textile Industry Employers' Federation, the French Federation of Metal and Mining Industries, the General Federation of Italian Industry, the Italian Federation of Hat Manufacturers, the Federation of Luxembourg Manufacturers, the Swiss central employers' organisations ¹ and the Federation of Swedish Employers;

**Workers' organisations:** the Ceylon Workers' Congress, the Irish National Union of Tailors and Garment Workers, the Norwegian

¹ These organisations forwarded a single agreed statement to the I.L.O.
General Confederation of Trade Unions, the Confederation of Swedish Trade Unions, the Swiss Clothing and Leather Workers' Federation and the Swiss Federation of Metalworkers and Watchmakers, and the United Steelworkers of America (C.I.O.).

None of the Governments or organisations stated that the introduction of payment by results had had the effect of reducing workers' earnings. Cases are, however, known where systems have been discontinued because of difficulties over earnings. Thus, during the second world war the United States National War Labor Board ordered the discontinuance of the incentive schemes being operated by (1) the Kozy Coach Company, "on the ground that a change in model had caused bonus earnings to decline"; (2) the Anaconda Wire and Cable Company, since "the resulting bonus earnings generally were little higher than the guaranteed daily minimum"; and (3) the Jefferson Coal Company (on a joint request from the Company and the union), "in order to eliminate intra-plant inequities caused by the circumstance that conditions in the mine enabled some crews to earn more than others without extra effort. In addition, less than 40 per cent. of the employees were eligible to participate in the existing incentive plan".¹

More detailed information follows regarding the effect of systems of payment by results on workers' earnings in certain countries.

**Australia**

Table XXXI contains some of the results of a survey by the Institute of Industrial Management, Melbourne, of wage incentive systems in different branches of industry in the State of Victoria. The table shows that slightly more than half of all the male productive employees and about three quarters of the female productive employees in the establishments surveyed were on wage incentive schemes, mostly individual schemes. In most cases the workers were paid for all time saved as a bonus. On the average the workers earned nearly 30 per cent. above their time rates; maximum earnings were from 65 to 106 per cent. above these rates.

¹ Cf. *The Termination Report of the National War Labor Board. Industrial Disputes and Wage Stabilization in Wartime, January 12, 1942-December 31, 1945* (Washington, D.C., United States Government Printing Office, 1947), Vol. I, p. 332. From 1 April 1944 to 18 August 1945, the Board dealt with 10,741 applications for installation or modification of piece-rate systems and incentive plans. It is reported, however, that only a few cases requesting discontinuance of existing schemes came before it. (Cf. *ibid.*, pp. 332 and 337.)
In the case of a firm employing about 250 workers which was engaged in the manufacture of various paper products in large quantities and which operated a single group bonus scheme applied to all employees, it was found that the monthly bonus percentages from September 1946 to September 1949 were as in Table XXXII.

With the exception of the initial month after introduction and two months during which there was a coal strike, there was no month when employees failed to earn a bonus. In 19 out of the 35 months during which a bonus was earned, the workers earned bonuses of more than 10 per cent., and in another nine months...
TABLE XXXII. MONTHLY BONUS PERCENTAGES EARNED BY WORKERS IN A PAPER MANUFACTURING COMPANY IN AUSTRALIA, SEPTEMBER 1946—SEPTEMBER 1949

<table>
<thead>
<tr>
<th>Month</th>
<th>1946</th>
<th>1947</th>
<th>1948</th>
<th>1949</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>—</td>
<td>.40</td>
<td>17.01</td>
<td>6.83</td>
</tr>
<tr>
<td>February</td>
<td>—</td>
<td>9.32</td>
<td>.07</td>
<td>7.41</td>
</tr>
<tr>
<td>March</td>
<td>—</td>
<td>12.91</td>
<td>15.75</td>
<td>13.39</td>
</tr>
<tr>
<td>April</td>
<td>—</td>
<td>14.51</td>
<td>18.56</td>
<td>4.49</td>
</tr>
<tr>
<td>May</td>
<td>—</td>
<td>12.62</td>
<td>14.30</td>
<td>3.23</td>
</tr>
<tr>
<td>June</td>
<td>—</td>
<td>3.92</td>
<td>12.88</td>
<td>Coal strike</td>
</tr>
<tr>
<td>July</td>
<td>—</td>
<td>8.24</td>
<td>13.80</td>
<td>Coal strike</td>
</tr>
<tr>
<td>August</td>
<td>—</td>
<td>10.46</td>
<td>8.24</td>
<td>6.07</td>
</tr>
<tr>
<td>September</td>
<td>3.63</td>
<td>11.98</td>
<td>7.67</td>
<td>13.60</td>
</tr>
<tr>
<td>October</td>
<td>6.24</td>
<td>15.14</td>
<td>14.67</td>
<td>—</td>
</tr>
<tr>
<td>November</td>
<td>3.92</td>
<td>13.34</td>
<td>14.37</td>
<td>—</td>
</tr>
<tr>
<td>December</td>
<td>9.32</td>
<td>12.00</td>
<td>16.10</td>
<td>—</td>
</tr>
</tbody>
</table>


Bonuses of between 5 and 10 per cent. In only seven months were the bonuses less than 5 per cent.

A wage incentive scheme for direct and indirect workers was introduced in October 1946 in the Melbourne factory of a firm which produced building materials in branch factories in a number of States. For the period January to April 1949, the employees’ total bonus earnings were equal to 19.5 per cent. of their total wages at ordinary time rates for the man-hours worked. It was not possible accurately to break down the average over-all wages bill for the factory in order to compare the bonus earnings of direct production workers with those of indirect workers. The gross earnings, wage plus bonus, of individual direct production employees varied from the award wage to between £15 and £16 per week, that is from no bonus at all to a bonus approximately equal to the ordinary award wage.

In the case of a light engineering firm in Melbourne which has two factories, each producing a different type of product, the

---

1 There were approximately 100 employees in the factory at the time of the study, of whom 87 were male employees engaged on production of a relatively unskilled nature. Some of the work was heavy, wet and dirty but the rest was comparatively light, clean and easy.

2 T. J. LAIDLAW: "Wage Incentives in Operation: Case Study No. 4", in Bulletin of Industrial Psychology and Personnel Practice (Melbourne), Dec. 1950, pp. 16-17.
average percentage bonus was about 25 per cent. in Factory No. 1 and 45 per cent. in Factory No. 2. The bonuses in different departments ranged from 10 to 40 per cent. in Factory No. 1 and from 30 to 95 per cent. in Factory No. 2. There was an extremely wide variation in the bonuses received by individual employees, ranging from 0 to well over 100 per cent., but on the whole the scheme enabled employees to increase their earnings considerably. The differences in earnings between the two factories were due mainly to the different allowances made in setting the different standards for males and females.

Belgium

In 1950 the Federation of Belgian Industries conducted an enquiry into the methods of remuneration in Belgian industry. Tables XXXIII and XXXIV include some of the information which was obtained concerning the increases in earnings which resulted from the introduction of individual and group piece-work and bonus schemes in various branches of industry. It will be noticed that the average increases ranged from 10 to 40 per cent. in the case of piece-work, from 10 to 20 per cent. in the case of individual production bonus systems, and from 1.5 to 27.5 per cent. in the case of group or workshop production bonus systems. The largest average increase (42 per cent.) occurred in the brick industry in the case of piece-work and the smallest (1.5 per cent.) in distribution in the case of group bonus systems. In most industries larger increases in earnings were obtained with piece-work than with any of the other systems. Increases of only 6 and 5 per cent. were obtained in the paper and printing industries respectively in the case of group or workshop production bonus systems.

1 The effect of the incentive payments scheme on employee earnings was measured by the percentage of bonus payments to the ordinary award time wages. Each factory was first examined as a whole and then for the departments with the highest and lowest bonus earnings respectively. Figures were extracted for each fourth week in the latest financial year for all direct production employees. The percentages of bonus payments varied only slightly over the year in Factory No. 1, while in Factory No. 2 these percentages were more variable. There was, however, no observable trend in either factory.

### TABLE XXXIII. PERCENTAGE INCREASES IN EARNINGS IN VARIOUS BELGIAN INDUSTRIES AS A RESULT OF THE INTRODUCTION OF SYSTEMS OF PAYMENT BY RESULTS

<table>
<thead>
<tr>
<th>Industry</th>
<th>Piece-work</th>
<th>Individual production bonuses</th>
<th>Group or workshop production bonuses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range 1</td>
<td>Average 9</td>
<td>Range 1</td>
</tr>
<tr>
<td>Mining</td>
<td>—</td>
<td>20</td>
<td>—</td>
</tr>
<tr>
<td>Quarrying</td>
<td>20-25</td>
<td>22.5</td>
<td>—</td>
</tr>
<tr>
<td>Concrete</td>
<td>20-60</td>
<td>40</td>
<td>10-15</td>
</tr>
<tr>
<td>Lime</td>
<td>15-40</td>
<td>23.5</td>
<td>—</td>
</tr>
<tr>
<td>Steel</td>
<td>10-100</td>
<td>30</td>
<td>20-50</td>
</tr>
<tr>
<td>Non-ferrous metals</td>
<td>10-30</td>
<td>20</td>
<td>—</td>
</tr>
<tr>
<td>Metal manufactures</td>
<td>5-60</td>
<td>23.5</td>
<td>10-25</td>
</tr>
<tr>
<td>Brick</td>
<td>25-50</td>
<td>42</td>
<td>—</td>
</tr>
<tr>
<td>Glass-ware</td>
<td>—</td>
<td>10</td>
<td>—</td>
</tr>
<tr>
<td>Ceramic</td>
<td>—</td>
<td>—</td>
<td>20-25</td>
</tr>
<tr>
<td>Chemical</td>
<td>5-30</td>
<td>12</td>
<td>—</td>
</tr>
<tr>
<td>Textile</td>
<td>5-50</td>
<td>17.5</td>
<td>5-20</td>
</tr>
<tr>
<td>Clothing</td>
<td>15-60</td>
<td>24.5</td>
<td>5-30</td>
</tr>
<tr>
<td>Construction</td>
<td>—</td>
<td>20</td>
<td>—</td>
</tr>
<tr>
<td>Wood</td>
<td>10-30</td>
<td>17.5</td>
<td>—</td>
</tr>
<tr>
<td>Leather</td>
<td>10-40</td>
<td>21</td>
<td>—</td>
</tr>
<tr>
<td>Fur</td>
<td>10-20</td>
<td>15</td>
<td>—</td>
</tr>
<tr>
<td>Paper</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Printing</td>
<td>10-20</td>
<td>13</td>
<td>—</td>
</tr>
<tr>
<td>Manufactures</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sugar refining</td>
<td>—</td>
<td>20</td>
<td>—</td>
</tr>
<tr>
<td>Tobacco</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Distribution</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Food</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Source: Fédération des industries belges: Réalisations sociales dans l'industrie belge: Monographie III: Modes de rémunération (Brussels, 1950), pp. 72-82.

1 Range of percentage increases. 2 Average percentage increases.

### TABLE XXXIV. DISTRIBUTION ACCORDING TO THE NUMBER OF UNDERTAKINGS OF PERCENTAGE INCREASES IN EARNINGS DUE TO PAYMENT BY RESULTS IN CERTAIN UNDERTAKINGS IN BELGIUM

<table>
<thead>
<tr>
<th>Percentage increases</th>
<th>Number of undertakings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With individual production bonuses</td>
</tr>
<tr>
<td>Less than 5 per cent.</td>
<td>5</td>
</tr>
<tr>
<td>From 5 to 9 per cent.</td>
<td>24</td>
</tr>
<tr>
<td>From 10 to 14 per cent.</td>
<td>34</td>
</tr>
<tr>
<td>From 15 to 19 per cent.</td>
<td>18</td>
</tr>
<tr>
<td>From 20 to 24 per cent.</td>
<td>22</td>
</tr>
<tr>
<td>25 per cent. and more</td>
<td>21</td>
</tr>
</tbody>
</table>

Source: ibid.
<table>
<thead>
<tr>
<th>Industry or occupation</th>
<th>Award weekly wages for adult workers</th>
<th>Increases in weekly earnings over award wages under piece-work</th>
<th>Increases in weekly earnings over award wages under premium bonus schemes</th>
<th>Increases in weekly earnings over award wages under 100 per cent. bonus schemes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing</td>
<td>Journeyman tailors £7 16s. 0d.</td>
<td>(8 firms)</td>
<td>(4 firms)</td>
<td>(4 firms)</td>
</tr>
<tr>
<td></td>
<td>Factory hands £7 7s. 6d.</td>
<td>(a) Average £1 5s. 0d.</td>
<td>(a) Average 10s. to 15s.</td>
<td>(a) Varied.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) 10s. to 15s.</td>
<td>(b) Average one third.</td>
<td>(b) 9 per cent to 29 per cent.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) Average £1 to £1 5s. 0d.; good operator £2 to £2 10s. 0d.</td>
<td>(c) Average £1.</td>
<td>(c) Females 8 per cent. average. Males 13.75 per cent. average.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(d) Average £1 10s. 0d.</td>
<td></td>
<td>(d) 12s. (group bonus).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(e) £1 15s. 6d. to £4 14s. 0d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(f) £1 5s. 0d. to £4 10s. 0d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(g) £3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(h) 1s. to £1 16s. 0d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1 firm) 25 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hatters</td>
<td>Journeymen £7 16s. 8d. (Northern Industrial District)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shirt, white and silk</td>
<td>Journeywomen £5 6s. 8d.</td>
<td>(5 firms)</td>
<td>(3 firms)</td>
<td>(4 firms)</td>
</tr>
<tr>
<td></td>
<td>Male machinists £7 13s. 6d.</td>
<td>(a) 10s. to 15s.</td>
<td>(a) Average operator 15s. to £1; good operator £3 10s. 0d.</td>
<td>(a) 14s.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) 10s.</td>
<td></td>
<td>(b) 11 per cent.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) £2 17s. 0d.</td>
<td></td>
<td>(c) 50 per cent.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(d) £1 15s. 0d.</td>
<td></td>
<td>(d) 33 per cent.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(e) £4 14s. to £3 6s. 0d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dressmakers and milliners</td>
<td>Journeywomen £4. 11s. 0d. to £5 1s. 8d.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Beginners over 21 years of age £315s. 6d. to £415s. 0d. (Northern Industrial District).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2 firms)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(a) 15s. to £2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) Up to £2 10s. 0d. over a 3-6 week period.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foodstuffs</td>
<td>£6 7s. 0d. to £8 6s. 8d.</td>
<td>(1 firm) 54 per cent.</td>
<td>(1 firm) 10s.</td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>Base Rate</td>
<td>Percentage Increases</td>
<td>Average Earnings</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------</td>
<td>-------------------------------</td>
<td>---------------------------</td>
<td></td>
</tr>
<tr>
<td>Biscuit and</td>
<td>£7 2s. 2d. (after six months' experience)</td>
<td>(4 firms)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confectionery</td>
<td></td>
<td>(a) 10s. to £1 6s. 0d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) 12s. to £1 4s. 0d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) 2s. 4d. to 17s. 4d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(d) Up to £3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metal trades</td>
<td>£7 5s. 0d. to £7 11s. 8d.</td>
<td>(2 firms)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(a) £2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) £2 average.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canister workers</td>
<td>Males £7 5s. 10d. to £7 9s. 2d</td>
<td>(1 firm)</td>
<td>Males £1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females £4 13s. 4d.</td>
<td></td>
<td>Females 10s.</td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>£7 3s. 4d. to £7 11s. 8d.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moulders</td>
<td>£7 15s. 0d.</td>
<td>(5 firms)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(a) 10 to 50 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) 30 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) 30 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(d) 20 to 25 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(e) 15 to 20 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woollen mills</td>
<td>£6 11s. 8d. to £8 0s. 0d.</td>
<td>(1 firm)</td>
<td>£2 13s. 6d. to £10 3s. 8d</td>
<td></td>
</tr>
<tr>
<td>Furniture</td>
<td>Journeywomen £4 13s. 4d.</td>
<td>(5 firms)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(upholsteresses)</td>
<td></td>
<td>(a) 75 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) 55 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) 30 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(d) 20 to 25 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(e) 15 to 20 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printing</td>
<td>£7 16s. 8d.</td>
<td>(1 firm)</td>
<td>£2 average.</td>
<td></td>
</tr>
<tr>
<td>Soap workers</td>
<td>£6 16s. 0d.</td>
<td>(2 firms)</td>
<td>£2 13s. 6d. to £10 3s. 8d</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(a) 10 to 15 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) 12 per cent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Average 10 per cent.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>sometimes up to 50 per cent.</td>
<td>Also group bonus of 15s.</td>
</tr>
</tbody>
</table>

Sources: The award weekly wages relating to clothing workers, foodstuffs workers, metal trades workers, engineering workers, moulders, woollen mill workers and printers were communicated to the I.L.O. by the Government of New Zealand and are for March 1949, except in the cases of moulders and printers where they are for October 1949. The other award weekly wages were obtained from Awards of the Court of Arbitration for the workers concerned and are for April 1949, except in the cases of dressmakers and milliners and hatters where they are for March and May 1949 respectively. All other figures are quoted from A Sample of Incentive Payment Schemes in New Zealand, op. cit., pp. 30-32. The letters (a), (b), (c), etc., represent the different firms to which the figures relate.
### TABLE XXXVI. AVERAGE HOURLY EARNINGS ON TIME WORK AND PIECE-WORK IN SOME TRADES IN COPENHAGEN, DENMARK, IN THIRD QUARTER OF 1949

*(in kroner)*

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Average hourly earnings on time work</th>
<th>Average hourly earnings on piece-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled male workers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building and construction:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridge builders</td>
<td>3.19</td>
<td>5.22</td>
</tr>
<tr>
<td>Carpenters</td>
<td>3.60</td>
<td>4.70</td>
</tr>
<tr>
<td>Masons</td>
<td>3.86</td>
<td>5.19</td>
</tr>
<tr>
<td>Joiners</td>
<td>3.44</td>
<td>4.32</td>
</tr>
<tr>
<td>Platers</td>
<td>3.50</td>
<td>4.48</td>
</tr>
<tr>
<td>Painters</td>
<td>3.56</td>
<td>4.25</td>
</tr>
<tr>
<td>Metal industries:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smiths and machine workers</td>
<td>3.72</td>
<td>4.09</td>
</tr>
<tr>
<td>Foundry workers</td>
<td>3.71</td>
<td>4.23</td>
</tr>
<tr>
<td>Unskilled male workers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Textile workers</td>
<td>2.93</td>
<td>3.31</td>
</tr>
<tr>
<td>Ready-made clothing workers</td>
<td>2.75</td>
<td>3.20</td>
</tr>
<tr>
<td>Bricklayers</td>
<td>3.30</td>
<td>4.31</td>
</tr>
</tbody>
</table>

Source: *Statistiske Efterretninger*, 12 July 1950, pp. 244-246.

### New Zealand

Table XXXV gives the results of a survey in 1949 by the New Zealand Department of Labour and Employment of the effects of the introduction of piece-work and premium bonus schemes on workers' earnings.\(^1\) In every case fairly substantial bonuses were earned by the workers but as the sample is small no conclusions can be drawn as to which system of payment by results was most effective in increasing earnings. The earnings under

\(^1\) Cf. Research Division of the New Zealand Department of Labour and Employment: *A Sample of Incentive Payment Schemes in New Zealand*, (mimeographed) (Wellington, 1949), pp. 30-32. Except where otherwise indicated the figures in the table refer to average workers' bonus earnings in excess of award rates as a result of the operation of these schemes. The published report noted that "there appear to be wide swings in earnings of workers under the same type of scheme both within individual factories and between one factory and another operating in the same industry and under the same award. This cannot be explained merely as a result of variations in individual efficiency; it is a symptom of badly set standards and confirms the impression of faulty methods used in setting them. It is obvious also that, if these swings in earnings exist, the substantial earnings quoted for individual workers often give a false picture of a factory as a whole."
the premium bonus schemes appear, however, to be less than under the other two types. This is to be expected since savings under premium bonus schemes are shared between the management and the workers concerned.  

**Denmark, Norway and Sweden**

Tables XXXVI, XXXVII and XXXVIII show that in the Scandinavian countries, earnings of workers on piece-work are higher in all the cases cited, and in some cases much higher than the earnings of workers on time work in the same occupations or trades. For example, in Copenhagen in the third quarter in 1948 the average hourly earnings of skilled bridge builders on time work were 3.19 kr. as compared with 5.22 kr. on piece-work; and in Norway in the second quarter in 1948 the corresponding figures for adult male workers in the ready-made clothing industry were 2.46 kr. and 3.40 kr. In some occupations, however, the differences were not so great. The figures for all Swedish industry in 1948 were 1.95 kr. on time work and 2.32 kr. on piece-work for men, and 1.36 kr. and 1.56 kr. for women.

**Union of South Africa**

In the Union of South Africa, the Department of Labour collected information in 1949 and 1950 regarding experience with payment by results in various industries, and found that employees

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1 The report pointed out, however, that “although all the schemes included in this classification obviously shared the savings in labour cost between employer and worker it was not possible to ascertain what the proportionate share of each amounted to... Most employers gave only vague estimates of the effect of the schemes on production, and in only a few cases was the sharing principle openly referred to. Out of five schemes in which the proportionate sharing of savings could be ascertained, four shared the savings in the proportion of 50 per cent. to the worker and 50 per cent. to the employer; and in one case 75 per cent. to the worker and 25 per cent. to the employer, In only one case was the 50 per cent. retained by the employer openly used for the remuneration of indirect workers, but five out of the twenty-eight schemes provided for a bonus to such workers.”

2 For Norway and Sweden the figures given relate to industry groups, each group comprising several subgroups and trades. The levels of earnings and the proportion of piece-work differ considerably between the subgroups, the trades and the localities. The figures for piece-work earnings in each industry group are not, therefore, strictly comparable with the corresponding earnings for time work, and they do not show the actual difference between hourly earnings on time work and piece-work for workers performing the same operation. This reservation applies also to the difference in earnings between men and women workers. The figures do, however, give a broad indication of the relative differences in earnings of workers on time work and on piece-work.
TABLE XXXVII. AVERAGE HOURLY EARNINGS ON TIME WORK AND PIECE-WORK IN SOME TRADES IN NORWAY IN SECOND QUARTER OF 1948

(in kroner)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Average hourly earnings on time work</th>
<th>Average hourly earnings on piece-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal mining and refining:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult men</td>
<td>2.65</td>
<td>3.35</td>
</tr>
<tr>
<td>&quot; women</td>
<td>1.65</td>
<td>1.66</td>
</tr>
<tr>
<td>Iron and metal:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult men</td>
<td>2.42</td>
<td>3.15</td>
</tr>
<tr>
<td>&quot; women</td>
<td>1.70</td>
<td>2.18</td>
</tr>
<tr>
<td>Chemical and electrochemical:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult men</td>
<td>2.61</td>
<td>3.39</td>
</tr>
<tr>
<td>&quot; women</td>
<td>1.64</td>
<td>1.95</td>
</tr>
<tr>
<td>Textile:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult men</td>
<td>2.46</td>
<td>3.02</td>
</tr>
<tr>
<td>&quot; women</td>
<td>1.56</td>
<td>1.96</td>
</tr>
<tr>
<td>Ready-made clothing:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult men</td>
<td>2.46</td>
<td>3.40</td>
</tr>
<tr>
<td>&quot; women</td>
<td>1.63</td>
<td>2.16</td>
</tr>
<tr>
<td>Food:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult men</td>
<td>2.53</td>
<td>3.48</td>
</tr>
<tr>
<td>&quot; women</td>
<td>1.67</td>
<td>2.10</td>
</tr>
<tr>
<td>Building:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platers, skilled</td>
<td>2.69</td>
<td>3.91</td>
</tr>
<tr>
<td>&quot; unskilled</td>
<td>2.20</td>
<td>4.49</td>
</tr>
<tr>
<td>Carpenters, skilled</td>
<td>2.56</td>
<td>3.78</td>
</tr>
<tr>
<td>&quot; unskilled</td>
<td>2.22</td>
<td>4.03</td>
</tr>
<tr>
<td>Painters, skilled</td>
<td>2.57</td>
<td>3.76</td>
</tr>
<tr>
<td>&quot; unskilled</td>
<td>2.36</td>
<td>3.08</td>
</tr>
<tr>
<td>Masons, skilled</td>
<td>2.63</td>
<td>4.39</td>
</tr>
<tr>
<td>&quot; unskilled</td>
<td>2.43</td>
<td>4.03</td>
</tr>
<tr>
<td>Plumbers, skilled</td>
<td>2.81</td>
<td>3.88</td>
</tr>
<tr>
<td>&quot; unskilled</td>
<td>2.06</td>
<td>2.41</td>
</tr>
<tr>
<td>All building industry:</td>
<td>2.67</td>
<td>3.93</td>
</tr>
<tr>
<td>Skilled</td>
<td>2.22</td>
<td>3.74</td>
</tr>
<tr>
<td>Unskilled</td>
<td>2.22</td>
<td>3.74</td>
</tr>
<tr>
<td>All industry, including other groups but excluding building:</td>
<td>2.49</td>
<td>3.20</td>
</tr>
<tr>
<td>Adult men</td>
<td>1.63</td>
<td>2.08</td>
</tr>
</tbody>
</table>

Source: Arbeidslønnings, 1948, pp. 43-53, 68, 70 and 74.
TABLE XXXVIII. AVERAGE HOURLY EARNINGS ON TIME WORK
AND PIECE-WORK IN SOME INDUSTRIES IN SWEDEN IN 1948

(in kronor)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Average hourly earnings on time work</th>
<th>Average hourly earnings on piece-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal mining and metal industry:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1.93</td>
<td>2.25</td>
</tr>
<tr>
<td>Women</td>
<td>1.34</td>
<td>1.59</td>
</tr>
<tr>
<td>Metal mining and refining:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>2.21</td>
<td>2.63</td>
</tr>
<tr>
<td>Iron and steel processing:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1.86</td>
<td>2.21</td>
</tr>
<tr>
<td>Women</td>
<td>1.25</td>
<td>1.47</td>
</tr>
<tr>
<td>Iron, steel and copper works:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1.71</td>
<td>2.01</td>
</tr>
<tr>
<td>Mechanical engineering workshops:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1.95</td>
<td>2.29</td>
</tr>
<tr>
<td>Women</td>
<td>1.37</td>
<td>1.63</td>
</tr>
<tr>
<td>Shipyards:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>2.02</td>
<td>2.35</td>
</tr>
<tr>
<td>Automobile production:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>2.15</td>
<td>2.47</td>
</tr>
<tr>
<td>Repair shops:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>2.04</td>
<td>2.32</td>
</tr>
<tr>
<td>Other mechanical engineering workshops:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1.91</td>
<td>2.26</td>
</tr>
<tr>
<td>Women</td>
<td>1.37</td>
<td>1.63</td>
</tr>
<tr>
<td>Electrical engineering:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>2.00</td>
<td>2.36</td>
</tr>
<tr>
<td>Women</td>
<td>1.36</td>
<td>1.67</td>
</tr>
<tr>
<td>Textile and ready-made clothing:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1.74</td>
<td>1.93</td>
</tr>
<tr>
<td>Women</td>
<td>1.31</td>
<td>1.53</td>
</tr>
<tr>
<td>Chemical industries:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1.88</td>
<td>2.21</td>
</tr>
<tr>
<td>Women</td>
<td>1.26</td>
<td>1.50</td>
</tr>
<tr>
<td>Food:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>2.00</td>
<td>2.63</td>
</tr>
<tr>
<td>Women</td>
<td>1.42</td>
<td>1.57</td>
</tr>
<tr>
<td>Building:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1.88</td>
<td>3.53</td>
</tr>
<tr>
<td>Transport:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1.98</td>
<td>2.70</td>
</tr>
<tr>
<td>All industry, including other groups:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1.95</td>
<td>2.32</td>
</tr>
<tr>
<td>Women</td>
<td>1.36</td>
<td>1.56</td>
</tr>
</tbody>
</table>

Source: Lönestatistik Arebok för Sverige, 1948, pp. 84-94.
TABLE XXXIX. BONUSES EARNED IN THE SOUTH AFRICAN IRON AND STEEL INDUSTRY

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Weekly wage</th>
<th>Weekly bonus</th>
<th>Percentage increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>£  s.  d.</td>
<td>£  s.  d.</td>
<td></td>
</tr>
<tr>
<td>Steel melting plant:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st smelter</td>
<td>7  1  10</td>
<td>2  15  11</td>
<td>39</td>
</tr>
<tr>
<td>2nd smelter</td>
<td>5  11  2</td>
<td>1  17  3</td>
<td>33</td>
</tr>
<tr>
<td>Pitman</td>
<td>4  19  8</td>
<td>1  17  3</td>
<td>37</td>
</tr>
<tr>
<td>Blooming, heavy and medium mills:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shift roller</td>
<td>8  1  0</td>
<td>2  3  9</td>
<td>27</td>
</tr>
<tr>
<td>2nd roller</td>
<td>6  18  0</td>
<td>1  9  2</td>
<td>21</td>
</tr>
<tr>
<td>3rd roller</td>
<td>5  11  2</td>
<td>1  9  2</td>
<td>26</td>
</tr>
<tr>
<td>4th roller</td>
<td>4  15  10</td>
<td>1  9  2</td>
<td>30</td>
</tr>
<tr>
<td>1st mill drivers</td>
<td>6  10  4</td>
<td>2  3  9</td>
<td>34</td>
</tr>
<tr>
<td>2nd mill drivers</td>
<td>5  11  2</td>
<td>1  9  2</td>
<td>26</td>
</tr>
<tr>
<td>Scrap loader</td>
<td>4  12  0</td>
<td>1  4  7</td>
<td>15</td>
</tr>
<tr>
<td>Light mills:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st roller</td>
<td>8  8  8</td>
<td>3  9  3</td>
<td>41</td>
</tr>
<tr>
<td>2nd roller</td>
<td>6  14  2</td>
<td>3  9  3</td>
<td>51</td>
</tr>
<tr>
<td>3rd roller</td>
<td>6  14  2</td>
<td>2  6  2</td>
<td>34</td>
</tr>
<tr>
<td>4th roller</td>
<td>4  15  10</td>
<td>2  6  2</td>
<td>48</td>
</tr>
<tr>
<td>1st control operative</td>
<td>5  15  0</td>
<td>3  9  3</td>
<td>60</td>
</tr>
<tr>
<td>2nd control operative</td>
<td>4  15  10</td>
<td>1  3  1</td>
<td>24</td>
</tr>
<tr>
<td>1st heater</td>
<td>6  6  6</td>
<td>2  6  2</td>
<td>36</td>
</tr>
<tr>
<td>2nd heater</td>
<td>4  15  10</td>
<td>2  6  2</td>
<td>48</td>
</tr>
<tr>
<td>Scrap reel operative</td>
<td>4  12  0</td>
<td>1  3  1</td>
<td>25</td>
</tr>
<tr>
<td>Cranes:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soaking pit cranes</td>
<td>6  18  0</td>
<td>2  3  9</td>
<td>30</td>
</tr>
<tr>
<td>Wellman chargers</td>
<td>6  18  0</td>
<td>2  15  11</td>
<td>40</td>
</tr>
<tr>
<td>Bessemer, quick acting Arrol, charging crane, etc.</td>
<td>6  14  2</td>
<td>1  17  3</td>
<td>27</td>
</tr>
<tr>
<td>Slab yard</td>
<td>7  1  10</td>
<td>1  4  7</td>
<td>9</td>
</tr>
</tbody>
</table>


have in some cases been able to supplement their earnings under incentive bonus schemes to the extent of over 100 per cent. of their basic remuneration.

Over a period of one year, workers in the weaving section of a textile factory earned an average bonus of 60 per cent. of their average minimum wage and cost-of-living allowance. In the leather industry increased earnings for the employees surveyed ranged from 6 to 200 per cent. In the engineering industry over a period of 13 weeks the average percentage increase in earnings was 11.5. In the clothing industry, 190 workers in one factory
earned over a period of four consecutive weeks average bonuses of 30 per cent. In another factory in this industry the bonus earnings over 13 weeks averaged 35 per cent. for the entire factory. Individual bonus earnings varied from 22 to 125 per cent. In another factory the average bonus earned by 59 workers was 20 per cent. In tyre manufacturing over 13 weeks on an average bonuses of 20 per cent. and 13 per cent. were earned by 173 Europeans and 505 Natives respectively.\(^1\) Table XXXIX shows the average bonuses earned by various categories of workers in the iron and steel industry. It will be noticed that these bonuses ranged from 9 to 60 per cent. of the weekly wage.

**United Kingdom**

Table XL shows the earnings of workers on payment by results as compared with the same categories of workers on time work in the engineering industry in the United Kingdom in one complete working week in January 1948. In nearly every case the earnings of workers paid by results were higher than those paid by time. The figures in the table should not be compared vertically as the number of hours worked per week was different for each category of workers.

**United States**

In 1943 the United States Bureau of Labor Statistics made an analysis of the yearly earnings of time workers paid by results in identical occupations in three important industries: machinery manufacture, cotton textile manufacture and primary fabrication of non-ferrous metals. The analysis revealed a definite and substantial margin in favour of the workers paid under incentive plans. In roughly half of the workshops in which comparisons were made incentive workers were earning per hour between 10 and 20 per cent. more than the time workers. Differences of less than 5 per cent. or more than 30 per cent. were rarely encountered and appeared in most cases to reflect deficiencies in the

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\(^1\) Communication to the I.L.O. from the Government of the Union of South Africa, dated 23 Oct. 1950. The Department of Labour pointed out that the industries in which these bonuses have been earned include some of the older and best established industries in which the employees are organised into strong trade unions, and that it is most unlikely that these unions would have allowed such schemes to operate if they were in any way detrimental to the interests of the workers.
TABLE XL. AVERAGE EARNINGS ON TIME WORK AND ON PAYMENT BY RESULTS IN THE ENGINEERING INDUSTRY IN THE UNITED KINGDOM IN ONE COMPLETE WORKING WEEK IN JANUARY 1948

<table>
<thead>
<tr>
<th>Section of industry</th>
<th>Fitters—skilled (other than toolroom)</th>
<th>Turners and machinemen (rated at or above fitters' rate)</th>
<th>Turners and machinemen (rated below fitters' rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Earnings</td>
<td>Earnings</td>
<td>Earnings</td>
</tr>
<tr>
<td></td>
<td>Time work</td>
<td>Payment by results</td>
<td>Time work</td>
</tr>
<tr>
<td>Agricultural engineers</td>
<td>121 s. 2½ d.</td>
<td>138 s. 10½ d.</td>
<td>123 s. 4 d.</td>
</tr>
<tr>
<td>Aircraft manufacturers</td>
<td>155 s. 11 d.</td>
<td>156 s. 7 d.</td>
<td>170 s. 6½ d.</td>
</tr>
<tr>
<td>Electrical engineers</td>
<td>138 s. 10 d.</td>
<td>153 s. 3½ d.</td>
<td>139 s. 10½ d.</td>
</tr>
<tr>
<td>General engineers: heavy light</td>
<td>146 s. 9¼ d.</td>
<td>142 s. 11¼ d.</td>
<td>133 s. 5½ d.</td>
</tr>
<tr>
<td>Instrument makers</td>
<td>133 s. 8½ d.</td>
<td>143 s. 11¼ d.</td>
<td>132 s. 6 d.</td>
</tr>
<tr>
<td>Locomotive manufacturers</td>
<td>121 s. 7¾ d.</td>
<td>143 s. 6½ d.</td>
<td>138 s. 8¼ d.</td>
</tr>
<tr>
<td>Machine tool makers</td>
<td>131 s. 4½ d.</td>
<td>147 s. 2½ d.</td>
<td>138 s. 2½ d.</td>
</tr>
<tr>
<td>Marine engineers</td>
<td>133 s. 9½ d.</td>
<td>145 s. 0½ d.</td>
<td>128 s. 0 d.</td>
</tr>
<tr>
<td>Motor-cars, cycles, etc.</td>
<td>161 s. 0½ d.</td>
<td>172 s. 10½ d.</td>
<td>166 s. 3½ d.</td>
</tr>
<tr>
<td>Textile machinery makers</td>
<td>128 s. 0 d.</td>
<td>140 s. 5½ d.</td>
<td>123 s. 1½ d.</td>
</tr>
</tbody>
</table>

Source: Communication to the I.L.O. from the Engineering and Allied Employers' National Federation, 16 Feb. 1951.
statistical data available for analysis. Table XLI shows the percentages by which incentive earnings exceeded time earnings for different occupations in the three industries. In the case of the cotton textile industry, the percentages were higher for the different occupations in the Southern than in the Northern mills and also higher in most cases for male than for female workers in the same occupation.¹

During 1945 and 1946 the Bureau of Labor Statistics conducted a comprehensive series of industry wage studies and found that incentive workers generally received higher earnings than time workers in comparable jobs, although the size of the differential varied from industry to industry. The earnings advantage of incentive workers ranged from less than 5 per cent. to at least 40 per cent. in the individual manufacturing industries studied. In many of the industries, the difference was between 15 and 25 per cent. Among four of the major manufacturing industry groups, the largest difference appeared in the apparel industries where incentive workers earned from one fifth to two fifths more than time workers. In the metal working industries incentive workers most commonly received from a quarter to a fifth more than time workers, whereas in the textile industries the differentials were typically between one sixth and one tenth. The chemical industries, in which incentive pay is relatively unimportant, showed no consistent pattern of differences between time and incentive earnings, although in several of these industries the difference was small. Among the non-manufacturing industries incentive pay was most important in automobile repair shops and clothing and departmental stores, where the difference amounted to about a third.²

A further series of wage structure studies was made by the Bureau of Labor Statistics in 1947. It was found, for example, that in the case of the radio industry, somewhat over one fifth of the workers were working under incentive systems of wage payment and such workers constituted 25 per cent. or more of the plant labour force in about one fifth of the plants. Industry piece and bonus rates were more widespread in parts manufacturing plants, while group incentive systems were more common in plants manufacturing complete radio sets. In occupations in which both time

TABLE XLI.\ PERCENTAGES BY WHICH INCENTIVE EARNINGS EXCEEDED TIME EARNINGS IN IDENTICAL OCCUPATIONS IN THREE INDUSTRIES IN THE UNITED STATES

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Machinery manufacturing industry</th>
<th>Cotton textile industry</th>
<th>Non-ferrous metal fabrication industry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percentage by which incentive</td>
<td></td>
<td>Percentage by which incentive earnings</td>
</tr>
<tr>
<td></td>
<td>earnings exceeded time earnings</td>
<td></td>
<td>earnings exceeded time earnings in</td>
</tr>
<tr>
<td></td>
<td>in 1942</td>
<td></td>
<td>Aug. 1941</td>
</tr>
<tr>
<td></td>
<td>Occupation</td>
<td>Occupation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>earnings exceeded time earnings in</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1942 in Sept. 1940</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Southern mills</td>
</tr>
<tr>
<td>Assemblers, bench, class A</td>
<td>7.2</td>
<td>Male workers:</td>
<td>Break-down and run-down rollers</td>
</tr>
<tr>
<td>Assemblers, bench, class B</td>
<td>18.0</td>
<td>Comber tenders</td>
<td>15.3</td>
</tr>
<tr>
<td>Assemblers, bench, class C, male</td>
<td>16.2</td>
<td>Creeler</td>
<td>Casting cleaners</td>
</tr>
<tr>
<td>Assemblers, bench, class C, female</td>
<td>27.9</td>
<td>Doffers</td>
<td>31.2</td>
</tr>
<tr>
<td>Boring-mill operators, class A</td>
<td>18.2</td>
<td>Drawing-frame tenders</td>
<td>Chippers</td>
</tr>
<tr>
<td>Boring-mill operators, class B</td>
<td>11.0</td>
<td>Lap-machine tenders</td>
<td>23.6</td>
</tr>
<tr>
<td>Broaching-machine operators</td>
<td>14.8</td>
<td>Loom fixers</td>
<td>Coremakers</td>
</tr>
<tr>
<td>Buffers and polishers</td>
<td>32.0</td>
<td>Slusher tenders</td>
<td>5.4</td>
</tr>
<tr>
<td>Burriers, class B</td>
<td>19.4</td>
<td>Speeder tenders</td>
<td>Crane operators</td>
</tr>
<tr>
<td>Casting cleaners</td>
<td>22.2</td>
<td>Spinners, frame</td>
<td>12.5</td>
</tr>
<tr>
<td>Craters, class B</td>
<td>20.4</td>
<td>Twister tenders</td>
<td>Diemakers</td>
</tr>
<tr>
<td>Drill-press operators, class A</td>
<td>18.2</td>
<td>Warp-tying machine</td>
<td>3.2</td>
</tr>
<tr>
<td>Drill-press operators, class B</td>
<td>18.2</td>
<td>tenders</td>
<td>Filers</td>
</tr>
<tr>
<td>Drill-press operators, class C</td>
<td>19.4</td>
<td>Warper tenders</td>
<td>43.7</td>
</tr>
</tbody>
</table>

Southern mills
Northern mills

<p>| Break-down and run-down rollers   | 15.3 |
| Casting cleaners                  | 31.2 |
| Chippers                          | 23.6 |
| Coremakers                        | 5.4  |
| Crane operators                   | 12.5 |
| Diemakers                         | 3.2  |
| Filers                            | 43.7 |
| Foremen, process                  | 2.6  |
| Furnacemen                        | 14.0 |
| Helpers                           | 23.8 |
| Gas and oil furnace operators     | 9.2  |
| Grinding-machine operators        | 2.5  |</p>
<table>
<thead>
<tr>
<th>Occupation</th>
<th>Male Workers</th>
<th>Female Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gear cutters</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Heat treaters, class A</td>
<td>25.8</td>
<td></td>
</tr>
<tr>
<td>Heat treaters, class B</td>
<td>25.2</td>
<td></td>
</tr>
<tr>
<td>Lathe operators, engine, class A</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>Lathe operators, engine, class B</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td>Lathe operators, turret, class A</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>Lathe operators, turret, class B</td>
<td>18.4</td>
<td></td>
</tr>
<tr>
<td>Metal-saw operators</td>
<td>17.4</td>
<td></td>
</tr>
<tr>
<td>Milling-machine operators, class A</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>Milling-machine operators, class B</td>
<td>25.1</td>
<td></td>
</tr>
<tr>
<td>Packers, male</td>
<td>38.2</td>
<td></td>
</tr>
<tr>
<td>Packers, female</td>
<td>11.6</td>
<td></td>
</tr>
<tr>
<td>Painters, spray</td>
<td>28.4</td>
<td></td>
</tr>
<tr>
<td>Planer operators</td>
<td>9.9</td>
<td></td>
</tr>
<tr>
<td>Platers</td>
<td>34.9</td>
<td></td>
</tr>
<tr>
<td>Power-shear operators</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td>Sandblast operators</td>
<td>26.3</td>
<td></td>
</tr>
<tr>
<td>Screw-machine operators, class A</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>Screw-machine operators, class B</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>Screw-machine operators, class C</td>
<td>24.5</td>
<td></td>
</tr>
<tr>
<td>Shaper operators</td>
<td>10.6</td>
<td></td>
</tr>
<tr>
<td>Testers, class B</td>
<td>27.4</td>
<td></td>
</tr>
<tr>
<td>Testers, class C, female</td>
<td>14.8</td>
<td></td>
</tr>
<tr>
<td>Thread-milling-machine operators</td>
<td>16.2</td>
<td></td>
</tr>
<tr>
<td>Welders, hand, class A</td>
<td>21.4</td>
<td></td>
</tr>
<tr>
<td>Welders, hand, class B</td>
<td>32.2</td>
<td></td>
</tr>
<tr>
<td>Welders, machine</td>
<td>38.3</td>
<td></td>
</tr>
<tr>
<td>Winders, class C, female</td>
<td>19.8</td>
<td></td>
</tr>
<tr>
<td>Winders, spoolers and reevers</td>
<td>9.8</td>
<td>1</td>
</tr>
<tr>
<td>Female workers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creelers</td>
<td>17.4</td>
<td></td>
</tr>
<tr>
<td>Doffers</td>
<td>21.3</td>
<td></td>
</tr>
<tr>
<td>Drawers-in, hand</td>
<td>24.9</td>
<td></td>
</tr>
<tr>
<td>Drawing-frame tenders</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>Spinners, frame</td>
<td>13.1</td>
<td></td>
</tr>
<tr>
<td>Twister tenders</td>
<td>13.9</td>
<td></td>
</tr>
<tr>
<td>Warper tenders</td>
<td>14.6</td>
<td></td>
</tr>
<tr>
<td>Weavers, plain loom</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>Winders, spoolers and reevers</td>
<td>10.8</td>
<td>11.0</td>
</tr>
<tr>
<td>Inspectors, final</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Inspectors, rough</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td>Loaders and unloaders</td>
<td>28.8</td>
<td></td>
</tr>
<tr>
<td>Packers</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Picklers</td>
<td>13.8</td>
<td></td>
</tr>
<tr>
<td>Polishers</td>
<td>24.5</td>
<td></td>
</tr>
<tr>
<td>Rod-straightener operators</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>Helpers</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>Rollers' helpers</td>
<td>16.3</td>
<td></td>
</tr>
<tr>
<td>Saw operators</td>
<td>13.9</td>
<td></td>
</tr>
<tr>
<td>Shear operators</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>Helpers</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>Tractor drivers</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>Tumbler operators</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td>Turret-lathe operators</td>
<td>6.4</td>
<td></td>
</tr>
<tr>
<td>Weighers</td>
<td>11.7</td>
<td></td>
</tr>
</tbody>
</table>


1. Number of plants and/or workers insufficient to justify comparison. 2. Incentive earnings less than time earnings.
and incentive systems were common, earnings of incentive workers on a nation-wide basis generally ranged from 5 to 11 per cent. above those of time workers in the same occupation. However, the relationship of incentive to time earnings varied widely among the regions and in a few occupations in each region the earnings of time workers exceeded those of incentive workers.¹

**Effects on Output**

Information was received by the I.L.O. from Governments and employers' and workers' organisations concerning the effects of systems of payment by results on both the volume of output per worker and its quality.

**Effects on the Volume of Output per Worker**

Various Governments, and employers' and workers' organisations, have stated that the introduction of systems of payment by results has generally led to increased output per worker. Among these Governments and organisations are the following:

(1) **Governments**: Bolivia ², Canada, Pakistan ³, the Union of South Africa, Sweden, and Turkey;

(2) **Employers' organisations**: the Australian Metal Trades Employers' Association, the Belgian Cotton Spinners' Association, the Brazilian National Confederation of Commerce, the Danish Confederation of Employers, the Danish Federation of Clothing Industries, the Danish Association of Textile Manufacturers, the French Federation of Metal and Mining Industries, the Finnish State Railways, the Finnish Metal Trades Employers' Federation,


² The Government of Bolivia stated that systems of payment by results have not always increased production but that in the mining industry an increase has taken place.

³ The Government of Pakistan stated that experience has shown that in the case of railway workshops, "wherever piece-rate timings have been allowed, a job on an average can be done in approximately 25 to 30 per cent. less time than if the same were to be done without piece-work. On the manufacturing side mistakes in fixing piece-rate timings have at times seriously reduced output." It adds that the application of payment by results "has produced favourable results in mines, too, as far as output is concerned". (Communication to the I.L.O. from the Government of Pakistan, 22 Nov. 1950.)
the Indian Millowners' Association, the General Confederation of Italian Industry, the Norwegian Employers' Confederation and the Central Federation of Swiss Employers' Associations; and

(3) Workers' organisations: the Ceylon Workers' Congress, the Italian Confederation of Metal and Engineering Workers, the Norwegian General Confederation of Trade Unions, the Swedish Confederation of Trade Unions, the United Steelworkers of America (C.I.O.) and the United Textile Workers of America (A.F.L.).

Most of these statements were in general terms. In some cases, however, specific instances were cited, together with quantitative information on the effects on output of the introduction of payment by results. The following pages summarise this information together with such quantitative information as was available from other sources. The information is given country by country as it was not possible to collate it according to types of systems or industries.

Australia.

The survey of wage incentive systems in Victoria by the Institute of Industrial Management referred to above found that "soundly designed and properly operated incentive plans have in practice increased production rate in the reporting firms from 20 to 50 per cent".

TABLE XLII. INDEXES OF OUTPUT PER WORKER IN A LIGHT ENGINEERING FACTORY IN MELBOURNE, AUSTRALIA, JUNE 1946 TO DECEMBER 1948

<table>
<thead>
<tr>
<th>Period</th>
<th>Total No. of jobs in sample</th>
<th>Index of output</th>
<th>No. of jobs which did not show increase over base period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three months before plan</td>
<td>62</td>
<td>100</td>
<td>--</td>
</tr>
<tr>
<td>First three months on standards</td>
<td>62</td>
<td>169</td>
<td>9</td>
</tr>
<tr>
<td>Second three months on standards</td>
<td>57</td>
<td>195</td>
<td>5</td>
</tr>
<tr>
<td>Third three months on standards</td>
<td>41</td>
<td>217</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: M. Kangar and G. D. Grant, op. cit.

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1 A study group consisting of directors of firms set up by the Federation stated that the introduction of a system of payment by results secures an increase in production as much as 30 per cent. above that where time rates are applied.

2 See pp. 121-123.

3 The Institute of Industrial Management, op. cit., p. 7.
Table XLII showing indexes of output per worker in a light engineering factory in Melbourne from June 1946 to December 1948 indicates that output was doubled nine months after the introduction of a standard hour system. The most substantial increase took place in the first three months. In a factory producing building materials in Melbourne average man-day productivity for January-April 1949 was 54.1 per cent. above that in the corresponding period in 1946. An incentive scheme was introduced in the factory in October 1946.

Table XLIII. Effects of the Introduction of Systems of Payment by Results on Productivity in Different Undertakings in Belgian Industry

<table>
<thead>
<tr>
<th>Number of undertakings</th>
<th>With piece-work</th>
<th>With individual production bonuses</th>
<th>With group or workshop production bonuses</th>
<th>With factory production bonuses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtaining increases in productivity</td>
<td>214</td>
<td>128</td>
<td>79</td>
<td>31</td>
</tr>
<tr>
<td>Not obtaining increases in productivity</td>
<td>8</td>
<td>3</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: Fédération des industries belges: Réalisations sociales dans l'industrie belge: Monographie III: Modes de rémunération (Brussels, 1950), pp. 72-82.

Belgium.

The enquiry by the Federation of Belgian Industries referred to above included information in regard to the effects of different types of systems on productivity. Some of this information is brought together in table XLIII. It will be noticed that relatively more undertakings obtained increases in productivity with individual piece-work and production bonus systems than with group, workshop or factory bonus systems.

In the case of undertakings applying individual production bonus systems it was found that four undertakings obtained increases in productivity of less than 5 per cent., eight undertakings of from 5 to 10 per cent., 14 undertakings of from 10 to 15 per cent., 15 undertakings of from 15 to 20 per cent., 21 under-

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1 For details of the scheme see Chapter IV, above.
2 Cf. T. J. Laidlaw, op. cit.
takings of from 20 to 25 per cent. and 21 undertakings of 25 per cent. and more.¹

**India.**

At the Tata Iron and Steel Company Limited steelworks at Jamshedpur it was found that whereas in the pre-incentive period from March to September 1949 output per man per month ranged from 1.69 to 1.75 tons, in the incentive period this output rose to 1.9 tons by November 1949 and increased each month thereafter until in December 1950 it reached 2.15 tons.² It would appear, however, probable that not all the increases in output were attributable to the operation of the efficiency bonus scheme. The cumulative effect of the expenditure on repairs and replacements during the last few years was mentioned as a factor during the year ending 31 March 1950.³

**Netherlands.**

When systems of payment by results were introduced in three factories in the Netherlands after work study the following results were obtained:

(1) labour efficiency increased by 36.5 per cent. and average hourly earnings by 5 per cent;

(2) male performances which ranged from 40 to 50 Bedaux units per hour before the introduction of the system of payment by results rose to between 70 and 80 units per hour after such introduction. The corresponding figures for females were 25 to 40 units before and 65 to 80 units after. Earnings increased 16 to 30 per cent. for men workers and 8 to 30 per cent. for women workers; and

(3) a particular product took 29.5 per cent. more hours to produce before the introduction of the system than after.

Increases in performance were also reported by establishments in the soap, textile, furniture, chemical and rubber industries.⁴

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¹ Fédération des industries belges, *op. cit.*, p. 76.
² Communication to the I.L.O. from the Tata Iron and Steel Company, Limited, Jamshedpur, Mar. 1951. The figures quoted are moving annual averages.
⁴ The information given above and in table XLIV was communicated to the I.L.O. by the Government of the Netherlands on 8 Feb. 1951.
Table XIV shows the results which were obtained by six establishments in the same industry after the introduction of systems of payment by results. The percentage increases in performance ranged from 7.5 to 53, the median being 31.

**TABLE XLIV. EFFECT OF THE INTRODUCTION OF SYSTEMS OF PAYMENT BY RESULTS ON PERFORMANCE IN SIX ESTABLISHMENTS IN THE SAME INDUSTRY IN THE NETHERLANDS**

<table>
<thead>
<tr>
<th>Establishment</th>
<th>Performance before the introduction of payment by results</th>
<th>Performance after the introduction of payment by results</th>
<th>Percentage increase in performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>84</td>
<td>108</td>
<td>29</td>
</tr>
<tr>
<td>B</td>
<td>68</td>
<td>104</td>
<td>53</td>
</tr>
<tr>
<td>C</td>
<td>76</td>
<td>103</td>
<td>35</td>
</tr>
<tr>
<td>D</td>
<td>83</td>
<td>105</td>
<td>27</td>
</tr>
<tr>
<td>E Dept. 1</td>
<td>73</td>
<td>107</td>
<td>47</td>
</tr>
<tr>
<td>E &quot; 2</td>
<td>95</td>
<td>102</td>
<td>7½</td>
</tr>
<tr>
<td>E &quot; 3</td>
<td>82</td>
<td>100</td>
<td>22</td>
</tr>
<tr>
<td>E &quot; 4</td>
<td>78</td>
<td>102</td>
<td>31</td>
</tr>
<tr>
<td>F</td>
<td>71</td>
<td>103</td>
<td>45</td>
</tr>
</tbody>
</table>

Source: Communication to the I.L.O. from the Government of the Netherlands, 8 Feb. 1951.

**United Kingdom.**

Under the auspices of the Institution of British Launderers, a production control system\(^1\), which includes an incentive pay scheme, has been installed over the last few years in a number of laundries. In the case of ten laundries with from 25 to 100 productive operators, the average increases in productivity for the various laundries are shown in table XLV. It will be noticed that these increases ranged from 41 to 55 per cent. for the first group of laundries where the scheme was completely installed, and that substantial increases were obtained in the other group of laundries where the scheme was in the process of being installed when the results were published.

In the case of another 25 laundries with from 30 to 400 operators, productivity per hour increased from 25 to 70 per cent., or by an average of 52 per cent., and labour costs decreased by from 5 to 35 per cent., or by an average of 18 per cent.

\(^1\) For a description of this system see Chapter IV above.
TABLE XLV. INCREASES IN PRODUCTIVITY OBTAINED IN TEN LAUNDRIES IN THE UNITED KINGDOM AFTER THE INSTALLATION OF A SYSTEM OF PRODUCTION CONTROL WITH INCENTIVE PAY

<table>
<thead>
<tr>
<th>Department</th>
<th>Laundry 1</th>
<th>Laundry 2</th>
<th>Laundry 3</th>
<th>Laundry 4</th>
<th>Laundry 5</th>
<th>Laundry 6</th>
<th>Laundry 7</th>
<th>Laundry 8</th>
<th>Laundry 9</th>
<th>Laundry 10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2</td>
<td>1 2</td>
<td>1 2</td>
<td>1 2</td>
<td>1 2</td>
<td>1 2</td>
<td>1 2</td>
<td>1 2</td>
<td>1 2</td>
<td>1 2</td>
</tr>
<tr>
<td>Sorting</td>
<td>25 51</td>
<td>72 45</td>
<td>18 34</td>
<td>89 48</td>
<td>42 40</td>
<td>40 23</td>
<td>43 12</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Wash room</td>
<td>2 14</td>
<td>37 23</td>
<td>48 6</td>
<td>25 24</td>
<td>45 24</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Calender</td>
<td>67 42</td>
<td>55 37</td>
<td>36 13</td>
<td>27 35</td>
<td>40 30</td>
<td>—</td>
<td>12</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Press</td>
<td>55 29</td>
<td>—</td>
<td>56 16</td>
<td>118 35</td>
<td>48 24</td>
<td>—</td>
<td>—</td>
<td>33 4</td>
<td>50 4</td>
<td>—</td>
</tr>
<tr>
<td>Rack and pack</td>
<td>—</td>
<td>48 46</td>
<td>45 28</td>
<td>34 82</td>
<td>44 71</td>
<td>24 19</td>
<td>9 60 11</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Press and hand iron</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Preparing</td>
<td>—</td>
<td>59 16</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Shirt unit</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sorting (M.F.)²</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sorting (F.F.)³</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Rack and pack (M.F.)³</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Rack and pack (F.F.)³</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Average all depts.</td>
<td>41 — 55</td>
<td>47 — —</td>
<td>44 — —</td>
<td>65 — —</td>
<td>— — —</td>
<td>— — —</td>
<td>— — —</td>
<td>— — —</td>
<td>— — —</td>
<td>— — —</td>
</tr>
</tbody>
</table>

Source: Communication to the I.L.O. from the Institution of British Launderers, 16 Mar. 1951.

1 Columns 1 show the percentage increases in productivity obtained. Columns 2 show the number of weeks the scheme had been applied. The scheme was completely installed in laundries 1 to 5 and was in the process of being installed in the other laundries at the time of the investigation as to the results of the scheme. ² "Machine-finished". ³ "Fully-finished".
Another group of ten laundries were able to handle on an average 35 per cent. more work after the system of production control was installed, while operator earnings increased by an average of 26 per cent. and productive labour costs fell from an average of 33.8 per cent. of total costs to 26.3 per cent.\(^1\)

**United States.**

In 1943 the Management Consultant Division of the United States War Production Board investigated 234 wage incentive schemes. In the case of 49 schemes which were applied in a wide range of industries information was available regarding the effect of these schemes on production two months or less after their introduction. It was found that the average increase in production over past performance was 41.5 per cent. No increase was recorded in the case of an aircraft tank motor plant. The largest increase, of 103 per cent., took place in a metal products factory.\(^2\) A further investigation by the Division in 1944 in the Chicago area found the average increase in productivity in 86 cases was 45 per cent. in 90 days. On the average, workers' earnings increased by 19 per cent. and labour costs decreased by 14 per cent.\(^3\)

A study by the Industrial Hazards Division of the Bureau of Labor Statistics of the effects of changes in the hours of work on output with and without wage incentive schemes in certain industries during the war found that such schemes could affect output only when the pace of operations was controlled by the workers either in whole or in part. When the pace was controlled entirely or primarily by the machine, then output tended to increase proportionately with increases in hours because non-productive time—getting ready, cleaning up, etc.—was spread over a longer work day, and offset the lower efficiencies of workers. It was found in the case of foundry work that after the introduction of piece-work, workers in the floormould department increased their output per man-hour by 30.3 per cent., while in the squeezer department day-workers increased their output per man-hour by 5.8 per cent. and night-workers by 11.2 per cent. Since reductions in hours of from three to seven per week took place at the same

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\(^3\) Cf. *ibid.*, VII, p. 4.
time, part of this increased efficiency could probably be attributed to those reductions.¹

A report prepared by the Dartnell Corporation of Chicago in 1948 on the experience of 117 companies in several different industries with wage incentive schemes found that most of these companies indicated that their wage incentive scheme had the effect of increasing production and at the same time decreasing costs. Among these were such organisations as the International Harvester Company, the Acme Steel Company, the Elgin National Watch Company, the Intertype Corporation, the Plumb Tool Company, the La Plant Choate Company, and Servil, Inc.

A large steel processing company, for example, reported that its wage incentive plan had been responsible for a 40 per cent. increase in production with a corresponding 20 per cent. decrease in unit cost, plus a 20 per cent. increase in earnings to employees. This plan had been in effect approximately 15 years. In the fuel processing field, a company reported increased production with an approximate decrease of 35 per cent. in manufacturing costs. A foundry with a 15-year-old plan indicated that the installation of wage incentives had cut costs about 20 per cent., increased production and increased earnings to employees. An automobile company reported that wage incentives had resulted in increasing production and employees' take-home pay. A rubber company stated that lower unit costs as well as greater production resulted from the installation of a wage incentive scheme. In the floor-covering field, two companies obtained a noticeable increase in employees' productivity and earnings, plus better control over costs. A furniture manufacturing firm reported that it had obtained "more consistent standards, and improved cost and production control with increased production". A time control manufacturing company stated that the increase in net production had amounted to about 35 to 40 per cent., with a substantial reduction in labour costs per unit, plus more take-home pay for employees.²

EFFECTS ON QUALITY

The information which the I.L.O. has received on the effects of systems of payment by results on the quality of output indicates

that in some cases the quality of products deteriorated after the introduction of such systems. This was especially the case where a high task was set and workers had to increase their output substantially to reach task. Quality tended to suffer also when supervisory employees were included in a system applied to direct production workers because in these cases supervisors were inclined to pass work which was not up to standard in order to increase their bonuses.

On the other hand many Governments and employers stated that the introduction of payment by results had not caused any noticeable increase in poor quality work, possibly because steps were taken to ensure that quality was maintained at its usual standard.

**Effects on Costs**

There is little statistical information available regarding the effects of the introduction of systems of payment by results on costs. Some of the Governments and employers' and workers' organisations mentioned above have, however, informed the I.L.O. that reductions in costs have been obtained in many instances, and that in some cases reductions in prices of the products were effected. In the Netherlands, for example, it was found by the Director-General of Prices that as a result of the introduction of systems of payment by results in various establishments the decreases in costs in these establishments were such as to make possible the following percentage reductions in prices: 5, 5 to 20, 6 to 7, 39, and 8 per cent. respectively by five engineering shops; 5 per cent. by a joinery factory; 5 to 20 per cent in a machine repair shop; 1.25 per cent. by a cardboard factory; 10 per cent. by a furniture factory; and 10 per cent. by an iron and copper foundry. The costs of production of a bicycle factory were lowered to such an extent that better models could be turned out at the prices of the older models.\(^1\)

It seems reasonable to assume that where increases in output have taken place costs have generally decreased, since even if the workers concerned have obtained all the savings in direct and indirect labour costs, the firm is likely to have made some savings in overhead costs. As examples of actual reductions in costs which have been obtained the following cases may be cited.

\(^1\) Communication to the I.L.O. from the Government of the Netherlands, 8 Feb. 1951.
In three case studies of wage incentives by the Australian Department of Labour and National Service it was found that the introduction of an incentive wage scheme in a light engineering plant in Melbourne reduced unit labour costs for the different jobs by from 7 to 54 per cent; in another light engineering firm in Melbourne by 28 per cent in the case of factory No. 1 and by 63 per cent. in the case of factory No. 2; and in a Melbourne factory producing building materials, by 4 per cent.

In the building industry in the United Kingdom, the effect of the introduction of incentive payment schemes in 1947 on costs has been the subject of several official investigations. The results of these investigations have been summarised in an article in the *International Labour Review* which noted that the greater part of the saving in direct wages on most schemes appeared to have been paid out in bonus. There were, in addition, savings in labour oncosts, plant changes and general overhead expenses consequent on the more rapid completion of contracts, but it seemed that generally these were largely offset by the cost of administering the incentive schemes. It appeared, however, that in most cases there was a net saving in the cost per house attributable to the operation of an incentive scheme of about £15 per house. The savings in man-hours amounted to about 150 to 200 per house.

### Effects on Relations between Management and Workers

The following have indicated to the I.L.O. that payment by results has either not adversely affected relations between management and trade unions or workers or has improved such relations: the Governments of Brazil, Pakistan and Sweden; the Confederation of Danish Employers, the Finnish Metal Trades Employers' Federation, the Finnish State Railways, the Association of Greek Industrialists and the Swiss central employers' organisations.

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4. See "Systems of Payment by Results in the Building Industry", in *International Labour Review*, Jan. 1951, pp. 64-78. This article also contains information relating to experience in the industry in certain other countries. The article is available as an offprint.
It was stated that relations had, in most cases, improved because the workers had been able to earn more and because they had a common interest with management in increasing production. The most favourable results were obtained where management and workers helped each other through joint management-worker committees to devise ways and means of increasing production. Another reason for the improvement in relations was that workers did not require so much supervision as on time work.

It was pointed out, however, by some Governments and employers' and workers' organisations that, where there was a substantial number of workers on time work, friction sometimes arose because of the higher earnings of the workers who were paid by results. Jealousies also sometimes arose among workers paid by results when some were able to earn substantially more than their fellows. Again, relations between management and workers sometimes worsened during the period of introduction of a system of payment by results, partly because of controversies over piece and bonus rates and partly because the new production targets often seemed high to the workers in comparison with former standards. Consequently good relations between management and workers depended to a large extent on the methods of application of a system and the adoption of equitable standards in the setting of which the representatives of the workers concerned were associated.¹

The Government of Sweden has pointed out, too, that certain difficulties often occurred in connection with time and motion studies but that in Sweden these difficulties are being resolved by the central employers' and workers' organisations through a special board set up to consider the matter.²

In some cases there is evidence that the introduction of inequitable systems of payment by results has led to widespread discontent and sometimes grave industrial trouble.³

¹ Cf. Communications to the I.L.O. from the Government of Luxembourg, 18 Oct. 1950; the Luxembourg Federation of Industrialists, 27 Nov. 1950; the Norwegian Employers' Confederation, 14 Nov. 1950; the Swedish Employers' Confederation, 8 Nov. 1950; and the Irish National Union of Tailors and Garment Workers, 23 Oct. 1950.
HEALTH AND SAFETY OF WORKERS

Most Governments and workers' and employers' organisations stated that the introduction of payment by results had not brought about any noticeable change in the health of the workers concerned. This was especially true where, as for example in Sweden, the setting of piece-rates was preceded by time and motion studies in the course of which the question of strain was examined and steps were taken, if necessary, to reduce physical and psychological strain; and where short rest periods were introduced for workers on assembly lines.¹

On the other hand it was pointed out by some Governments and employers' and workers' organisations that the health of workers and especially that of older workers might suffer in certain circumstances, for example, if the task were set too high. In Bolivia the Government considers that there is no doubt that systems of payment by results have had a bad effect on the health of the workers because these systems lead the worker to work more than eight hours a day and 48 hours a week in order to secure higher earnings.²

In some countries it was observed that, where systems of payment by results had been introduced, there was a tendency for the safety of the workers to be endangered since on some days they worked at a rate which increased the likelihood of accidents.

SUMMARY

According to the information available concerning the effects of systems of payment by results, these systems have, in the great majority of cases, led to increased output, higher earnings for the workers and lower costs.

Adverse effects on relations between management and workers or trade unions, on the health and safety of the workers or on the quality of products are reported in only a few cases. But experience indicates that such effects may result if care is not taken by the management and trade unions to see that appropriate safeguards are applied. The types of safeguards which are needed are considered in Chapter VII.

¹ Cf. Communication to the I.L.O. from the Swedish Employers' Confederation, 10 Nov. 1950.
CHAPTER VI

SOME ADVANTAGES AND DISADVANTAGES

This chapter discusses the chief advantages and disadvantages of systems of payment by results in general and of particular types of systems.

ADVANTAGES AND DISADVANTAGES OF SYSTEMS OF PAYMENT BY RESULTS IN GENERAL ¹

The chief advantage of payment by results is that, when well designed and properly applied, it can generally be relied upon to yield increased output, lower costs of production and higher earnings for the workers. The extent of these gains in various cases was noted in Chapter V. While the increases in output may be due in part to greater effort by the workers, they appear in most cases to be due mainly to the improved organisation of work and the elimination of lost time and other sources of inefficiency and waste which result from the systematic work study associated with payment by results and from the fact that, under a well-designed system, both supervisors and workers are provided with a positive inducement to improve working methods and increase output.²

Certain other advantages of payment by results may be noted briefly. It usually enables labour costs, and therefore total costs, per unit of output to be estimated more accurately in advance than under payment by time. Less direct supervision is needed to keep output up to a reasonable level. In some operations, such as the hewing of coal, where effective supervision is difficult or impossible, it is the only practicable system of payment.

¹ For a balanced and authoritative statement of these advantages and disadvantages see the conclusions of the I.L.O. Meeting of Experts on Systems of Payment by Results (Geneva, 1950) quoted on pp. 176-183.
On the other hand, systems of payment by results may have important disadvantages. Thus, there is a tendency for the quality of the products to deteriorate unless steps are taken to ensure the maintenance of quality through, for example, a stricter system of checking and inspection. This involves added expense. In some cases, it may not be possible or may be too expensive fully to maintain quality, and the benefits gained in the form of increased output and lower costs may be offset to a considerable degree by deterioration in the quality of the products.

Difficulties may arise over the introduction of new machines or methods. Workers may oppose such introduction for fear that the new piece or bonus rates set when the job is restudied may yield lower earnings; or when the new machines or methods are introduced they may slacken their rate of work in order to avoid raising output to a level which would make a restudy of the job necessary. Costs may not, therefore, be lowered to the extent that they would be if the workers were on time work. Most trade unions recognise that cuts in piece or bonus rates are justifiable in such circumstances; but individual workers may not share this view, and output and the level of costs may be affected accordingly. Workers tend moreover to regard their highest earnings as normal and may, therefore, press for a considerably higher minimum wage when they are paid by results than when they are paid by the hour. Payment by results may, therefore, lead to higher labour costs in certain industries such as papermaking and coal mining where workers experience, for reasons beyond their control, good and bad runs. Their earnings on the days they have good runs are apt to be regarded by them as being normal earnings.

The introduction of a system of payment by results increases the amount and cost of clerical work since it involves considerably more book-keeping. This is particularly true when the production is subdivided into many processes.

Further, there is evidence that some workers paid by results have disregarded security regulations in order to achieve high output, thus increasing the danger of accidents. Some workers, too, tend to overwork during the normal working day and sometimes keep on working in their lunch hour. These practices may eventually affect their health.

Another disadvantage is that jealousies may arise among workers because some are able to earn more than others. In the case of group systems, the fast workers may be dissatisfied with the efforts of the slower members of the group; where heavy work
is involved, older workers in particular are likely to be criticised for being too slow.

One of the greatest difficulties with systems of payment by results is in the setting of piece or bonus rates. This process involves delicate problems of judgment in which there is always a risk of error. If rates are set too low, workers may be under pressure to work too hard and are bound to be dissatisfied. If rates are set too high, workers may slacken their efforts at times so that their employers may not have cause to ask for a revision of rates because earnings are too high. Workers sometimes decide approximately how much they feel they wish to earn per day on the basis of the rates which have been fixed and are therefore not interested in working for that part of the day which remains after they have earned the amount they want.

Most of these disadvantages or difficulties can, however, be avoided in many industries by appropriate safeguards. Given such safeguards there would appear to be a wide range of cases in which well-designed systems of payment by results introduced after the necessary consultation and agreement between workers' representatives and management can yield a substantial balance of advantages to all concerned. One of the major reasons for this conclusion is the stimulus which the use of such systems gives to both management and workers to improve the organisation and methods of work and thus to raise productivity. It is in fact through the immediate and continuing improvements of this kind, for which the introduction and operation of payment by results afford both the opportunity and the stimulus, more even than through the incentive they give to greater individual effort, that systems of this kind can yield increases in output, lower unit costs and higher earnings.

**Advantages and Disadvantages of the Various Types of Systems**

The advantages and disadvantages of the various types of systems which were described in Chapter I may now be considered.

*Systems with Workers' Earnings Varying in the Same Proportion as Output*

It is convenient to consider separately the advantages and disadvantages of the straight piece-work system and the standard
hour or time piece-work system, although these systems are, as was pointed out in Chapter I, essentially the same.

**Straight Piece-Work.**

Many executives and many trade unions consider that straight piece-work is the most satisfactory system since it encourages high production and rewards the worker in direct proportion to the volume of his output. The worker reaps the full benefit of his extra effort since he is not required, as is the case with many other systems, to share the results of this increased effort with his employer. The industrious and skilled worker is thus encouraged to do his best and the less proficient or lazy worker earns less. Where there is a guaranteed minimum wage which is payable irrespective of output, the worker whose output is low is however not penalised to the same extent as he would be if no such guarantee existed.

The fairness of this system depends to a large extent on the fairness and accuracy with which the piece-rates and production standards are set and on the maintenance of a smooth flow of work and raw materials. If rates or production standards are not set accurately and consistently, inequities will arise and the resulting jealousies among the workers may lead to the failure of the scheme. If piece-rates are set too high, piece-workers may earn considerably more than their foremen or than, for example, highly skilled tool-makers whom it is not possible to place on straight piece-work.

Piece-work is nearly as simple to apply as time work. The accounting and clerical work is not complicated and lends itself much better than time work to the determination of costs. Since direct costs can be determined in advance, piece-work also facilitates the application of standard costing systems and modern methods of budgetary control.

A disadvantage of straight piece-work lies in the fact that the piece-rate reflects only the worker's ability to perform a certain operation in a given time. One worker may be much more valuable to a firm than another because of his greater all-round ability and versatility. Straight piece-work makes no allowance for the value of these factors to a firm.

Further disadvantages are that straight piece-work does not lend itself readily to group incentives or team work. It has often been in disfavour with trade unions because rate cutting has taken place in the past. It also links time and motion study with the amount of money earned and this leads to difficulties when the cost of living is increasing and workers wish to negotiate for higher
wages. In this event a considerable amount of clerical work is entailed in changing all the different piece-rates when a general wage increase is allowed to the workers.

Piece-work does, however, have the merit that it is simple and easy for the worker to understand and easy for the employer to apply. Further, it comes closest to giving the worker a feeling of independence and of ability to determine by his own efforts the amount of his total earnings.

The Standard Hour System.

As was explained in Chapter I, the standard hour or time piece-work system is very similar to straight piece-work in that under it the worker's reward varies in the same proportion as his output. The main difference is that under the standard hour system earnings are stated in terms of earned hours instead of the number of pieces turned out. Wage negotiations can therefore be concentrated on the hourly rates for the different workers instead of being concerned, as under straight piece-work, with quantities which involve both time (the standard time required to produce a unit of output) and money (the rate of pay per unit of output). This means that on occasions when wage rates have to be altered because of, for example, a rise in the cost of living, it is necessary under the standard hour system to change only the hourly rate which is paid to the individual worker or group of workers since the standard times for the various jobs are not affected. Under straight piece-work, on the other hand, many thousands of individual piece-rates may need to be changed.

Another advantage of the standard hour system is that it is easy for the worker to understand. Furthermore, production standards are expressed in terms of an hour and the workers' hourly rates can differ while the standard remains unchanged. This means that for a given operation one standard is required but individual operators may be paid at different hourly rates. These hourly rates can therefore be set in such a way as to take into account other qualities in a worker such as punctuality or versatility which make him more valuable to his firm than a worker lacking these qualities.

Except in matters of collective bargaining the standard hour system is, of course, somewhat more complicated to operate than straight piece-work; but it is nevertheless much simpler than most other systems of payment by results.
As was noted in Chapter I, the Halsey, the Rowan, the Barth Variable Sharing and the Bedaux systems are the most widely used of the systems under which workers' earnings vary proportionally less than output. Earnings under these systems are generally less than under straight piece-work or under the standard hour system except for levels of output between 75 and 100 per cent. of standard, where earnings under straight piece-work are lower. Thus one of the chief advantages of these systems is that where a low task, say 70 per cent. of standard, is set, they encourage a new worker to try to reach standard output by offering a relatively large increase in earnings for each increase in output up to this level.

These systems, too, are useful where it is not possible to measure production standards with a high degree of accuracy, since they allow the workers to earn a reasonable remuneration for a fair range of levels of output above task. They are, therefore, useful for small firms which are unable to afford the employment of highly qualified production or time study engineers, since it is not necessary to make such a thorough time study as is essential with straight piece-work. Tasks are often set on the basis of average past performance. The management does not have the same inducement to attempt to cut rates under these systems as under straight piece-work. These systems also have the important advantage that they can be operated almost at once without any elaborate investigation and the worker, besides having a guaranteed minimum wage, is given the opportunity of earning more than this wage. Further, direct labour costs are lower than under straight piece-work for levels of output above standard.

On the other hand it must be recognised that under these systems earnings tend to level off as output above standard increases. The worker gets less and less and the employer more and more of any savings which the worker may be able to make by increasing his output. These systems also place a ceiling on earnings below what would be within the reach of many employees under straight piece-work. They also tend to increase direct labour costs at low levels of output, with possible adverse effects on the competitive position of the firm concerned. Finally, it should be noted that it is difficult to explain or to justify to workers
the reasons for sharing their savings in time with the employer. Sooner or later this sharing is likely to lead to dissatisfaction.

To sum up, it can be said that although gain-sharing systems are useful for small firms or in cases where it is not possible to set production standards accurately, such systems are becoming more and more difficult to justify as improved techniques of work study enable piece and bonus rates and production standards to be set with increasing accuracy.

*Systems with Workers' Earnings Varying Proportionally More than Output*

The chief advantage from the point of view of workers of systems with earnings varying proportionally more than output is that their earnings are higher under these systems than under any others. The increment in earnings is generally anything from 1.2 to 1.33 per cent. for every 1 per cent. increase in output. It is often claimed for these systems that they encourage workers to reach high levels of output.

On the other hand a high task is generally set and this, together with the incentive which workers have to reach high levels of output, may induce excessive effort and have a bad effect on the health of the workers concerned. Further, from the point of view of the employers, direct labour costs are higher under these systems than under any of the others and could be so high as to absorb almost all of the savings in indirect labour costs and in overhead costs which result from increased output.

*Systems with Workers' Earnings Varying in Proportions which Differ at Different Levels of Output*

The following systems of this type were, it will be recalled, described in Chapter I above: the Taylor Differential Piece-Rate, the Merrick Differential Piece-Rate, the Gantt Task, the Emerson Empiric with its variations, and the accelerating premium systems.

The chief advantage of most of these systems is that they encourage the worker to do his best since a substantial reward is given, at certain levels of output, for even small increases in output and also because the worker receives a relatively large bonus when he reaches the high task which is set under some of these systems.
With the possible exception, however, of the Gantt Task system, these systems are complicated, difficult to install and not easy for the worker to understand. In particular, the worker is apt to find it difficult to calculate or check the earnings due to him under these systems. For these reasons most employers and trade unions prefer the simpler systems described above. In any case, the earnings received by the average worker under the systems discussed in this section are not greatly different from those under simpler systems.\footnote{Cf. National Industrial Conference Board: \textit{Wage Payment Systems}, Studies in Personnel Policy, No. 91 (New York, 1948), pp. 7-12; and \textit{Experience of 117 Companies with Wage Incentive Plans} (Chicago, The Dartnell Corporation, 1948), pp. 28-37.}
CHAPTER VII

SAFEGUARDS

When a system of payment by results is applied in a particular undertaking the interests of employers and workers may be seriously affected if provision is not made for suitable safeguards. For example, as was noted in Chapter V, the quality of products may deteriorate, especially if a high task is set or if supervisors are included in the same scheme as direct production workers. Again, employees, in a desire to raise their earnings, may attempt to increase their output to a level at which quality is adversely affected. Such deterioration of quality is, of course, not in the interests of the employers nor ultimately of the workers. Provisions designed to ensure the maintenance of quality are therefore a necessary part of any system of payment by results.

Similarly, unless systems of payment by results are applied in an equitable and reasonable manner, the benefits which they bring to employers in the form of higher output and lower costs may not be fully reflected in benefits to the workers, even though individual earnings may be higher than on time work. The health and safety of the workers may suffer if the task is set too high. Again, inequities may result if some workers are able to earn considerably more than their workmates or their foremen because of errors in setting piece and bonus rates or because of failure to set reasonable production standards. Further, workers may be tempted to neglect security regulations while on piece-work in an effort to secure high output and earnings, thus increasing the risk of accidents and ill-health.

These few examples of possible undesirable effects of systems of payment by results indicate that when such a system of payment by results is applied the interests of both employers and employees require to be protected by suitable provisions in collective agreements or in orders of wage-determining authorities. This chapter discusses, therefore, the various safeguards which are required to protect their interests and cites examples of safeguard provisions from collective agreements and orders of wage-determining autho-
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rities. As is evidenced by the fact that most of these examples are drawn from collective agreements, these safeguards are normally the subject of collective bargaining. Indeed, from the point of view of the workers the participation of their representatives in the framing and application of appropriate safeguard provisions is itself the most important of all safeguards. This means, of course, that, so far from superseding the process of collective bargaining, as is sometimes supposed, payment by results tends rather to enlarge its scope; the piece or bonus rates for workers paid by results must be fixed by bargaining just as are the time rates for workers paid by time; and in addition there is scope for bargaining over production standards and over the various safeguards relating to the introduction and application of the system of payment by results.

In the pages that follow these safeguards are considered under three headings: (1) those designed to promote equity and good industrial relations; (2) those designed to protect the health and safety of the workers; and (3) those designed to ensure the maintenance of the quality of products.

SAFEGUARDS DESIGNED TO PROMOTE EQUITY AND GOOD INDUSTRIAL RELATIONS

Unless a system of payment by results is applied equitably from both the management's and the workers' points of view, good industrial relations will be difficult to secure or maintain and the increased output, lower costs and higher earnings which might have been obtained from the successful operation of the system may not be forthcoming: distrust between management and workers and friction among the workers themselves may prevent the system from functioning properly, may lead to wasteful strikes, or may even force the complete abandonment of the system.

Some of the principal safeguards needed to ensure the equitable operation of any system of payment by results include (1) safeguards relating to the introduction of the system, including rules concerning such matters as time studies, and the setting up or changing of production standards and piece and bonus rates; and (2) safeguards relating to the operation of the system, including protection against rate cutting and a guarantee of minimum earnings.
Safeguards Relating to the Introduction of Systems of Payment by Results

Provisions Preliminary to the Introduction of a System.

It is desirable (1) that the consent of the representatives of the workers concerned should be secured before any system of payment by results is introduced; and (2) that the system should cover as large as possible a proportion of the workers in the establishment, in order to avoid dissatisfaction due to disparities in earnings between workers paid by results and those paid by time. The following are examples of provisions in collective agreements in the United States covering these points 1:

**Union Consent Required**

The employer agrees that he will not institute any piece-work, bonus or other incentive system except by mutual consent between employer and union.

There shall be no extension of piece-work except by mutual consent.

**Coverage of a Plan**

All production work which can be measured with a reasonable degree of accuracy and otherwise lends itself properly will be placed on incentive at piece-rates which will provide the employee working 100 per cent. efficiently the opportunity to earn the incentive rate for that job classification listed in the schedule of piece-work incentive rates.

All classifications shall be placed upon the incentive system as quickly as possible whenever the unit cost of labour is not thereby increased.

The company will begin a study for the purpose of determining the feasibility of an over-all incentive for those employees not covered by direct incentive.

The company will give all employees covered by this contract the opportunity of earning a bonus whenever possible, and will, wherever possible, adopt the group or departmental bonus plan for the entire department.

**The Conduct of Time Studies and the Fixing of Production Standards.**

Before piece or bonus rates are set, production standards must be determined, usually by time studies. Since much will depend

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on the methods followed in these time studies and in the fixing of production standards, safeguards are required to ensure that timings and standards are fair to both worker and management. It has usually been found desirable, therefore, (1) that representatives of the workers should participate in the timing of jobs and in fixing production standards; (2) that there be further safeguards for the workers in regard to such matters as the selection of the workers to be timed and the determination of the normal work conditions under which the timing is to be conducted; and (3) that there should be safeguards for management to ensure, for example, that workers do not slacken their pace during timing and that reasonable production standards are maintained at all times.

Provisions concerning many of these safeguards are included in collective agreements and orders of wage-determining authorities in many countries. In some countries, for example Sweden, collective agreements in many industries contain quite detailed provisions relating to the methods to be followed in the introduction of piece-work.

The following typical provisions for safeguards on these points are from various United States collective agreements.

Union Participation in Time Studies and in Setting Production Standards

A system of scientific management and time and motion study for the setting of piece-rates may be introduced by an agreement between the employer and the union. All timing shall be subject to the inspection and approval of the shop committee.

The company and shop committee shall co-operate in timing jobs so as to avoid speed-up and inefficiency and secure a satisfactory rate of production.

The foreman may request a time-study man or a time-study steward to come into the department to study and time any job on which a question has arisen. Any time the company time-study men find they need the assistance of the time-study steward they will call a time-study steward in on the job in question. Likewise any time the time-study stewards find they need the assistance of the time-study man they will call the time-study man in on the job in question.

The union is not a party to the time studies, but it shall have the right to bargain collectively concerning all matters pertaining to the time studies, including the basic formulas used, the choice of the operator to be timed, the defining of average conditions and the determining of the levelling factors and other time allowances. All time studies shall be available to the employee through the officers of the union at any time.

Employees shall have the right to question the time study of any job that may appear to be improperly timed, and through the proper person or persons to request the re-timing; the company shall have 24 hours from the receipt of such request for such re-timing. Any
increase or decrease in the rates shall be retroactive to the time of request.

In all cases where a time study is made, the time study shall be signed by the foreman and the time-study man. If the employee feels the time is too tight, it will be restudied at the request of the employee or the union, but the employer shall not be requested to process re-time studies in excess of the number which can be processed by the normal time-study staff without interfering with its normal and routine functions.

Both union and management shall have the right to question time standards prior to final acceptance and shall have the right to request that additional time studies be made by the standards department during a period of fair trial by the operator of not more than 30 days. Any disagreement will be handled through the regular grievance procedure.

Standards and piece-rates, once established, will be made available to employees when clocking in on the job. Employees will be informed of all new standards within 24 hours of the application of the new standard. The union, upon request, may review time studies in consultation with the time-study supervisor.

**Union Safeguards on Timing**

*Selection of Workers to be Timed.*

Piece-work prices shall be set on the work of one or more employees selected by the foreman and the shop committee, which men shall be skilled in their line of work.

The time-study representatives of the company and of the shop committee shall co-operate in picking the operators to be timed.

Piece-rates for piece-workers shall be determined as follows: the employer shall select from among the piece-workers of the appropriate section one person to time the operation. Should objection to this selection be made by the shop committee, the employer shall have the final right to select any other piece-worker from the same section to make the test.

Where timing is required to determine a price for a given operation, such timing shall be done in the factory by the workers of the particular branch involved. The worker chosen shall be satisfactory to both parties. In the event either side cannot agree to any one particular timer, the firm shall time one of its own choice and the union shall time one of its choice. The price shall be determined by the average result of the two workers timed.

*Maintenance of Normal Operating Conditions during Time Study.*

All labour time standards shall be established in conformity to present time-study practices of the company. These practices require that fair consideration shall be given to the requisite quality of workmanship and the reasonable working capacities of normal employees.

All time studies are to be taken to assure a fair test under normal conditions. The time-study man shall remain on any job studied not less than half an hour and the rates shall be set and the employees notified within two hours after a study is completed.

The policy regarding the speed of operations shall be discussed with the shop committee before final determination is made on any operation or job. Company management and shop committee shall cooperate in setting a fair standard of production on all operations.
Time-Study Allowances.

Time values will be set by the company on the basis of the average time of an average skilled workman, working at average speed under normal conditions, with reasonable allowances for fatigue, personal needs, and other factors recognised in sound time-study methods.

Minimum allowances shall be established as follows:

- **Personal:** 5 per cent. of total cycle normal time.
- **Contingency:** 2 per cent. of total cycle normal time.
- **Fatigue (placed on elemental normal manual working time):**
  - 2 per cent.—light bench assembly, light machine work, light jig or fixture and part.
  - 5 per cent.—medium bench assembly; medium machine work; medium jig or fixture and part.
  - 8 per cent.—heavy bench assembly; heavy machine work; heavy jig or fixture and part.
  - 12 per cent.—extra-heavy work (as sledging); without hoist or chain fall.

Fatigue allowance should be placed according to the job when time-studied.

Before the actual timing begins the selected timer shall first complete one half dozen operations and the actual time study shall then be made upon the next dozen and the average time consumed upon this dozen shall be the time set. To such time there shall be added an allowance of 10 per cent. for unavoidable delay and fatigue.

The allowances for the various operations will not be less than 15 per cent. on the time value which will include the two fifteen-minute rest periods and the allowance for fatigue. In the event that a fifteen-minute lunch period is paid for by the company, an additional 3.2 per cent. allowance will be included.

Protection against Secret or Concealed Time Studies.

All time studies for the purpose of establishing or changing piece-work prices shall be made with the knowledge of the employee affected, and all such studies shall take into consideration all details of the complete operation.

The union shall be informed of any proposed time studies.

If time studies are taken the company shall notify the operator and the union in advance of such intent, and disclose to the operators and the union the findings of such studies.

Size and Composition of Crews.

It is agreed that the crew of each standard stemming machine shall consist of eight girls, including three operators, the placing of operators to be optional with the crew. The crew of each Pasley stemming machine shall consist of seven girls, of whom two shall be used as operators.

A regular furnace crew shall not be required to change more than 18 retorts without extra help.

Nine men (not including fireman) shall constitute a furnace crew on a 208-retort furnace. Ten and one half men (not including fireman) shall constitute a furnace crew on a 304-retort furnace. Ten and three fourths men (not including fireman) shall constitute a furnace
crew on a 328-retort furnace. Three men (fireman included) shall constitute a furnace crew on an 80-retort furnace.

On any work of a character normally requiring a definite number of men, whether two or more, the company will assign a man to fill the position of any employee absent through any cause, if the work is to be carried on continuously without interruption or reduction in volume, or is not occasioned by a rearrangement of work or a change in equipment.

On group incentive jobs, time studies shall be taken with extreme care, and the group must operate regularly with the number of employees assigned at the time the time study was taken.

Management Safeguards

During any timing of a job the operator shall produce at normal standard as requested by the foreman and shall not control or limit production.

There shall be no slow-down, false motions or any other unfair attempts on the part of the union or the employees to impair a fair and true result of such time studies.

The union agrees to see that its members give a reasonable and just time study.

The union agrees to assist in seeing that—

(a) Employees being time-studied shall give an honest effort while the study is being made.

(b) No deliberate attempt be made to slow down, stretch out, or other means used to obtain a loose standard during the course of the study.

(c) Any employee resorting to various methods of falsifying the time cycle shall be subject to a reprimand or a lay-off penalty.

It is stipulated and agreed between the company and the union that any bonus, incentive or production plan heretofore in effect in the plant is hereby abolished. The union agrees that, in consideration of the rates of pay and other adjustments made under this memorandum agreement, that the employees within the bargaining units will work and produce at a normal pace. Normal pace means, to produce a reasonable day's work or give the company a fair day's work for a fair day's pay. This does not mean that the employees within the bargaining units will be rated according to any previously established production standards.

No employee will be compelled to produce more than the union bas stated was fair, but continued failure of an employee to co-operate in establishing a fair standard or to meet the agreed rate of production of an established standard or the rate of production as stated by the union as fair, without a reason mutually satisfactory to both union and company, will result in dismissal or, if the circumstances warrant unusual treatment, transfer to another department.

The time-study man may refuse to continue a study if in his judgment the employee being studied is deliberately refusing to co-operate by working at other than normal pace or not in accordance with prescribed method; and he shall so notify the employee's foreman who may consider it as cause for discipline.
Further examples of such provisions for the metal trades in Australia, Denmark, Italy, Norway, the Union of South Africa and Sweden were quoted in a report prepared for the Third Session of the Metal Trades Committee of the I.L.O.

The Setting of Piece and Bonus Rates.

From the point of view of the workers concerned, participation by their representatives in all rate setting is one of the most important of the safeguards which are essential to ensure the equitable operation of a system of payment by results. Such participation may in fact prove the only means of ensuring that the piece and bonus rates fixed will be regarded by the workers as satisfactory. Experience shows that the workers' representatives should if possible be trained in rate-setting methods and should be competent to negotiate with management concerning any disputed rates.

In some industries and in some countries piece-work prices for all factories in an industry are laid down in the collective agreement for the industry or are fixed by the appropriate wage-determining authority. Sometimes, too, provision is made for disputes concerning piece and bonus rates to be settled by arbitration. More often, however, the piece and bonus rates are fixed separately within each plant—a method under which the workers concerned are perhaps more likely to feel confident that their interests are being fully considered. The following clauses from United States collective agreements illustrate the type of provision which may be made for the participation of workers' representatives in rate setting.

All piece-work rates, incentive pay and production bonuses shall be agreed upon by the company and the union. There shall be established in the shop of the employer a price committee, selected by the workers in the said shop under the supervision of the union, and all piece-work prices shall in the first instance be adjusted upon the premises of the said shop between said committee and the employer.

All piece prices shall be adjusted between the representative of the employer and a price committee of three workers engaged in that particular branch of work selected or designated by the union. The

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2 This is the case, for example, in certain industries in Australia.

3 Such provisions exist, for example, in Australia, Norway, Sweden and the United States. In Norway, Rationalisation Offices have been set up by the employers' and workers' organisations. (Communication to the I.L.O. from the Norwegian Employers' Confederation, 14 Nov. 1950.)
employer shall not withhold from the piece-workers any settled work which may be on hand pending disputes between the employer and the price committee about prices. No workers shall be asked to work on unsettled work.

Piece-work prices shall be settled by the price committee and each employer in the association, in conferences which are to take place outside of the regular working hours of the shop, and at such times as are agreed upon by the committee and the employer; such piece-work prices so fixed and agreed upon shall be reduced to writing, and copies of such writing shall be delivered to each party and to the office of the union and shall be final and binding upon both; whenever piece-work prices cannot be agreed upon by the committee and the employer, such dispute, in the first instance, shall be referred to a representative of the union and the association; if such representatives fail to agree, the matter shall be referred within 48 hours to the impartial chairman who shall have the right to take such evidence and order such tests to be made, procure such data, take such other steps as in his discretion may be necessary in order to reach a just and fair conclusion as to such dispute, and the decision then made by the impartial chairman shall be binding upon all parties hereto; pending determination of such dispute, however, all garments shall be put in production with the understanding that the piece-work price thereon shall be settled and fixed before the next ensuing pay day; workers shall not be required to make garments if not settled as stipulated above.

A further safeguard desirable in this connection is a provision that piece and bonus rates should be set at such a level that a worker working under normal conditions can earn at least a specified percentage over his time wage. Collective agreements and orders of wage-determining authorities in many countries contain provisions to this effect. In Austria, for example, the collective agreement for the brick industry provides that “the piece-rates shall be fixed in agreement between the management and the workers’ representatives so that piece-workers will, by normal efforts, be able to earn from 15 to 40 per cent. above their hourly wage depending upon the heaviness of the work, and in especially heavy work 50 per cent. more”. The collective agreement of 12 October 1948 for the coal and iron-ore mining industry states that “an average worker shall by normal efforts be able to earn at least 20 per cent. more than his basic wage”.

In Norway, the 1949 collective agreement for the ready-made clothing and hosiery industries provides that “the piece-work price list shall be so regulated that a fully skilled piece-worker shall be able to earn 30 per cent. above the corresponding highest weekly wage when working at a normal speed”.

In the United Kingdom most collective agreements contain similar provisions. If account is taken of the total number of workpeople employed in the different industries, the percentage
margin set for the majority of workers is between 10 and 20 per cent., although a figure of 25 per cent. is set in a considerable number of industries. In a few agreements, as in that covering furniture manufacture, a distinction is drawn between collective and individual systems of payment, a certain percentage being fixed for collective systems and another for individual systems. In some industries, however—for example, cable making, glass container manufacture—the agreements stipulate that the piece prices shall be such as will normally yield specified weekly or hourly amounts which are at appropriately higher levels than the ordinary time rates. This method is also adopted in the majority of industries to which the Wages Councils Act has been applied. Under the provisions of the orders issued under this Act, where general minimum piece-rates have not been fixed, each piece-rate paid must be such as would yield, in the circumstances of the case, to an ordinary worker at least "the general minimum time rate" applicable, or, where no such time rate is fixed, at least some specified amount of money as the "piece-work basis time rate".

Review of the Organisation of the Work.

Experience in many countries has shown that it is desirable, before a system is finally applied, to undertake a review of the organisation of work to ensure that it is well adapted to the particular scheme. In the United Kingdom, for example, it has been found to be of great importance that materials and work should flow evenly through the establishment and that the numbers of workers employed at any stage of production should be properly adjusted to the productive balance of the plant as a whole. Delays at any stage of a process may retard the completion of work affecting the subsequent payment of bonus and lead to resentment by the workers affected, and possibly to a slow down of output. 1 Provision might well be made in collective agreements for such a review, as it is obviously in the interests of both management and workers.

Review of the Wage Structure.

Experience has shown too that the existing wage structure should be examined when the organisation of the work is reviewed. Such an examination is necessary in order to remove any wage

1 Communication to the I.L.O. from the Government of the United Kingdom, dated 1 Dec. 1950.
anomalies which may exist and to prevent the development of such anomalies as a result of the introduction of a system of payment by results, for example in regard to the relation between the wages of the workers who are paid by results and the wages of time workers. Any adjustments which are made should be made in agreement with the representatives of the workers concerned. In many cases it has been found advantageous to revise the wage structure by the application of job evaluation methods.¹

*Job Security.*

Workers accustomed to time work may oppose the introduction of payment by results for fear that the increased output per man to which it is expected to lead will result in some of them losing their jobs. To counter this fear and to protect the workers concerned where such protection is actually necessary, it may be desirable to include in the system a guarantee, valid for a period to be determined by agreement between management and the workers' representatives, that workers who may be rendered redundant as a result of its introduction will not be laid off. In general such a guarantee should not prove difficult to apply since normal turnover in the labour force is likely to be more than sufficient to offset within a reasonable time any reduction in labour requirements.

*Safeguards concerning the Operation of a System*

*Guaranteed Minimum Earnings.*

Experience has shown that safeguards are required to ensure that work is distributed equitably and that all workers paid by results receive at least a certain minimum level of earnings when output is affected by causes beyond their control such as machine breakdowns, power failures, or lack of raw materials. Even in a well-organised plant delays are sometimes inevitable for reasons beyond both the workers' and management's control. If a worker is paid by the hour, no special compensation is necessary in such cases, but when he is paid by results it is usual for him to be compensated for undue delays. If this is not done workers are likely to be resentful of the fact that their earnings are reduced for causes for which they are not responsible. It has been found too that

¹ Cf. Chapter II.
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provision is needed for payment for waiting time in jobs where this is involved and for the time required in setting up a particular job; the latter type of provision is of course more important in plants where work is done according to a customer’s specification than in plants where the products are turned out by assembly-line methods.

The guarantees of minimum earnings are usually hourly, daily or weekly, depending upon the method of payment. In most cases, however, a guarantee of daily earnings at the hourly rate seems to be regarded as the most equitable arrangement. It is usually provided, further, that earnings above minimum on one day should not be used to make up the minimum on a day when a worker’s output is below normal.

The following provisions from various United States collective agreements are designed to cover these points:

The hourly rate is guaranteed for individual or group workers. In other words, if an individual or group incentive worker should earn for any day an amount that averages less per hour than his hourly rate, he will receive his guaranteed hourly rate.

The union and the company have agreed that all job classifications shall carry minimum weekly full time, full job rates of pay amounting to 100 per cent. of the present base rates of pay. Each individual employee working at piece-rates shall be guaranteed weekly earnings equal to this minimum weekly rate. The guarantee of minimum earnings to piece-rate workers shall not apply to learners or handicapped employees and this clause shall not preclude the exception of substandard operatives upon agreement between the company and the union.

If piece-rates are used, the company agrees that the rates shall be so fixed (based on standards of output now on record in the shop or set up by a fair and competent time-motion study or any mutually adjusted revision thereof) that production at those production rates will result in at least the average wages per hour, or day, or week previously earned at hourly rates by skilled workmen.

In addition to the daily guarantee incentive workers are paid their guaranteed hourly rate in the following instances: lack of sufficient stock or break-down; unrated operations or operations under development; during the establishment of production standards; call-in pay; visits to first-aid room or to company doctor during regular working hours; actual time lost due to grievance or negotiation meetings.

An employee whose piece-work earnings are affected by causes which are clearly beyond his personal control shall receive pay at the rate of his average hourly earnings for the period during which the above-mentioned conditions affect his earnings. This does not apply when these delays are caused by labour stoppages over which the employer has no control.

Piece and incentive rate employees whose earnings for a period are affected adversely because of faulty materials shall receive not less
than their average hourly earnings determined as in the case of downtime, but no such claim shall be allowed unless while the condition still exists the overseer is notified by the operative of the faulty materials. If the overseer disallows the claim that the materials are faulty, the operative may call the shop delegate and not more than one other person for the sole purpose of inspecting the material and the overseer may call not more than two other persons for the same purpose. The operative shall then proceed with his work and be paid at his regular piece or incentive rate unless he shall elect to have the dispute considered as a grievance, in which case his rights shall be determined under the grievance procedure. The right to have the dispute considered as a grievance will be lost unless the grievance is presented in writing within 48 hours after the disallowance by the overseer of the claim that the materials are faulty.

When a piece-worker has finished a job, his earning therefrom shall not be used to build up subsequent jobs on which he fails to make guaranteed base rate.

The company guarantees base rates under the incentive system and each day's earning shall stand for itself.

Further, in no case shall an employee receive for a given day less than the amount earned by him as a result of the application of piece-work, tonnage, or incentive rates. The turn guarantee of incentive earnings shall not apply on an individual turn basis to those operations concerning which it is not practicable to calculate such incentive earnings on the single turn basis, but shall in such cases apply on the smallest practicable number of eight-hour turns.

**Protection against Rate-Cutting.**

Probably the most common safeguard to be found in collective agreements with provisions relating to systems of payment by results is a guarantee against changes or cuts in existing rates during the life of the agreement except, in some cases, for such specified reasons as changes in job content or methods of operation, the introduction of new machinery, or to correct clerical errors. Such a safeguard is rendered particularly necessary by the fact that rate-cutting by employers in the past is one of the main reasons why workers are often suspicious of, or hostile to, systems of payment by results.

A safeguard of this type is, therefore, common in most countries. Thus, in the United Kingdom provisions governing changes in rates by mutual agreement exist in many collective agreements. These conditions apply particularly where there is no uniform piece price list, for example in the engineering industry where piece-work price and bonus, or basis times, are fixed by mutual arrangement between the employer and the worker who has to perform the work. It has been jointly agreed in this industry that no piece-work prices, bonus or basis times once established
SAFEGUARDS

may be altered except for the following reasons: (1) a mistake in the calculation on either side; (2) a change in material, means, or method of production, or the quantities produced; or (3) a mutual agreement between the employer and the worker in the same way as a new price is arranged. Similarly in the furniture manufacturing industry it has been agreed that the times fixed for individual jobs shall be arranged between the employer and the workers affected or the shop representative of these workers or in some other way which is mutually satisfactory. No variation of times is to be made except in the same way. A log book of times so arranged or varied is to be kept available to both sides for reference.

The following clauses are from United States collective agreements:

It is mutually agreed that there shall be no reduction in the present established piece-work rates.

All piece-work rates to remain as they are at present, and all employees on piece-work will be guaranteed their hourly rate for the workweek.

The company will not re-time or question the basis of incentive rates which have been set in the past. The same rule will apply to incentive rates established hereafter on new or changed jobs.

The company will continue to establish incentive rates on all production and maintenance jobs where it has been the practice to provide incentive earnings for employees. Once an incentive rate has been established as fair, after a fair trial period under normal operating conditions, there shall be no reduction in such rate during the term of this agreement, unless there is sufficient change in the operation to substantially change job duties or requirements.

All permanent piece-work prices in effect are accepted during the life of this contract with the following exceptions: permanent piece-work prices may be increased or decreased where either a change is made in design or in material specifications of the part or where a change in method of manufacture changes the work element required to do the job. Where such change affects only part of the operations of the job, re-timing and price changes will apply only to the changed or affected elements.

Permanent bonus work standards shall be guaranteed for the duration of this agreement unless: the tools, jigs, fixtures, machines, machine feeds and speeds, or method of operation are changed; work is added or taken away from the operation; quality requirements are raised or lowered from the original specification; a genuine clerical error has been made in computing the standard.

In event that an employee can change the method of operation through some time-saving device or method, thereby increasing his productive efficiency, such change shall not affect the bonus rate on that particular operation during the life of this agreement.

Increased skill of an employee shall not constitute a reason to adjust established piece-rates except by mutual consent.
As was noted in Chapter II\(^1\), however, some companies have found it desirable to conduct a periodic review, in some cases annually, of production standards and rates. Such a review should, of course, be made only if the representatives of the workers agree.

**Measurement of Performance.**

Workers cannot be expected to be satisfied with a system of payment by results, or to respond to the incentive it offers, unless they can see exactly how it works. They must be able to check up on their own performance and to see how it affects their earnings. It has consequently been found important, both in the interests of efficiency and as a safeguard to the workers, that their performance should be measured over as short a period as is practicable. If this is not done—if, for example, a worker's performance is measured only at intervals of a month—he has no means of checking up on his efforts. In some cases a worker's performance is measured daily; the worker is then able to see, at short intervals, just what his output is in relation to his previous efforts and in relation to the efforts of his fellow workers.

The efficient operation of a system of payment by results requires also the maintenance by employers of adequate records of the earnings and output achieved during successive periods—for example, month by month—to enable them to assess accurately the working of the scheme and to modify it, in agreement with the representatives of the workers, where such modification is deemed necessary to correct abuses, inequities or inefficiencies.\(^2\)

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\(^1\) See p. 50.

\(^2\) In this connection it is interesting to note that a recent survey by the New Zealand Department of Labour and Employment of a sample of 250 incentive schemes found that "the failure to keep adequate records of the effect of incentive schemes on production, already noted as a defect among a number of employers operating piece-work schemes, was even more evident among employers operating premium bonus schemes. Only one of the 28 managements concerned gave a specific figure—an increase of 25 per cent. in the rate of production. One other management set the rate between 10 per cent. and 20 per cent. (which may be a guess rather than an accurately determined figure). The remainder could only generalise in vague terms and while impressions were mostly favourable they were, in most cases, merely impressions. In short, many of these schemes are being operated with a "hit or miss" philosophy—so long as production remains on the right side the scheme is considered to fulfil its purpose well enough." (Cf. A Sample of Incentive Payment Schemes in New Zealand, a Report prepared by the Research Division of the New Zealand Department of Labour and Employment (mimeographed) (Wellington, 1949), p. 33.)
Other Safeguards.

Workers are likely to suspect any system which is so complicated that they cannot follow clearly the relation between their output and their earnings. Systems should, therefore, be as simple as possible and steps should be taken to ensure that the workers understand them. For this reason, systems of payment by results are often introduced in stages. A system which is introduced initially in a simple form, and as a result is understood and accepted, can, if necessary, be modified and developed in the light of experience with relatively little risk of arousing suspicion and resentment from the employees concerned.

If the prospect of additional earnings is to be a real incentive, rates must be set in such a way that all employees will have a reasonable chance of increasing their earnings beyond what they would receive if they were paid by the hour. As a minimum the rewards offered will need to be proportionate to the extra effort called for from the workers concerned.

Systems of payment by results should not be used as temporary expedients in, for example, a busy season and then allowed to lapse. Workers will not have any real faith in any system which is applied for some part of the year and not for another. They will feel that their employers are taking advantage of conditions and that they, themselves, are being exploited in some way even if this is not true in fact. They will also be inclined to think that the management has introduced the system to meet its own needs but refuses to permit workers to gain any permanent benefit from it.

Provision should be made for a trial period of, for example, 30 days, during which the management and workers agree to accept any changes in times, production standards and rates, which may be necessary.

Provision should be made for dealing with workers' grievances over production standards, rates and any other matters relating to the operation of the system.

Protection of the Health and Safety of Workers

Some workers, when paid by results, have a tendency to speed up excessively in order to maximise their earnings; and in any case when the task is set too high and the minimum wage too low, all workers find themselves under some compulsion to work too hard. Safeguards are, therefore, needed to protect the health and
safety of workers. These safeguards usually take the form of provisions designed to ensure that the task is set at a reasonable level and that there is an adequate guaranteed minimum wage.

In addition, it is widely recognised that the introduction of a system of payment by results may call for special measures to promote the safety of the workers, including instruction in suitable safety precautions and the provision of safety devices for all machinery. Thus, the Italian Confederation of Metal and Engineering Workers considers that appropriate officials should secure the proper application of all safety rules, since the risk of accidents is greater when production is speeded up. It points out that proper care should be taken to regulate and perfect the operation of the drive and control gear of the machines themselves, especially power-driven cutters and presses; their defective operation frequently causes serious injury to the workers, mainly women, even when there is no carelessness. The Swedish Confederation of Trade Unions, similarly, has expressed the view that, where piece-work is widely applied, there is an evident need for more extensive protective legislation.

MAINTENANCE OF QUALITY

Experience has shown that there is a tendency, in some cases, for the quality of products to deteriorate after a system of payment by results has been introduced and that special precautions may, therefore, be needed to safeguard quality. Work recording systems showing the incidence of spoilt work, inspection arrangements and other aspects of works organisation, may therefore need to be reviewed before the introduction of a system of payment by results.

Provisions concerning the quality of work do not usually appear in collective agreements or in orders of wage-determining authorities. The control of quality is usually a matter for which management has sole responsibility. In Australia, for example, provisions concerning quality appear, so far as is known, in only one Award of the Commonwealth Arbitration Court, the Felt

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1 Communication to the I.L.O. from the Italian Confederation of Metal and Engineering Workers affiliated to the International Confederation of Free Trade Unions, 10 Nov. 1950.
Hatters Award, which provides that “work done by a journeyman shall be inspected by a foreman as soon as is reasonably practicable and thereupon promptly passed, or not passed, and any work notified as passed shall thereupon be finally regarded as properly done, provided that where a journeyman’s work is of such character that it cannot be passed finally at a first inspection (such as finishing), then a final inspection shall be made as soon as a reasonable time has elapsed and the work then promptly passed, or not passed, finally”.

Provisions for the supervision of quality also appear in a few of the Awards of the various Australian State Industrial Tribunals. For example, in the Printing Industry, Compositors, Cardboard Box Makers and Females (Cumberland and Newcastle) Award, there are the following provisions concerning the supervision of quality:

The House may at any time in its discretion correct proofs on time and deduct from the machine compositor the number of lines requiring alteration. The machine compositor shall have the opportunity of seeing proofs containing any correction charged against him.

Where matter is set on two or more bars it shall be laid out by the House but the machine compositor shall be responsible for any mistake made by him.

The correction of errors resulting from the defect of working of the machine and sunken letters shall be paid for at double rates providing that where a mechanic is employed on the shift or some responsible person is present his attention is called to the defect and he has failed to remedy the matter, but a machine compositor shall be entitled to this charge for all matter set up to the time when the defect was, or should reasonably have been, observed by him.
PART II

CHAPTER VIII

GENERAL PRINCIPLES CONCERNING THE USE OF PAYMENT BY RESULTS

A comprehensive statement of the general principles which should be followed in the use of systems of payment by results was drawn up in April 1951 by a Meeting of Experts on Systems of Payment by Results held under the auspices of the International Labour Organisation. The meeting, which included experts drawn from employers', workers' and independent circles in different parts of the world, had before it a draft of the present report. Its conclusions on general principles were adopted unanimously and are being communicated to Governments, with the request that they be brought to the attention of employers' and workers' organisations and other interested bodies. The conclusions are as follow:

INTRODUCTION

1. It is now generally recognised that a steady increase in the productivity of labour is an essential condition for assuring a higher standard of living to all classes of the population and notably to wage earners.

2. This conception has given a new significance to systems of payment by results. To the extent that such systems can be effectively applied they will help to assure increased production and thereby promote the general welfare.

3. It must be recognised at the outset, however, that the essential object—the general welfare—can be achieved only where systems of payment by results are developed and applied with the agreement of the workers and in an atmosphere of good industrial relations. It is also necessary that the systems should be adapted to the conditions peculiar to each industry and country concerned and that they should include definite safeguards designed to protect the interests of the workers.

1 See p. 2 for the names of the experts who attended the meeting.
4. The methods to be followed in the introduction and application of systems of payment by results should wherever possible be the subject of collective bargaining between the employers and workers concerned.

5. Where systems of payment by results have in the past been introduced by employers with the sole object of reducing the cost of production and without the agreement of the workers, disputes and hostility on the part of workers have often resulted.

6. In countries or industries where the workers have secured adequate safeguards against the abuses which formerly occurred in the application of these systems, this hostility has gradually been replaced in most cases by a more or less formal acceptance.

7. The introduction of systems of payment by results in any industry must be viewed in perspective as one part of a programme aimed at raising output, improving productivity and reducing costs by all available means for the purpose of making possible increased earnings and higher general standards of living. While systems of payment by results may constitute only part of such a programme and the great majority of manual and non-manual workers are still paid on a time basis, a high percentage of workers are paid by results in many individual firms and industries and the introduction of such systems has contributed effectively to the raising of productivity in many cases.

8. Within this framework, the immediate object of systems of payment by results is to provide workers with a financial incentive to improve their individual or group effectiveness or performance within reasonable limits.

9. The "results" which should be taken as the basis of payment under a system of payment by results will depend in each case upon the relative economic importance of such factors as output, quality, machine utilisation and material usage which are directly under the influence of the individual or group of workers concerned.¹

10. A system of payment by results will yield its full benefits only if all possible steps are taken before and during its application to improve the production process, the lay-out of the plant and equipment and the production control procedures.

11. In many undertakings, systems of payment by results are applied only to manual work. Technological developments are however continually increasing the proportion and importance of

¹ The term "payment by results" has been used by the experts to cover all systems under which wages are related directly to some measurement of the work done by the individual worker or group of workers. The term consequently does not include such methods of remuneration as profit-sharing, workers' stock participation, seniority allowances, bonuses for length of service, the "proportional wage" and so on.
technical and clerical workers and it is desirable to consider systems of payment by results or other measures which are appropriate to this growing section of the working force.

**ADVANTAGES AND DISADVANTAGES OF SYSTEMS OF PAYMENT BY RESULTS**

12. It is generally recognised that in a wide range of industries systems of payment by results which are well adapted to the production processes and organisation of the plants concerned, which are installed after thorough investigation of the relevant factors and which are introduced and operated in accordance with the principles set out in paragraphs 28-42 below, can yield the following benefits:

(a) They can make a substantial contribution to the raising of productivity, to lower costs of production and to increased earnings for the workers.

(b) In general, less direct supervision is required to maintain reasonable levels of output than under payment by time, and attention can be focused more on quality and on the factors affecting output.

(c) Workers are encouraged to pay more attention to reducing lost time and to make more effective use of their equipment, although this latter advantage may be offset to some extent by the increased wear and tear on such equipment.

(d) In most cases, systems of payment by results, if accompanied by improved organisation and work measurement, enable labour costs to be estimated more accurately than under payment by time and so facilitate the application of modern systems of standard costing and budgetary control.

13. On the other hand, past experience has shown that if adequate precautions are not taken, systems of payment by results may have the following disadvantages:

(a) Unless suitable inspection procedures or other appropriate measures are used such systems often lead to a deterioration in the quality of the product. Additional expense is involved in the application of an adequate system of quality control.

(b) If the task is set too high or there is a low guaranteed minimum wage the health, efficiency and morale of the workers may be adversely affected.

(c) The risk of accidents may be increased as the result of an increased pace of work or of a tendency on the part of the workers, under the stimulus of an incentive scheme, to disregard security regulations.

(d) Inaccurate rate-setting under an incentive scheme or wide differences in the ability or capacity of workers working in close
proximity may lead to large differences in earnings and to ill-feeling between workers.

(e) Wide differences in the ability or capacity of workers paid on a group output basis may also lead to ill-feeling.

(f) Additional expense is involved in employing the personnel required to install and administer a system of payment by results; and in some cases this expense may be out of proportion to the potential savings in costs.

(g) Unless there are appropriate guarantees, workers may tend to oppose the introduction of new machinery or methods or other changes in conditions of production which would necessitate a re-study of the job because of a fear that their earnings may be reduced.

14. On balance, it would appear that in many industries or undertakings and for large groups of operations, well-designed systems of payment by results, introduced with the agreement of the workers in accordance with conditions in the country concerned and accompanied by appropriate safeguards for the workers, can yield advantages to all concerned. Many of these advantages will result from the work study which is required to enable a system of payment by results to function smoothly and successfully.

Scope for the Application of Systems of Payment by Results

15. The available information shows that, although systems of payment by results are in general use in certain important industries, the great majority of workers throughout the world continue to be paid by time.

16. Systems of payment by results are difficult to apply and payment by time is particularly well suited to—

(a) industries in which measurement of individual or group output is rendered difficult or impossible either by technical considerations or by psychological circumstances which might be prejudicial to output;

(b) industries in which the control of quality is necessary and is particularly difficult, or in the case of certain classes of workers, the high quality and precision of whose work is of prime importance; and

(c) industries in which the work is especially dangerous and it is particularly difficult to ensure the observance of adequate safety precautions.

17. Individual systems of payment by results are not suited to work the speed of which is governed by the speed of the pro-
duction process or machinery; in such cases group systems or payment by time are generally preferred.

18. The available information also shows that systems of payment by results are being successfully applied in many industries, and in particular in the textile and metallurgical industries, the metal trades, mining and many branches of the clothing, leather and rubber industries. It also shows that such systems have been successfully applied in certain countries and in certain circumstances in the building industry and in the chemical and other industries.

19. Generally speaking, it would appear that systems of payment by results can be most successfully applied in the larger firms which can afford to employ the administrative and engineering staff needed to ensure the efficient organisation of production, quality control and measurement of work. However, such systems frequently yield appreciable results in smaller undertakings which may, in case of need, have recourse to the services of experts for the design of such systems.

20. Even in industries where systems of payment by results can be applied with advantage, it must be noted that the proportion of workers who should be covered will not necessarily be uniform but can and must vary according to the nature of the operations and other conditions of production.

**Types of Systems Suited to Different Circumstances**

21. Systems of payment by results should be adapted to the particular requirements and conditions of the operations or work to which they are to be applied.

22. In practice, the individual type of system is generally used wherever the production processes are such as to enable it to be successfully applied.

23. Group, sectional or departmental systems are generally used in cases where assembly lines exist or where several workers are required to operate jointly a single unit of the plant. Such systems are also generally considered preferable in those cases in which indirect workers and supervisors are covered, though in many cases such workers can be placed with success on an individual system.

24. Most systems of payment by results present no marked advantages when compared with one another and they can be judged only by how they work in practice. Every system has some advantages and disadvantages which are dependent largely upon the conditions of production, the psychological conditions in the plant and the objectives to be aimed at. The choice of a system
can therefore only be made having regard to the circumstances in each case. In general, however, systems may be classified into three groups as follows:

(a) those in which the payment is designed to encourage performance up to a given level;

(b) those in which the payment is directly proportional in a 1:1 ratio to the performance of the individual or group; and

(c) those in which the payment is designed to encourage the highest possible individual or group performance consistent with health and safety.

25. Whatever the scheme adopted it must in general lead to a definite increase in the average earnings of the operators concerned, otherwise it would be unsatisfactory to management and rejected by the workers.

26. The application of any system of payment by results, and in particular of any piece-work or standard hour systems, requires for its success the careful and accurate setting of production standards and piece or bonus rates; if these are not set accurately, the earnings of workers of similar skill and ability engaged on different machines or different processes may be widely different. Where it is not possible to set production standards and rates accurately, one of the systems under which the range between the lowest and the highest earnings is more limited may be considered preferable.

27. Since it is an essential condition of the successful operation of a system of payment by results that the workers concerned should understand it fully and be able to check their earnings without difficulty, preference should be given wherever possible to the simplest system which meets the essential needs of the undertaking and the workers concerned.

Principles which Should be Applied in the Introduction of a System of Payment by Results

28. No system of payment by results can be applied successfully if good relations do not exist between the management and the workers concerned. Before attempting to introduce any such system, therefore, steps should be taken to establish such relations and to obtain the consent of the workers concerned. It is advisable in this connection for the workers to be taken into the confidence of the management from the outset and for all the features of the proposed scheme to be carefully explained to them in advance.

29. Provision should be made for the participation of workers' representatives in the introduction of the system in a manner to be defined by collective agreement. Such participation may take
the form of participation in the timing of jobs, in fixing production standards and in setting rates; or it may take the form of participation in the establishment of appropriate safeguards.

30. Time values should be set on the basis of the average time of a workman of average skill working at average speed under normal conditions, with reasonable allowances for fatigue, personal needs and other factors recognised in sound time-study methods.

31. The piece and bonus rates or allowed times should be set at a level which will enable workers paid by results to earn a margin above ordinary time rates sufficiently high to encourage them to do their best.

32. Before a system is actually applied it is advisable that a thorough review of the organisation of work should be undertaken to ensure that it is well adapted to the operation of the system.

33. At the same time, the existing wage structure should be reviewed and steps taken in advance to prevent the development of anomalies, particularly in the relation between the earnings of workers paid by results and those of others who will continue to be paid by time. In a number of industries, the steps taken for this purpose have included the use of job evaluation.

34. It is also advisable to have a trial period on the basis of which any necessary changes may be agreed between management and the workers’ representatives before the system is finally applied.

35. Appropriate measures should be agreed in advance between management and the workers’ representatives to provide for workers who may become redundant as a result of the introduction of the scheme.

**Principles which Should be Applied in the Operation of a System of Payment by Results**

36. In the application of any system of payment by results, the health and safety of the workers should always be protected by setting the task at a reasonable level, by guaranteeing an adequate minimum wage and by the enforcement of suitable safety regulations.

37. The equitable operation of a system of payment by results requires—

(a) that workers should be guaranteed minimum earnings for any period in which output is affected by causes beyond their control;

(b) the assurance, in conditions laid down by custom or agreements, that favourable earnings obtained in the carrying out of a
job or in the course of a given period will not be used to compensate for low earnings obtained for other jobs or in other periods;

(c) further, rate modification should only occur for agreed reasons such as changes in job content, methods of organisation, or the correction of clerical errors.

38. Workers' performance should be measured over as short a period as possible in order to enable them to check on the relation between their efforts and their earnings.

39. Employers should maintain adequate records of bonus earnings and production achievements so as to enable the working of the system to be accurately assessed and so as to enable the system to be modified where necessary in the interests of equity and efficiency. Relevant information should be available to workers' representatives on request.

40. Adequate steps should be taken to control quality of output, in particular by inspection and by suitable work recording systems showing the incidence of spoilt work.

41. As many of the workers in a factory as possible should ultimately be included in the scheme so as to avoid, as far as possible, ill-feeling over differences in opportunities for increasing earnings.

42. Adequate procedures should be available for the adjudication of workers' grievances arising from anomalies in earnings, working conditions and other matters affecting the workers' welfare.
OBSERVATIONS ON SYSTEMS OF PAYMENT BY RESULTS RECEIVED FROM GOVERNMENTS AND FROM EMPLOYERS’ ORGANISATIONS AND WORKERS’ ORGANISATIONS IN CERTAIN COUNTRIES

Some of the replies to the questionnaire on systems of payment by results which was sent out by the International Labour Office included general observations or statements of conclusions. These are reproduced in the following pages.

SOME CONCLUSIONS OF THE NETHERLANDS COMMITTEE FOR THE IMPROVEMENT OF LABOUR PRODUCTIVITY ¹

The Application of Piece-Rates

Every effort should be made to determine performance in the most objective manner possible. It is therefore highly recommended that the widest possible application be made of time studies and of the technique of job analysis.

It should, however, be remembered that the activities in certain enterprises are continually changing to such an extent as to make accurate time studies more expensive than is economically justified, though in such cases rates based on estimates and experience are quite feasible. This objection on economic grounds can sometimes be overcome by co-operation between a number of similar enterprises, for which separate research into time study, rate-fixing and questions of efficiency would be too costly.

The fact that the introduction of rates based on time studies presents difficulties, not only as regards the time and money involved but also as regards the provision of necessary experts, might well be an obstacle to the widespread introduction of such rates within a reason-

¹ The passages reproduced here were translated into English from the Netherlands Committee for the Improvement of Labour Productivity: Prestatie Beloning (Payment by Results), pp. 21-22, 27 and 30-31. This Committee was composed of representatives of the Government and of the Foundation of Labour which consists of representatives of the employers’ and workers’ organisations. The conclusions reproduced above reflect, therefore, the views of the Government and of these organisations. (Communication to the I.L.O. from the Government of the Netherlands, 13 Mar. 1951.)
able period of time. Recently this situation has improved as a number of time and motion study bureaux are giving considerable attention to the training of time and motion study engineers, and a start has been made for including instruction in this field in the curricula of the secondary technical schools. A further extension of opportunities for such training is still desirable in view of the importance of the introduction of measured premium rates and improved working methods in the Netherlands industry in general.

**Corrections on Premium Scales in Connection with Quality, etc.**

Payment by results is also concerned with the quality of the product to the extent that the determination of actual performance is based on that part of output which meets certain qualitative standards. To pay for qualitatively inferior products serves no useful purpose.

It is sometimes possible to relate piece-work earnings directly to the quality of the product. For instance, a percentage reduction in piece-work earnings could be applied, according to the amount of products rejected on inspection.

The quality of the product may also be of such vital importance and may demand such a measure of care and attention on the part of the workers, that some special means of taking this into account in the system of payment will have to be devised.

**The Relation between Piece-Rates and Time Rates**

It is well known that jealousies exist between workers on piece-work whose output is high and those whose output is low, and likewise between time workers and piece-workers performing similar functions in the same enterprise.

On the one hand there are those piece-workers who have a high output and are able to earn more than their basic wage. On the other hand, time workers may perform similar functions but, despite their individual efforts, cannot earn more than their time wage. The closer the contact between these two categories of workers, the greater the likelihood of such jealousies. Yet, a certain amount of jealousy between time workers and piece-workers is both justified and necessary, otherwise piece-work, which is the most outstanding means of raising output per worker, will no longer be attractive.

In general it may be said that to secure good relations between time workers and piece-workers, the difference between their average earnings in the same occupational category should not exceed more than 10 or at most 15 per cent.

Thus, in enterprises where the piece-workers earn on the average 20 per cent. or more above the time wage it is advisable to give the time workers opportunities to earn, in some way or another, more than their time wage.

**Consulting the Workers**

A further question of importance is the extent to which employees should be consulted on the introduction of systems of payment by
results. The fields in which such consultation is possible are the following:

(a) the introduction or amendment of piece-work systems;
(b) the examination of rates;
(c) co-operation in handling grievances and disputes; and
(d) co-operation in evaluating the performance of time workers in connection with the application of a system of premiums for extra performance by time workers.

It should be stressed that the introduction and application of systems of payment by results are part of wages policy. From this point of view it is generally recognised that the workers should have a say in this matter. The only issue is whether, and to what extent, this is practicable.

The introduction or amendment of piece-rate systems should form part of normal consultation between employers' and workers' organisations. In this connection it may be stated with satisfaction that workers' organisations have engaged and are training more experts in this field. It is a point for consideration whether and to what extent the consultation might be delegated by the workers' organisations to a committee in the enterprise. It is the general opinion of the Committee that the technique of rate-fixing is mainly a matter for experts in this field, and that the workers usually do not possess the necessary specialist ability. At the same time, there is an unmistakable danger that employees will regard rates with distrust unless they are convinced of their fairness. The Committee, therefore, considers that it is desirable that there should exist some body in each enterprise through which employees can make known their objections to rates which they consider unjustified, or to the unfair application of a system. Such bodies should consist of the most expert persons in this field who are available. This means that the workers' delegates represented thereon should have received a certain amount of training in the time-study department of the enterprise. There should be no great difficulty in forming these bodies in large enterprises having time-study departments of their own. It is quite another point whether small firms will be able to invest their systems of payment with similar guarantees. The Committee suggests that regional agencies for each branch of industry or each group of enterprises, consisting of an equal number of employers' and workers' representatives, might be set up to perform similar functions. Although there is one example of an agency of this kind, the extension of the principle should not proceed without further enquiry into its possibilities and desirability.

The Committee considers that workers' organisations should confine their activities to the general issues arising out of the application of piece-work, such as the systems which ought to be applied and the question whether or not piece-work should be adopted. The handling of objections to the application of piece-work systems should be carried out by the above-mentioned committee for the enterprise concerned.

The Committee is of the opinion that the foregoing conclusions indicate the general lines along which workers should be consulted in matters relating to the application of systems of payment by results.
STATEMENT OF THE GOVERNMENT OF THE UNITED KINGDOM, 
FORWARDED IN AGREEMENT WITH THE BRITISH EMPLOYERS' 
CONFEDERATION AND THE TRADES UNION CONGRESS

Wage incentive schemes are of various types. It cannot be asserted 
that any one type is superior to other types, since each industry has 
its own characteristics and what may suit one industry may not be the 
best for another industry. Differing circumstances can and do exist 
even as between individual firms within an industry. It should not 
be assumed that in every case the type that has been actually adopted 
is necessarily the most suitable. Indeed there is room not only for a 
more general adoption of wage incentive schemes but also for improve­ 
ments in some of the schemes already established. As regards the 
widder application of incentive schemes, it has to be recognised that 
there are some processes or industries to which incentive schemes 
cannot appropriately be applied for various reasons, including in some 
cases considerations for the safety of the workers engaged. As regards 
the merits of existing schemes, there are certain qualities which an 
incentive scheme should possess if it is to fulfil the purpose for which 
it was designed. Such schemes must fit in which the collective agree­ 
ments and working rules in operation in the particular industry; in 
addition some of the more important features which are characteristic 
of good incentive schemes may be enumerated as follows:

(1) Additional rewards result from extra effort and are confined as 
far as possible to those who do in fact put out extra effort. The scheme 
is not merely a disguised form of wage increase.

(2) Careful study of each job is undertaken before fixing piece­ 
work prices or basic times, so that errors in rate-fixing may be avoided. 
Similarly piece prices that have become unrealistic through lapse of 
time or change of circumstances are adjusted by agreement.

(3) The scheme is based on joint consultation at all stages between 
management and workers or their representatives so that all parties 
have full confidence in the arrangements.

(4) Increased output is not to be obtained at the expense of the 
quality of the product or at the cost of excessive fatigue or strain.

(5) Where collective, as opposed to individual, incentive payments 
are concerned the reward is not to be too remote from the effort which 
earns it. Bonuses are therefore paid at intervals as short as possible.

OBSERVATIONS OF VARIOUS AUSTRALIAN EMPLOYERS' ORGANISATIONS

Any incentive schemes must be evolved as a result of efficient time 
and motion study and must be based on good work with allowances 
for fatigue and personal time. Any scheme must be simple enough to

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1 Communication to the I.L.O., 1 Dec. 1950. This statement has been 
published in United Kingdom Ministry of Labour and National Service: 
Wage Incentive Schemes, Industrial Relations handbook Supplement No. 4
(London, H.M. Stationery Office, 1951). This handbook was prepared by 
the Ministry of Labour and National Service in co-operation with the National 
Joint Advisory Council which is a body consisting of representatives of the 
British Employers’ Confederation, the Trades Union Congress and the nation­
alised industries.
allow of the employee readily understanding the system under which he works and as being related to his personal effort. They should be adopted on an industry basis and after agreement with the employees concerned. The possibility of including an attendance bonus for rotating shifts in the rate fixed should be kept in mind. There should be prompt payment of earnings.

Any incentive schemes which are based solely or in part on attracting labour or a means of appeasing militant sections of employees defeat their own purpose. Some of the abuses of those schemes between employer and employee include such factors as improperly prepared schemes, because of inadequate time and motion study; selection of the wrong type of personnel for such work, because of technical incompetence or for other reasons; disregard of the ability of the average workers and elimination of the fatigue and personal time factor. In other cases unsuitable schemes may be adopted on the recommendation of motion study personnel who may be concerned not with the correctness of the task set but with the commendation of their management. While these factors all militate against the success of any incentive schemes it should be stressed that the greatest abuse is to be found in cutting the price fixed after scientific investigation. Any scheme devised merely for the purpose of attracting employees constitutes an abuse between employers.

Because of the difficulties in implementing profit-sharing schemes they should be restricted to staff employees and should be expressed as annual bonuses.¹

Prior to the introduction of any incentive scheme, mutual trust and confidence between the management and employees must exist.

There must be absolute justice and fair play to all concerned.

Incentive systems should be established on a basis which will make it possible for the employee to earn such amount in excess of time wages as is considered a reasonable incentive to co-operating in such a scheme.

Employees should be made conversant with the system and be able to calculate their own earnings without undue difficulty. The plan must be clearly presented and understood. Full information regarding the system should be published.

A set of rules should cover contingencies, such as variations of standards when the machine or process is changed, variations in hourly award rates, the effect of breakdowns, payment for overtime, shift premiums, absenteeism, etc.

Shift premiums, penalty rates and overtime premiums shall be a separate addition and excluded from calculation of incentive earnings.

An allowance to cover normal delays shall be incorporated into standard times or rates. Waiting time in excess of a predetermined minimum shall be paid for at award rates.

Incentive schemes, to be successful, should be based on motion and time study methods. It is essential that only trained time-study observers with adequate experience should be employed.

A basis for adjustment of incentive earnings with variations in hourly award rates must be predetermined.

An incentive system should be introduced preferably in a small section to prove its advantages and later expanded as the advantages to all concerned become apparent.

¹ Communication to the I.L.O. from the Australian Council of Employers’ Federations, 4 Jan. 1951.
It is management's responsibility at the inception of an incentive scheme, and thereafter, to see that operators are instructed in the established methods.

If an operator cannot earn a reasonable margin on an operation, he shall have the right to question the rate set. On receipt of such question, the rate shall be investigated and either justified or revised.

Standards, once set, should be guaranteed by management and should not be reduced unless warranted by a change in conditions, operation, methods or material; or to correct a demonstrable clerical error.

As there is a tendency for alterations in processes to accumulate, it is desirable to record every change and decide whether or not such changes warrant an alteration in standard time. Incentive systems should be applied to the individual as far as possible, or in small groups, as the larger the group the less direct is the incentive.

Those responsible for checking the quantity and/or quality of the work performed should not be direct participants in the incentive system.

Bonus payments should follow as quickly as possible after they have been earned.

A definite policy as to whether earnings on one job or established period should be offset against loss on another, must be established.

Sound and unvaried standards and methods of inspection are an essential part of any plan, together with a definite method of recording achievement.

Employees should not be paid incentives on faulty work within their control.

It is essential that management plays its part in the provision of all factors necessary for continuous production.¹

Systems of payment by results have an advantage over payment by time because the former exerts a strong influence on initiative and meets the desire, latent in all human beings, for individual recognition.

There is no greater stimulation to personal self-confidence and mental security than the genuine appreciation of work faithfully and efficiently performed. Everyone looks for reward and recognition, and this desire is satisfied by systems of payment by results.

Payment by results gets much of the world's best work done as it satisfies the employee's desire to be noticed—to be recognised. It therefore inspires employees' thoughts, feelings and behaviour, and produces satisfaction in the employee.

Opinion differs as to the advantages of individual versus group systems. Group systems are common in the metal trades but they are not regarded as a true system of payment by results. Employers who have regard for a proper and soundly based system prefer the individual system.

Employers believe that the selection, introduction and operation of a soundly based incentive system must first of all be related to the basic requirements, which involves—

(a) a study of variable factors;
(b) the amount of standardisation required;
(c) determination of allowances, bonuses and increments;

¹ Communication to the I.L.O. from the Associated Chambers of Manufacturers of Australia, 4 Jan. 1951.
(d) motion and time study;
(e) administration and training;
(f) written instructions for the benefit of employees;
(g) quality specifications;
(h) production control;
(i) accounting;
(j) method of payment;
(k) contingencies, e.g., a study of rules to cover such matters as variation of standard when a man or process is changed; variation in hourly award rates; the effect of breakdowns; payment for overtime; shift premiums; absenteeism; inability to make standards, etc.

Appreciable increases in output have been noticeable, which have been, of course, accompanied by commensurate increases in pay.

However, in quite a number of instances limitations on output have been introduced through union interference and thus in these instances the whole conception of the true incentive has been destroyed.

Soundly based incentive systems improve employer-employee relations. However, this is not to be taken as meaning that there are no disputes where payment by results operates. Disputes do occur but not with the severity of the disputes in workshops where payment is by time.¹

OBSERVATIONS OF A STUDY GROUP OF DIRECTORS OF FIRMS SET UP BY THE CENTRAL FEDERATION OF SWISS EMPLOYERS' ASSOCIATIONS ²

A system of payment by results certainly constitutes the fairest method of remuneration. The fixing in advance of a piece-rate or of the time which will be allowed for a job provides a target which the worker can actually attain. On the other hand, with payment by time, the worker has no fixed target. All times must be calculated on an equitable and objective basis.

A system of payment by results is advantageous to both sides—the worker and the employer: on the one hand it gives the worker a wage corresponding to any greater effort, while on the other it enables the employer to utilise his means of production better.

Preference ought to be given to individual systems of payment by results. The worker's remuneration then depends exclusively on his own output. Moreover, this system is applicable to the majority of industries. On the other hand, in cases where production can be carried on only by a group of workers, a group system of payment by results or a bonus system should be applied. Under these systems the worker generally participates in the collective output bonus or in the premium in proportion to his basic wage. The system recommended for Switzerland is the fixed-time (i.e., the standard hour) rather than the fixed-price (i.e., the piece-work) system. With the fixed-time system it is possible to take account of the personal capacities of the worker, for example, the care with which he carries out his work and the proportion of rejects that he produces.

¹ Communication to the I.L.O. from the Australian Metal Trades Employers' Association, 4 Jan. 1951.
² Communication to the I.L.O., 7 Feb. 1951.
Experience has shown that the collaboration of a firm's works committee—the members of which are directly acquainted with workshop conditions—is extremely useful in the introduction and application of systems of payment by results. On the other hand, the collaboration of the trade union, which is not in direct contact with the undertaking and which tends to be inspired by doctrinarian views, is not to be recommended.

In fact the introduction of a system of payment by results secures an increase in output as much as 30 per cent. higher than the output under payment by time.

It is inevitable that differences of opinion sometimes arise between employers and workers regarding the sum earned, but this happens also under hourly wage systems. The important thing in fixing rates of payment by results is that the times allowed shall be determined in as fair a manner as possible and that the worker shall have complete confidence in the service which does the timing. If he so wishes, the worker ought to be informed of the manner in which the times have been determined. Payment by results is not injurious to the health of the worker, but if this should arise it is due to the character or personal conditions of the worker. Generally, the health of a worker depends chiefly on his way of life. Further, in the majority of enterprises, the works doctor, social assistance and the works committee safeguard the worker against overwork.

Conclusions of the United States National Association of Manufacturers

The fundamental factors essential to the installation and administration of an incentive plan are as follows:

1. The standard of performance for a job must be established by management based on fairness of a fair day’s work for normal operators, consistent with health and safety, quality production and operating efficiency.

2. Base rates should reflect fair wage differentials between jobs based on their relations and relative requirements in terms of skill, experience, responsibility, degree of difficulty, application, and working conditions. Such base rates necessarily apply to those established in an individual plant.

3. It must be recognised that for any incentive plan to produce results, there must be no limitation of output of the individual worker, and this must be agreed by the unions. Management, on its part, must agree that after a permanent standard is once set, the standard will remain unchanged, unless there has been a change in equipment, work specifications, in method, design, or in other controlling conditions.

4. In any incentive system in a new plant, in a new operation, or for a new product, a temporary standard will have to be set until such time as fixtures, methods and work procedures are fully developed and standardised, and the training of operators is completed. Only after this is accomplished can permanent standards be set. Great care must be exercised to avoid having the temporary standard through inattention become the permanent standard.
5. It is desirable for employees to understand the operation of an incentive plan and be able to compute their earnings thereunder.¹

Observations of the American Federation of Labor ²

1. It is probably fair to say that although not all unions have opposed these systems of wage payment, it is probably true that the overwhelming majority of American unions are quite suspicious of them. In general, American workers seem to feel that payment for work done on the basis of time spent at the work is the fairest method of wage payment.

2. Where piece-rate or incentive wage systems are introduced, workers insist that there be a floor in the form of a minimum wage below which no worker's wages may be reduced.

3. American trade unions have insisted that where piece-rate or incentive wage systems are established, the formula used and the rate set must be jointly determined by the employer and the trade union representing the employees.

4. Where these systems are in operation, trade unions have generally tried to make sure that the formula used and the rates established take adequate account of the factors over which the worker has no control, such as breakdowns of machinery, temporary shortages of materials, etc., and also allow for rest periods and "personal time" for the worker.

5. Before these systems of wage payment are introduced, trade unions generally attempt to obtain the agreement of the employer to a short trial period during which both the employer and the union will have an opportunity to determine whether the proposed system is fair and workable.

Observations of the Research Department, United Steelworkers of America (C.I.O.) ³

Point-by-point comment on items in the I.L.O. questionnaire.

1. Incentive systems of payment generally produce greater compensation for the employees, increase production, improve the competitive position of the employer and make possible the passing on of benefits to consumers in the form of price reductions.

Numerous disadvantages also are sometimes connected with the use of incentives, such as dangers to the health of the workers (disregard of safety through use of shortcuts in an attempt to increase earnings); creation of inequities (omission of some groups of employees from incentive method of payment); less union solidarity because of the competitive factor; possible lowered employment and/or reduced hours in periods of recession.

The preference of the union is toward group incentive plans rather than individual incentives. It is felt that group plans are less likely

¹ National Association of Manufacturers, Industrial Relations Department: Information Bulletin No. 5, 11 June 1946, p. 48. This Bulletin was supplied to the I.L.O. in reply to the I.L.O. questionnaire on systems of payment by results by the National Association of Manufacturers.

² Communication to the I.L.O., 12 Dec. 1950.

³ Communication to the I.L.O., 22 Mar. 1951.
to create inequities, encourage teamwork rather than competition at a health-killing pace, and are more equitable since individual incentives often produce great disparities in earnings.

2. The United Steelworkers of America (C.I.O.) favours as simple incentive plans as possible—such as the Standard Hour Plan which enables workers to calculate incentive earnings quite easily. Under this plan the work requirements for a standard hour are spelled out; the standard hourly rate is the base rate and also the guaranteed minimum hourly rate, and compensation for work above the standard is on a “one for one” basis. In some cases union representatives assist in such matters as time studies, but in the basic steel industry the actual initial responsibility for time and motion studies is the company’s, as is the task of introducing and explaining to the workers involved the incentive plans to be used.

The union, of course, negotiates with management concerning the types of incentive plans and with respect to technical matters such as the type of time study, interpretation of time-study results, etc. The union continues to press for a standard approach to time study in the industry. At the present time different managements have different approaches—some being primarily concerned with production, some with the physical amount of work performed by the employee and others with the capacity of a particular machine.

3. Our experience has been that the key to successful operation of an incentive system is the attitude of the workers involved. Output will increase if the workers understand the plan and consider it fair and equitable. A successful plan which provides equitable increases in earnings results in better labour management relations, makes workers more conscious of management problems and increases worker interest in finding ways and means of increasing production.

4. Employees’ interests are safeguarded somewhat through provision for a guaranteed minimum hourly rate, through contractual provisions forbidding the changing of incentive rates except when there are changes in equipment, materials processed, etc., and through the retained right of the union to challenge incentive rates, after a trial period, through the grievance procedure and, if necessary, to arbitration.

Observations of the Italian Confederation of Metal and Engineering Workers

Any system of payment by results is advantageous to the undertaking, but whatever system is applied must be accepted by the workers and not imposed upon them. To secure their acceptance, such systems must fulfil the following conditions:

(a) The work should be reckoned and paid for individually, save where several workers co-operate, as in the assembling of complicated machinery, the assembling of automobiles by the chain system, or in work at furnaces and rolling mills in the steel industry. The desirability, and the form, of systems of collective payment by results must be carefully studied in each case, since they may fail to provide an individual stimulus.

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1 Communication to the I.L.O., 10 Nov. 1950.
(b) The rate of payment per unit of output must be expressed in currency, and not in abstruse or abstract symbols, and must be applied in full, however large the number of units produced.

(c) The rate per unit of output must be determined so that each worker can effectively obtain the prearranged minimum (except where he commits a breach of contract and may be fined).

(d) The workers should be enabled to check all the elements making up their earnings.

(e) After the lapse of the period required to determine the piece-rate, the rate should be permanent and not subject to cuts, except when alterations—in either direction—are justified by technical changes which reduce or extend the time required.

The above principles should be contained in a single collective agreement.
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