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INTRODUCTION

The International Labour Organisation has always had a deep interest in the promotion of effective systems of labour inspection to ensure that the theoretical standards embodied in labour laws will be given practical effect and thus become the actual standards of protection for workers. This interest culminated in the adoption by the International Labour Conference at its 30th Session of the Labour Inspection Convention, 1947 ¹, which has been widely ratified.²

In addition the International Labour Office is called upon from time to time to advise governments on the application of protective labour laws and regulations; experience in response to such requests has shown that it would be useful to publish a guide for labour inspectors outlining the methods and procedures of inspection and including basic information on the organisation and responsibilities of the labour inspectorate.

In drawing up the guide the Office has taken account of the standards of the above-mentioned Convention which, it may be useful to point out, is primarily concerned with inspection in industrial and commercial workplaces and is therefore not wholly appropriate for such activities as mining and transport, which present special problems.

While practical inspection standards have been evolved on the international plane it must nevertheless be recognised that details of the organisation and operating practices of inspection services vary in some respects from country to country. A study such as this cannot, therefore, be based on the labour law or enforcement machinery of any one country; on the other hand, it has been necessary to proceed on the basis of certain assumptions so as to give the guide the desired practical

² On 1 January 1955 the Convention had been ratified by the following countries: Austria, Bulgaria, Cuba, Dominican Republic, Finland, France, Guatemala, Haiti, India, Iraq, Ireland, Italy, Japan, Netherlands, Norway, Pakistan, Sweden, Switzerland, Turkey, United Kingdom.
character, and to suggest certain methods and procedures of inspection, well tested in practice, for the guidance of inspectors in situations where the service may still be at an early stage of development. The protective labour laws assumed in this guide to be enforceable by inspectors are those dealing with hours of work and related questions (e.g., meal and rest breaks, overtime and night work), wages, the prohibition of child labour, the various regulated aspects of the conditions under which women and young workers are employed, and industrial safety, health and welfare—in short, the laws and regulations concerning conditions of work and the protection of workers while they are engaged in their work. Although in some cases an inspector’s responsibilities may include arbitration of labour disputes, administration of employment exchanges and the collection of various types of statistics, such duties are not directly connected with the inspector’s primary functions and are consequently excluded from consideration in this guide.¹

The above reference to the safety and health of workers calls for some additional comment. Protection against the hazards of accident and occupational disease embraces complex technical matters with which the general labour inspector is often not equipped to deal. In some countries this is the responsibility of specialised staff (e.g., specialists in engineering, medicine and chemistry), who may form part of a unified, comprehensive inspection service or be organised as separate inspection bodies (such as a mines inspectorate) or attached to branches of the public service other than the labour ministry. In other cases, however, particular national conditions and the stage of development of the inspection service may be such that responsibility for these matters falls to a great extent on the general labour inspector. While it cannot be over-emphasised that the protection of the safety and health of workers requires the technical skills of competent specialists trained to detect and deal with industrial hazards, the assignment of such duties to general labour inspectors must be recognised as an existing

¹ It may be recalled that Article 3 of the Labour Inspection Convention, 1947, after defining the functions of the system of labour inspection, provides that “any further duties which may be entrusted to labour inspectors shall not be such as to interfere with the effective discharge of their primary duties or to prejudice in any way the authority and impartiality which are necessary to inspectors in their relations with employers and workers.”
fact. Accordingly, the guide includes a section dealing mainly with general problems of industrial safety and health; and, to assist inspectors who may wish to obtain more specific guidance on the most common safety and health risks, a selected bibliography of publications dealing with such problems is appended.

Finally, while the guide contains indications concerning administrative record and report forms, these are no more than suggestions since the details in each case must be worked out having regard to such matters as the particular legal provisions to be enforced and the administrative practice of the country concerned and it is therefore impossible to elaborate a uniform set of forms that would be generally applicable.
PART I

THE LABOUR INSPECTION SERVICE

Legislation for the protection of workers acquires real meaning only when it is enforced by a body of specially qualified officials who visit workplaces at frequent intervals in order to carry out three essential tasks: (1) to see, through personal examination and investigation, whether the legal provisions in question are being applied and, if this is not the case, to take appropriate action to secure compliance; (2) to assist both workers and management, by giving them the technical information and advice they need, to understand the requirements of the law and how to comply with them; and (3) to investigate labour conditions for the information of the government and to bring to the notice of the competent authority any defects or abuses not specifically covered by existing legal provisions. The machinery set up to ensure that these tasks are carried out with maximum effect is the labour inspection service. This service is primarily concerned with the enforcement of legislation regarding conditions of work and the protection of workers while they are engaged in their work, such as provisions relating to hours of work and rest, wages, safety, health and welfare, and the employment of women and young persons. Labour inspection is not, in itself, a direct protective instrument; it is rather a method of ensuring the enforcement of protective legislation, of promoting improved labour conditions and of investigating existing conditions for the information of the government.

Historically, labour inspection in its early development as regards industry was largely directed towards factories, in which the need for protective legislation first made itself felt. The introduction of mechanical processes of production, in factories employing sizable concentrations of workers, including large numbers of women and children, made it clear that measures must be taken to protect workers against the worst effects of
overwork and the special dangers to their health and safety which arise in factory operations. From these beginnings, protective legislation has been progressively extended to cover other fields of economic activity, such as workshops and undertakings where work is carried on under factory conditions but is not directly concerned with manufacture or production (e.g., docks, warehouses, laundries), to commerce and distribution, to building and construction and to agriculture. As the scope and complexity of legislation for the protection of workers have increased, there has been a parallel development in the organisation of methods and procedures of enforcement to ensure that the objectives of the legislation are achieved in actual practice.

While the value of labour inspection to the worker is self-evident and has been recognised from the beginning, there has also been a growing recognition of its value to management and to the social and economic interests of the community as a whole. For the employer, the system of labour inspection provides the means whereby he can get reliable information on his obligations under the law and practical advice concerning the means of complying with the legal requirements. He can expect of the service that it will ensure uniform and impartial application of the legislation so that he is protected against unfair competition of others based on depressed labour standards, and he shares in the benefits to the community that flow from the efficient administration of labour laws. The maintenance of sound labour standards in his undertaking, in which he is assisted by the labour inspectorate, tends to result in more efficient production from workers who work reasonable hours, who are not employed in tasks that surpass their physical powers, and who are provided with safe and healthy workplaces and conditions.

These benefits brought to both employer and worker in the workplace also redound to the general benefit of the community in the form of higher and more efficient economic productivity, protection of the welfare of the population as a whole, and the promotion of a harmonious industrial atmosphere.

To achieve these important social objectives—in a word, to secure an efficient labour inspectorate—is by no means an easy task. Much care and effort must be applied in tackling a wide range of interrelated problems of administration, staff,
methods and procedures. While the details of labour legisla-
tion, and consequently the problems of enforcement, vary from
country to country, generally in accordance with the stage of
economic and industrial development, experience has shown
that these problems arise in much the same form in all countries
whose public policy is to protect the welfare, health and safety
of its working population. Fortunately, however, there has
also been considerable experience in the best principles and
methods to be followed in ensuring the strict and uniform
enforcement of labour legislation and the organisation for that
purpose of systems of labour inspection.

The general survey that follows, based in large part on the
provisions of the Labour Inspection Convention, 1947, is
intended to give in broad outline the essential principles of
inspection and to indicate sound methods and procedures of
enforcement, advice and inquiry.

Organisation of Labour Inspection

The Central Authority

An essential object of the inspection service is to ensure
uniformity in the application of labour legislation throughout
the national territory. This can only be achieved through
direction and co-ordination of the work of inspectors by a
central authority, whose functions include responsibility for
formulating uniform methods and procedures of inspection, and
for supervising the enforcement activities of inspectors. The
central authority provides inspectors with documentation dealing
with sound labour conditions and the proper equipment of
workplaces. It organises inquiries whose scope may go beyond
the geographic limits of a particular inspector's district. When
problems of a general character arise, the central authority,
with greater resources of specialised staff and with access to
research or testing services, is better equipped than the individual
inspector to work out solutions useful in various parts of the
national territory, thus ensuring uniformity and relieving
inspectors of the need to work out problems individually. As
the focal point of the inspectorate, to which information flows
from the local or district branches of the service, the central
authority has an over-all view of social and labour problems, which enables it to keep the government informed of new developments and needs.

The labour inspectors are the executive agents of the service and carry out the actual work of enforcement. Close co-operation between them and the central authority is essential to the effective functioning of the service. They must carry out their tasks in accordance with the procedures established for the service as a whole, and must keep their superiors informed of their activities and findings. This co-operation has a double effect: for the labour inspector, it means that he can carry out his duties with confidence that his colleagues are applying the same interpretations and methods in their particular districts and in the knowledge that he has the full support of the central authority; while, for the latter, it means that complete reliance can be placed on the accuracy of inspectors’ observations and the effectiveness of their work.

Local Organisation

Labour inspectors should be in a position to visit all the undertakings under their supervision at regular and sufficiently short intervals, and without undue expense or loss of time. The local offices or branches of the service should therefore be so situated that inspectors can remain in close touch with the establishments they have to inspect and with the employers and workers concerned; the branches should also cover districts of a size appropriate to the needs of the service.

However, even in small districts visits involving considerable expense may have to be made to outlying establishments. Such expenses should in no case be borne by the inspector himself and provision should therefore be made for granting allowances for travel and out-of-pocket expenses. This is most often done by refunding expenses the inspector has incurred in the course of his duties.

While most of an inspector’s time is spent in visiting establishments, a substantial fraction must be devoted to the preparation of reports, interviewing employers and workers, correspondence, and so forth. If they are to carry out these duties satisfactorily, inspectors must be provided with centrally located and suitably equipped offices.
INSPECTION STAFF

Status and Position of Inspectors

The successful execution of the work entrusted to inspectors depends in large part on their impartiality, personal authority and independence from improper external influence. It is therefore necessary to provide for conditions of service in keeping with the social importance of their mission and designed to safeguard their position in these respects.

The inspection service cannot enjoy the authority it requires unless the labour inspectors are guaranteed by their conditions of employment a certain minimum of security and a social position which places them above any influences that might affect their impartiality. Nor can a labour inspector carry out his duties in an independent and unbiased manner if his continued employment in the service depends on political influence or personal considerations. Hence it is necessary to guarantee to inspectors stability of employment and equitable remuneration. Only by providing such conditions can suitable candidates be attracted to the inspection service.

In this connection article 6 of the Labour Inspection Convention, 1947, provides that—

The inspection staff shall be composed of public officials whose status and conditions of service are such that they are assured of stability of employment and are independent of changes of government and of improper external influences.

Qualifications of Inspectors

The personal qualifications of labour inspectors have a direct effect on the prestige of the service with employers, workers and the general public. They should be persons with a highly developed feeling for the human and social problems with which they have to deal, and should carry out their duties with integrity, tact, intelligence and good judgment. For employers and workers alike, the labour inspector is the official representative of the labour authority, and their opinion of and respect for that authority will depend on their relations with the inspector.

The inspector should have a knowledge of social and economic questions in general and of their significance for the
industries with which his work is concerned in particular, so that his dealings with the many different kinds of people with whom he comes in contact may be carried out intelligently and on a practical basis. He may have to deal with all sorts and conditions of people and should be able, by reason of his acquaintance with their practical problems, interests and circumstances, to speak with them at their own level and in their own "language". The inspector must also, of course, be technically qualified by experience and training for his work. No precise rules can be laid down in this regard since it is evident that the technical qualifications required of inspectors will depend on their particular responsibilities; an industrial safety inspector, for example, must have certain technical skills different from those required of, say, an inspector specialising in questions of young persons' employment. In many inspection services, however, it has not yet been found possible to institute a system of specialised technical inspectors, with the result that responsibilities for technical inspection fall upon officials to whom a wide range of inspection duties, both general and technical, is assigned. Whatever may be the arrangements in a particular service, a basic and essential qualification for inspectors is that they must have technical skills commensurate with the duties they have to perform and in any case a knowledge of the technology of the different branches of industry they deal with.

Training of Inspectors

In view of what has been said above, it will be readily apparent that the directing officials of an inspectorate must devote particular attention to the training of labour inspectors. Two major purposes are thereby served: to attain a high level of competence in the inspection staff and to ensure uniformity in inspection standards.

While candidates for the service may be found who possess the necessary moral qualifications, a good standard of general education and a useful background of industrial experience, the duties of a labour inspector will inevitably present many new and unfamiliar problems. Both specialised training for the particular problems of inspection and considerable practical experience in the work itself are required if an inspector is to become thoroughly competent to perform all his duties. It is
particularly important (and indeed customary) that recruits should undergo a period of probation—say, one to two years—during which they are trained in the performance of their duties and their abilities and personal qualifications are tested. Training may consist of formal courses or new recruits may simply be initiated in their duties by accompanying older inspectors on their daily rounds, a method akin to "on-the-job" training. However, the latter method alone would not appear to ensure adequate training and the most satisfactory solution is probably to provide both general theoretical training and specialised training in a particular branch or branches of inspection work, and to supplement such formal training courses by practical experience acquired under the supervision of an older inspector.

Employment of Specialists and Technical Experts

The tasks of the labour inspectorate include the supervision not only of legal provisions concerning hours of work, rest periods, night work, etc., but also of those concerning conditions of safety, hygiene and welfare in workplaces. The growth of industry using machinery and the development of mechanical, chemical, electrical and other processes have made the problems of safety and health with which the inspectorate has to deal increasingly complex and difficult.

For these reasons the inspectorate must be able to count on the services of technical experts and specialists. This need is usually met either by attaching special technical sections (consisting, for example, of doctors, engineers, chemists or experts in youth problems) to the central service, or by including technical specialists in the staffs of the various district branches. Complementary arrangements may also be made whereby the inspectorate secures the co-operation of laboratory or research specialists who do not belong to the inspection service itself but may be attached to other government departments (the Ministry of Health, for example).

Whatever the arrangements made in this regard, however, the general labour inspector should be given sufficient technical training to be able to detect possible dangers to the workers' safety and health in the course of his routine inspection work, and to appreciate the need for calling upon the services of
specialists when he comes upon complex problems the solution of which requires specialised skills that he may not himself possess.

Employment of Women Inspectors

From experience acquired over a considerable period of time by well-established inspection services, there can be no doubt that women inspectors must be employed if a high level of effective protection for women and young workers is to be maintained. It is a common practice therefore to appoint women inspectors in districts where the proportion of women and young workers is high, and to assign special duties to them in connection with the protection of these categories of workers. Nevertheless, no distinction should be made between men and women inspectors; for example their selection, training, supervisory and regulatory powers, status and conditions of service should be identical.

Duties of Labour Inspectors

The primary duties of labour inspectors have already been mentioned. The Labour Inspection Convention, 1947, goes further and provides that—

Any further duties which may be entrusted to labour inspectors shall not be such as to interfere with the effective discharge of their primary duties or to prejudice in any way the authority and impartiality which are necessary to inspectors in their relations with employers and workers.

This latter provision is of considerable importance for inspection services in a relatively early stage of development, since experience has shown that there is often a strong temptation to use the staff of an inspectorate for a variety of extraneous duties at the expense of the work of visit and inspection. Among such duties—which may include, for example, the collection of industrial statistics or the administration of employment exchanges—particular mention may be made of formal conciliation or arbitration duties in connection with industrial disputes. When an inspector has to act also as an industrial conciliator or arbitrator, there is a real danger that he may be tempted to

1 See above, p. 5.
carry out his enforcement duties with some laxity in order to win the employers' goodwill; or he may find that, where he has sided with one of the parties to a dispute, the other party will tend to regard him with suspicion and to withhold its confidence and collaboration from him in his capacity as inspector.

The functions of a labour department are varied and numerous, and must be carried out, to the greatest extent possible, by skilled personnel whose attention is focused on related and compatible responsibilities. The assignment to inspection officials of unrelated or incompatible extraneous duties, for reasons of convenience in the matter of supervision or because of the experience they gain in carrying out their principal duties, should be carefully considered if the work of visit and inspection is not to be prejudiced.

**THE POWERS OF LABOUR INSPECTORS**

Labour inspectors must be armed with certain powers to enable them to carry out their duties effectively. These essential powers are, briefly, the power of free access to, and investigation in, workplaces subject to inspection; the power to initiate legal measures to enforce compliance and to bring legal sanctions to bear in the case of serious or repeated breaches of the law; and the power to take measures to protect workers against dangers to their safety and health.

The practical significance of the first power mentioned above is that the inspector must be entitled to enter undertakings subject to inspection without hindrance and without having to give previous notice to the employer.

Having entered a workplace, the inspector requires certain rights of investigation to enable him to see for himself whether the law is being applied and to observe whether there exist any dangers to the safety and health of the workers. Consequently, he is empowered to question the employer or workers on any matters concerning the application of the relevant legislation; to require the management to produce for his examination any registers, records or other documents the keeping of which is prescribed by the legal provisions relating to conditions of work; to enforce the posting of notices prescribed by the legal provisions with a view to keeping the workers
informed of conditions of work; to take or remove, for purposes of analysis, samples of materials and substances used or handled in the undertaking; and to examine the plant, layout, machinery and other installations to see that adequate measures are taken to protect the health and safety of the workers.

Finally, there are regulatory powers to be applied if the inspector observes defects in plant, layout or working methods which constitute a threat to the health or safety of the workers. Under this heading falls the necessary power to issue orders requiring such alterations to the installation or plant as may be necessary to secure compliance with protective provisions, such orders to be carried out within a specified time limit or, where imminent danger is present, immediately. Depending upon the administrative or judicial practice of a country, the power to issue regulatory orders may be exercised directly by the labour inspector or, on the information he supplies, by another authority, usually the regional or central headquarters of the service.¹

In the application of these basic powers there must be certain modifying safeguards, prescribed by law or by knowledge of what is good practice. Thus, while the inspector has the right to enter workplaces without giving advance notice to the employer, it is reasonable and proper that he should normally notify the employer or his representative when carrying out a visit of inspection. Again, the employer should be notified if samples of materials and substances used or handled in the undertaking are removed for analysis. And, finally, employers should have the right to appeal to a judicial or administrative authority against a regulatory order that they may consider unjustified or illegal.

Measures to Facilitate Inspection

The granting to labour inspectors of specific powers of entry and investigation is not in itself sufficient to ensure effective supervision.

There can be no doubt that the work of supervision is appreciably facilitated when the inspectorate is kept regularly informed of the existence of undertakings that may be subject

¹ See also pp. 21-22 below.
to inspection. This problem may be handled in such a variety
of ways, depending largely upon the administrative or legal
practice of a particular country, that no generally valid solution
can be indicated. The practice may be to require any person
who proposes to open an establishment, or to take one over,
or to make substantial changes in the nature of his business,
to notify the inspectorate accordingly. Such an arrangement
may be general in scope or it may apply solely to establishments
of such a nature that they require supervision from the point
of view of safety and health, or to establishments involving
special dangers on account of the operations performed or the
plant used. Another method sometimes employed is to require
persons opening new establishments to obtain an industrial
permit or certificate of registration from some general or
municipal authority other than the inspectorate, in which case
an administrative arrangement is made whereby the industrial
registration authority informs the inspectorate. Or, again, the
requisite information is transmitted to the inspection service
by a social insurance institution.

Not only should the inspectorate be notified of the existence
of workplaces but it should also be given an opportunity to
examine plans for new establishments, plant or processes of
production so that it may advise whether due account has
been taken of safety and health requirements. In a substantial
number of countries such plans may be carried into effect
only on condition that alterations ordered by the inspectorate
for the purpose of securing the health and safety of the workers
are made. The major reason for such an arrangement is that
it is much easier to make the required changes in the plans
than in premises already built or in construction, or in fixed
installations after an establishment has begun operating.

In the actual work of supervision the labour inspector
needs some degree of positive help from the parties concerned
to facilitate his task of checking compliance with the legal
requirements. In particular, certain records essential to inspec­
tion must be kept by employers and made available to the
inspector for examination. While here, too, the situation will
necessarily differ from country to country, it is possible to call
attention to the more common requirements, which experience
would seem to indicate are the essential minimum. These
include:
(a) staff lists and registers, showing the name, age, sex and occupation of the workers;

(b) records of all young workers under a specified age (e.g., 18 years);

(c) records of hours of work and wages, including hours of beginning and ending work each day, the time allowed for meals and rest breaks, the weekly rest day and, in respect of each worker, the total number of hours worked each week, gross earnings, deductions from wages and the net amount of wages paid;

(d) accident records, showing the date of each accident, the name of the person involved, his work assignment and duties engaged in at the time of accident, the location of the accident, its probable cause, time lost from work, the nature of the injury, and the disposal of the case.

Furthermore, with regard to accidents, it is of great importance that notice be given promptly to the local branch of the inspection service so that an expert investigation may be carried out into the nature and causes of the accident and measures taken to prevent recurrence. The inspectorate should similarly be informed of cases of occupational disease.

Another aid to enforcement, although not of direct assistance to the inspector himself, is to require the posting of certain notices in workplaces to inform the workers concerned of such particulars as scheduled hours of work, shift arrangements, place and date of wage payments, and works regulations, or of the name and address of the labour inspector for the district; or to bring to their notice the texts or abstracts of certain laws or matters connected with health and safety. For the labour inspector, the effect of measures of this kind is that workers will be better informed and hence in a better position to collaborate in the enforcement of the legal provisions.

**Methods and Standards of Inspection**

**METHODS OF INSPECTION**

In carrying out his main duty—that of visiting workplaces and investigating the conditions under which the legal provisions are applied—the inspector can initiate the application of
legal sanctions in cases where he notes violations of the regulations, or he can persuade an employer to comply voluntarily and spontaneously with the legal requirements by giving him expert advice and assistance in understanding the provisions of the law and the means of complying with them.

Both of these conceptions of the inspector's approach to his responsibilities are important and useful, and neither should be relied upon to the exclusion of the other. The use of repressive measures alone would be likely to create and maintain among employers a state of hostility towards the inspection service and labour legislation, which would prejudice the enforcement of the law and might well create a source of irritation in relations between employers and workers. On the other hand, exclusive reliance upon persuasion is also open to criticism, since the absence of compulsion would not give guarantees of uniform enforcement of the regulations and would favour deliberate transgressors at the expense of the workers and of those employers who faithfully carry out their obligations.

The most effective practice is to lay particular stress on promoting understanding of sound labour conditions and of the legal provisions, and on informing and advising employers and workers of the most effective means of complying with their legal obligations. At the same time, the way is left open for repressive measures to be applied, if unavoidable, in cases of serious or repeated offences and obviously intentional violation.

This approach to the work of inspection lays great responsibility on the inspector and on his personal appraisal of a particular situation. Its successful application depends in large part on his technical skill, impartiality and tact, and is a measure of his ability to convince employers and workers that he can assist them to secure practical application of the law and to improve labour conditions in general.

Efficiency of Inspection Visits

Without efficient visits of inspection the law would remain a dead letter and the protection afforded to the workers would be an illusion. The efficiency of inspection visits depends on a number of factors already mentioned, such as the inspector's personal qualities of skill and tact and the measures
taken to facilitate the work of inspection, as well as on other factors which should not be overlooked or neglected.

One of these is the degree of education of workers and employers with regard to labour legislation, hygiene and safety, for the value of the inspector's advice and recommendations increases in proportion to the understanding shown by employers and workers. The latter often do not take health or safety precautions because they are not fully aware of the dangers that may exist and the necessary preventive measures they should apply; or, being aware of dangers, they fail to take precautions because of apathy or a feeling that the danger is not personal. Moreover, a lack of knowledge of the law on the part of workers may lead them to make unfounded complaints the investigation of which is a waste of time.

Other factors that influence the value of visits are the judicious selection by the inspector of the time of year, the day, or the hour at which they are made; their unexpectedness; and their duration and thoroughness. Visits to seasonal establishments during a slack season are of little value since it is during periods of full activity that there is a risk that the rules concerning rest periods will be violated; moreover the possibility that daily hours of work may be extended beyond the statutory limit arises more particularly at the beginning or end of work spells, depending on the timetable of each establishment. If a visit is to be effective, it must be unexpected as there are many violations that cannot be discovered if previous notice of the visit is given. This is the case, for example, with regard to violations of regulations concerning hours of work, the minimum age for employment, and the employment of women and young persons on dangerous or unhealthy operations prohibited by law. Finally, the time devoted by the inspector to the visit also has an influence on the standard of inspection. Short visits, unless they are made for a specific and limited purpose, are generally useless and often involve an excessive loss of time in travel. No inspector, however experienced, can in the course of a cursory inspection cover all the points with which he is expected to deal; moreover, in such a case, his personal educational and advisory influence on the management of the undertaking can scarcely make itself felt.

It should be kept in mind that the inspector's effective working time is the time spent in the actual visit to workplaces
under his supervision. Travel and the performance of certain administrative and clerical duties, while necessary and unavoidable, reduce the time available for carrying out this basic task. A useful criterion which may be suggested is that at least three-fourths of the inspector's working time should be devoted to the actual work of visit and inspection, and no more than one-fourth to travel and administrative duties.

**Frequency of Inspection Visits**

The standard of enforcement of labour legislation depends not only on the methods of inspection and the degree of efficiency of the visits but also on their frequency. If routine visits are not carried out at sufficiently frequent intervals, if check visits are not made regularly to see that the measures ordered by an inspector are being carried out, or if accidents, occupational diseases and complaints are investigated only after undue delay or at irregular intervals, the work of inspection will be largely ineffective. Moreover, irregularity in the enforcement of labour law creates inequalities in conditions of production from which the employers who faithfully observe the law are the first to suffer.

No particular problem arises in the case of a special visit to check compliance with an order issued by the inspector, since such orders usually lay down a final date for compliance, and it follows that the visit should be made within a reasonably short time after that date has passed. With regard to the investigation of complaints there is likewise little difficulty in prescribing a standard; complaints that appear to be well-founded should be looked into with little delay. Again, the investigation of an accident or cases of occupational disease should be accorded a high priority.

It is difficult, on the other hand, to define a standard of frequency for routine visits of inspection. This question may be approached in either of two ways. The standard may be expressed in chronological terms, requiring establishments to be visited, say, once a year at least; or it may be expressed in terms of need, requiring workplaces to be inspected "as often . . . as is necessary to ensure the effective application of the relevant legal provisions". The latter, in fact, is the standard adopted in the Labour Inspection Convention, 1947,
and appears to be the criterion most commonly employed in inspection services with long experience and proved effectiveness.

The practical application of this standard depends in large part on the judgment and initiative of the inspection staff stationed at the local branches of the service. It means that, once priority demands have been met (e.g., investigation of accidents and occupational diseases and of complaints), a decision has to be taken on the relative needs for routine investigation among the establishments coming under the supervision of the service. The most effective solution to this problem appears to be to concentrate inspections in the first place on establishments that carry on operations involving a high degree of risk to safety or health, and on those with a record of serious violations of the legal provisions.

**Collaboration with Employers and Workers**

There can be no question that the active assistance and co-operation of employers and workers are of paramount importance in the work of supervising the application of labour law. It is certainly valuable for inspectors to profit by the practical knowledge of those directly concerned in production, and both management and labour will have greater confidence in the work of the inspectorate if they feel that they share in the work and are not merely regarded as passive objects of inspection. It is therefore important that the parties concerned should be given an opportunity to express their opinions, bring forward suggestions and even take an active part in the work of inspection.

Some forms of co-operation have already been mentioned—i.e., the notification of complaints alleging abuses, the maintenance of records and registers, the notification of accidents, etc. There are, in addition, arrangements designed to encourage active collaboration between employers and workers in improving conditions affecting health and safety conditions, and between these parties and the inspectorate. There is a well-established and spreading tendency towards the formation of safety committees or similar bodies within each undertaking or establishment, comprising representatives of the employers and workers concerned. In some cases the establishment of such bodies may be required by law, in others they are set up
voluntarily by the parties concerned. In either case their functions generally include direct collaboration with labour inspectors in their investigatory work and, more particularly, in connection with inquiries into industrial accidents or occupational diseases.¹

Another form of collaboration is to organise conferences or joint committees where officials of the inspectorate discuss questions concerning the enforcement of labour legislation and the health and safety of workers with employers’ and workers’ organisations, or their representatives. Still another is to make arrangements for informing employers and workers, by means of lectures, posters, pamphlets and films and through special safety and health exhibitions, of the provisions of labour legislation, methods of application and measures for preventing industrial accidents and occupational diseases.

**Enforcement Measures**

As has been mentioned the inspection service aims in the first instance at securing voluntary compliance with the law by assisting employers and workers to understand the legal requirements and by giving them useful and practical advice on the best means of compliance. In spite of this primary consideration, however, the service must be capable of enforcing compliance by applying legal penalties when efforts to secure voluntary compliance fail—i.e., in the case of deliberate, repeated or serious violations. Moreover, because of the wide range of possible offences, a system of warnings and orders must be interposed between these two extremes of persuasion and legal sanctions.

A common practice in this regard is for the labour inspector to issue a warning in all cases of minor offences (and exceptionally in the case of a serious offence) with a view to avoiding unnecessary litigation. Related to this is the power of the inspector to issue an order requiring remedy of a defect that may constitute a threat to the health or safety of the workers; such orders prescribe a time limit for compliance or, in the event of imminent danger to health or safety, may have immediate executory force.

¹ See also pp. 98-101.
It will be readily apparent that recourse to such enforcement measures, i.e., warnings, orders and legal sanctions, depends in large part on the personal judgment of the inspector as to the seriousness of an offence, the intention of the offender (e.g., the possibility of recurrence) and the risk to safety or health involved. While the central administration of the service can lay down general principles to guide the inspector, these would be recognised as applicable largely in respect of extreme cases of serious or deliberate violation. More often than not, however, the inspector would probably be confronted with cases which fall short of being extreme and in which he would have to apply his own judgment as to the action most likely to yield maximum results. These results should be measured not in terms of penalties but rather in the degree of success achieved by the inspector in promoting willingness to correct abuses and introduce improvements.

Labour Inspection Reports

There are two types of general report in use in well-established inspection services: the reports made periodically by the labour inspectors on their supervisory work, their observations and results obtained, and annual reports published by the service on the work of inspection as a whole.

Inspectors' Reports

To enable the central inspection authority to exercise constant supervision over enforcement throughout the national territory and thereby to ensure uniformity in the norms of application, inspectors should keep their superiors regularly informed of their activities and observations. The information to be given, the administrative procedures involved and the prescribed periodicity for submitting reports will necessarily vary from country to country. Nevertheless, it is possible to sketch in broad outline some of the essential principles.

Whether inspectors' reports should be submitted daily, weekly or monthly, or at some other convenient interval, is a matter for decision by the central inspection authority, but in any case it seems clear that reports should be submitted as often as possible, though their quality should not be sacrificed to their frequency. Moreover, inspectors should be required
to draw up their reports according to a prescribed plan—that is, to use forms elaborated by the central authority for the purpose. This considerably simplifies the administrative work of the inspectors themselves and facilitates supervision by the central authority.

With regard to the particulars of inspectors' reports, it seems essential in the first instance to prescribe a general form for routine or regular visits of inspection. The information to be recorded on such a form may be approximately as follows:

(a) identification of the establishment visited (including name, address, ownership and nature of business), and the number of workers employed (classified by sex and age—i.e., if above or below a prescribed age limit);

(b) a summary of the inspector's investigations, including references to each of the matters within his competence (e.g., hours of work, rest breaks, weekly rest, the various regulated aspects of the conditions under which young persons and women are employed, medical examination, health hazards, sanitation, ventilation, lighting, guarding of machinery and moving apparatus, personal protective equipment, the posting of schedules and notices, record keeping), together with indications of the inspector's observations, any violations that may have been noted, and warnings or orders issued to make needed corrections;

(c) administrative details of the inspection visit (e.g., the inspector's name, the date and time of the visit, the names of persons interviewed).

In addition to this basic general report, the record system of an inspectorate usually comprises such special reports as may be required by the particular circumstances of the service, its organisation and its administrative practice. These may include, for example, report forms dealing specifically with the employment of children, hours of work, and wages, which are generally used in cases of violation and are designed to record the observations of the inspector in greater detail than is possible on the general report form. Still other special types of report may be prescribed in respect of accident and occupational disease investigations, follow-up inspections (i.e., to check compliance with orders requiring correction of a situation observed on a previous visit) and the investigation of complaints.
Internal reporting procedures should be kept as simple as possible consistent with the needs and circumstances of the service, so that inspectors can devote the greater part of their time to the actual work of inspection.

**Annual Reports of the Inspection Service**

The internal reporting system of the inspectorate is not only important for the proper administrative functioning of the service and for ensuring uniformity of supervision: it also provides the material needed by the central authority to compile a general report on the activities of the service as a whole. Such reports, usually published annually, have both national and international significance. Nationally, they enable the public (e.g., employers’ and workers’ organisations, social welfare institutions) and the legislative authorities to judge whether, and to what extent, the legislation for the protection of workers is really being applied, what points are not adequately covered by the existing legislation, and what legislative action is needed to correct abuses. They also provide material for the international comparison of real labour standards (as distinct from the theoretical standard indicated by the provisions of the laws), which can be revealed only by inspection, and permit those concerned to compare experience, to draw useful conclusions with a view to improving their own methods of enforcement, and promote the adoption of effective preventive measures.

As regards the substance of annual reports, which depends to a large extent on the scope and content of the laws enforceable by the inspection service, article 21 of the Labour Inspection Convention, 1947, provides that—

The annual report published by the central inspection authority shall deal with the following and other relevant subjects in so far as they are under the control of the said authority:

(a) laws and regulations relevant to the work of the inspection service;
(b) staff of the labour inspection service;
(c) statistics of workplaces liable to inspection and the number of workers employed therein;
(d) statistics of inspection visits;
(e) statistics of violations and penalties imposed;
(f) statistics of industrial accidents;
(g) statistics of occupational diseases.
Collaboration with Other Authorities and Bodies

Mention has already been made of the collaboration of employers and workers with labour inspectors, at the level of the workplace and in connection with the actual work of inspection. Full advantage should similarly be taken of every opportunity to promote collaboration between the labour inspection service and other authorities and bodies; strictly speaking such collaboration does not enter into the internal organisation of the service, but it is nevertheless of valuable assistance in the elaboration and application of labour standards and in educating employers and workers, and the public in general, on such matters.

Public authorities with responsibilities and functions related to the work of the inspection service may include employment exchange services, educational authorities, health authorities, social insurance and workmen's compensation funds, various types of social welfare services, etc. Collaboration between such authorities and the inspectorate in the solution of problems of mutual concern is a widely recognised asset of great value, which should be promoted locally, regionally or nationally, according to circumstances.

Any opportunity for useful collaboration with non-governmental bodies should likewise be seized. One outstanding example of such collaboration is the work that the central authority may do with national organisations of employers and workers in elaborating and applying protective labour standards—in particular, safety and health standards for specific industries. There may also be voluntary or private bodies such as national safety organisations, associations interested in youth problems or social welfare, scientific and technical associations, standards institutions and companies issuing insurance against a variety of industrial risks: the central administration should be active in promoting effective co-operation with all such groups having research and educational interests in industrial and social problems.
PART II

INSPECTION RULES AND PROCEDURES

In order to carry out his duties the labour inspector must himself be fully familiar with the purpose and content of the legal provisions he is responsible for enforcing and with the most effective means of complying with them. He should, so far as possible, familiarise himself with the problems and operations of the establishments he has to inspect, so that his advice on measures needed to protect workers from industrial hazards will be practical. He must be able to explain why legislation has had to be enacted; the benefits in lower costs of production, higher productivity and improved relations to be derived from the application of sound labour standards; the role of the labour authority in enforcing the law; and how management and workers can co-operate to make more secure the safety, health and welfare of the workers.

Success in this work depends not only on the inspector's technical skills and knowledge but on his personal judgment and qualities of tact, impartiality and integrity. All these factors bear directly and substantially on the inspector's success in inspiring the full confidence of employers and workers in his ability to help them achieve the purposes of protective labour laws and regulations.

In accomplishing these purposes, the labour inspector performs a social mission of the highest importance to the interests of management, workers and the general community. He is not a routine official carrying out a routine task: as an enforcement officer and an expert and trusted adviser of labour and management, the inspector has a substantial contribution to make to the economic and social life of his community, both local and national.
General Rules

CONDUCT AND OBLIGATIONS OF LABOUR INSPECTORS

It is of paramount importance that the inspector should at all times conduct his relations with employers and workers in a courteous and tactful manner. At no time should he express to employers or workers any disagreement with or criticism of the legal provisions he has to enforce or the administrative instructions prescribed by his supervisors. Any suggestions concerning the legal standards or administrative procedures should be made to the inspector’s supervisors, who will give them the fullest consideration.

Similarly, the inspector should at all times bear in mind that the provisions of the law establish minimum requirements that may not be abated through action taken by private persons, either as individuals or in a body. He cannot accept as a possible defence the excuse that an agreement, individual or collective, exists providing for standards lower than those prescribed by law.

The inspector’s work demands the application of his full time and interests. He cannot attempt to carry on another occupation or business and at the same time give full attention to his official duties. Moreover, his impartiality would be seriously jeopardised if he had a personal interest in any workplace to which his responsibility extends. Inspectors are accordingly prohibited from having any direct or indirect interest in the undertakings under their supervision.

The inspector must strictly observe the rule of professional secrecy. In the course of his duties, he enters workplaces, examines wage and employment records and observes machinery, appliances and processes of production. The individuals and undertakings concerned are entitled to the fullest assurance against the unwarranted disclosure of information obtained in this way. Consequently, inspectors are bound not to reveal, even after leaving the service, any manufacturing or commercial secrets or working processes that may come to their knowledge in the course of their duties.

Moreover, it is important that persons, and in particular workers, who give information to labour inspectors, or who bring complaints alleging that a defect exists or that a legal
provision is being violated, should not be exposed to retaliation or disadvantages. The inspector must treat the source of such information or complaint as absolutely confidential; he should not even give the employer any intimation that a visit of inspection was made in consequence of a complaint.

It is obvious that a labour inspector cannot accept gifts, services or favours from either employers or workers. The acceptance of objects of even small material value or of special services (such as the purchase of an article at a discount not extended to the general consuming public) may be construed as evidence of an improper relationship and thus destroy the reputation of the inspector for impartiality. Inspectors must therefore firmly refuse any offer of gifts, services or special favours from employers or workers.

**INSPECTION VISITS**

The inspector should at all times carry the official credentials issued to him by the service, since they attest his rights and powers of visit, inspection and investigation. In carrying out visits of inspection he should, for general purposes, be equipped with copies of the laws and regulations enforceable by the inspection authority, explanatory pamphlets and similar publications, where such exist, the prescribed record and report forms and forms of posted notices.

*Regular and Special Visits*

Inspection visits may be divided into two kinds: (1) visits of routine inspection, and (2) special visits—i.e., check visits, visits of reinspection, investigation of complaints and investigations of accidents and occupational diseases.

In a routine visit of inspection the inspector examines employment records, registers or documents that the employer is required by law to maintain, visits all the premises where work is performed, and investigates the conditions under which the legal provisions for the protection of workers are applied. With this object in view he observes general working conditions, the specific conditions of hygiene, safety and welfare prescribed by law either generally or in certain types of industry or for certain classes of workers, and compliance with provisions regulating the employment of workers in occupations classified
as dangerous or unhealthy, where such regulations exist. He also sees that the notices required by law are duly posted up for the information of the workers. He asks for such information as he considers necessary, from the employer or from workers, on any matters concerning the observance of laws and regulations.

In making a special visit the inspector has a particular purpose in view, which may be to check compliance with certain specific legal provisions; to ascertain what action has been taken to give effect to recommendations or orders made on a previous visit; to investigate the causes of an accident and take measures to prevent the recurrence of similar cases; or to investigate a complaint. As regards complaints alleging violation of the law, two general rules apply: they should be treated as confidential and they should be investigated. If there is a dispute about the facts and the inspector feels it may be necessary to disclose the name of the complainant, he should first obtain the latter’s permission to do so, if possible in writing. If permission is refused the inspector should in no case disclose the identity of the complainant. Every complaint should be investigated unless the allegations made are clearly insufficient to support a charge of violation of the law. This also applies to anonymous complaints. The investigation of a complaint should be carried out and reported in the same manner as a regular inspection.

**Timing of Visits**

As a rule a routine visit of inspection should be carried out during the ordinary working hours of an establishment. However, if the inspector has cause to suspect the existence of violations at other times of the day or night—for example, illegal overtime or night work, work performed illegally on the weekly rest day, or the employment of children at proscribed hours—the visit should be made at a time when the situation can be investigated. If more than one shift is worked in the establishment a visit should, if possible, be made during each shift.

In the case of industries or establishments that are particularly busy at certain times of the year, the regular inspection visit should normally be made at seasonal or peak periods of employment, since violations are more likely to occur at such times than during slack seasons.
If new laws or regulations are adopted that apply to a particular industry or type of establishment, inspection should be concentrated on that industry or those establishments in the period immediately following such adoption; and the efforts of the inspector should largely be devoted to instructing the persons concerned on the requirements established by the new legal provisions and how best to comply with them.

Notice of Visits

In normal circumstances the inspector should not inform an employer in advance that an inspection visit will be made. A previously announced visit may make it possible to conceal violations of regulations relating, for example, to minimum-age requirements, prohibition of night work, and hours of work.

In some cases notice to the employer that a visit will be made may be unavoidable for practical reasons. In rural districts, for example, an inspector who has no personal means of quick transport may have to arrange for transport to be provided by the management of an undertaking. Or, again, the layout of premises may be such that the inspector cannot expect to make a surprise visit.

In either case, upon entering an establishment the inspector’s normal practice should be to address himself to someone in authority—the employer or his representative—to whom he should show his credentials and explain the purpose of his visit. In exceptional circumstances (for example if the inspector has reason to believe that the normal procedure may result in concealing an abuse) he may decide to examine the working premises before addressing himself to a person in authority.

Order of Inspection

It is not possible to suggest an order of inspection adapted to all situations. The inspector has to judge for himself whether he should first examine conditions in the working areas of an undertaking or inspect records and documents. If he is not already familiar with the undertaking from his previous visits, or if he considers it desirable to interview a number of workers before examining the records, he may wish to visit the working areas first. On the other hand he may decide to inspect the records first if his previous experience
with the undertaking indicates that they are complete and accurate, or if he suspects that the employer may otherwise be able to conceal evidence of violation.

In the course of the inspection visit to the working areas of the undertaking the inspector may, should he think it desirable, ask to be accompanied by the employer, manager or other responsible person so that any necessary changes may be explained to someone with sufficient authority to take action in the matter; and, in cases in which a joint works council or safety committee or similar body exists, by one or more workers' representatives on such bodies.

First Inspection Visit

If properly carried out the first visit by an inspector to an establishment that has not previously been visited, or the management of which is new, can greatly influence the attitude of the employer towards the service.

The inspector should present himself to the employer at the outset of the visit, show his credentials and explain the purpose of the visit. He should, moreover, take the time to outline the scope of his inspection activities, including the examination of records, interviews with workers and examination of the working areas and processes, and be prepared, if necessary, to give detailed information concerning the legal requirements. He should try to make it clear that the purpose of his mission is to ensure that the law is applied and that, to this end, he is prepared to furnish the employer with all necessary information and advice to assist him in complying with his obligations.

After the inspector has made the initial visit, he should discuss his findings with the employer, pointing out any shortcomings he may have observed, and offer advice on needed improvements. It should be noted, however, that this suggested procedure does not affect the inspector's obligation to make a full report on the visit and to initiate administrative procedures in case of serious or wilful violations.

The extra time and care with which the first visit of inspection is carried out will be amply repaid if it results in establishing a firm basis of respect for the inspector's mission and confidence in his personal capacity.
Closing the Inspection Visit

As in the case of a first visit it is a useful practice for the labour inspector to inform the employer or his representative of his findings, explain what specific action may be needed to eliminate any violations he may have observed, and furnish any appropriate or pertinent informative material, such as copies or extracts of the labour laws, interpretations, posters, etc. However, at such discussions the inspector should not undertake prolonged negotiations concerning future compliance, nor should he, except in the case of minor offences, discuss evidence of violations observed. Furthermore, such discussions in no way affect the inspector's obligation to submit the prescribed reports on his inspection visit.

Inspectors' Reports

Every visit of inspection, whether routine or special, and regardless of the outcome of the visit, must be reported by the inspector to his supervisors. These reports enable the central authority to exercise over-all direction and control of the enforcement activities of inspectors, and thereby ensure uniformity in inspection standards and practices. They also form a reliable statement of the inspector's observations in the event that further action by a higher administrative authority is necessary. And they provide a concrete basis for judging the real standard of protection afforded by the inspection service and progress made in the administration of the social policy of the State.

In order to facilitate supervision by the central administration, ensure comparability and simplify the administrative work of inspectors, standard forms are prescribed, together with instructions on their use.

General Inspection Procedures

The inspection procedures indicated below are classified for convenience under separate headings relating to hours of work and related questions, wages, and the employment of young persons and women. Although each is thus dealt with separately,
the implication is not intended that a separation is to be maintained in following these procedures. While reference to the examination of various types of registers, records and other documents and to the interviewing of workers is made under more than one heading, the inspector in carrying out an investigation may well examine records and interview workers in respect of more than one subject at the same time (e.g. hours of work and wages).

The thoroughness with which these procedures should be applied rests in the last analysis on the judgment of the inspector with regard to the situation in each undertaking. In a great number of cases the inspector may be reasonably sure from previous inspection visits that the legal provisions are faithfully applied and that it is therefore not necessary to follow the procedures fully. In other circumstances, however, such as a visit to an undertaking with a previous record of repeated or intentional violations or to an undertaking which has not previously been visited, the inspector should apply them.

It should be remembered that the inspector's primary aim is to help employers and workers to understand and comply with the legal requirements. The object of these inspection procedures is largely to determine how well the law is being applied, and thus to serve as a basis for further action by the inspection service. If the inspector should find, for example, that an employer, through lack of knowledge of the legal requirements and the means of applying them, commits a relatively minor violation of record keeping, the inspector should undertake to explain what the requirements are and how the situation may be improved. The procedure for applying legal sanctions should be initiated only if these efforts prove unsuccessful and the inspector reaches the conclusion that failure in compliance is deliberate and is likely to be repeated.

**Hours of Work and Related Questions**

The various aspects of this group of questions include normal and maximum limits on hours of work, shift work, night work, rest periods, meal breaks, weekly rest and annual and public holidays, to the extent that there may exist legal provisions on these matters enforceable by the labour inspectorate.
The inspector can ascertain whether the legal provisions in question are effectively applied mainly in two ways: (1) by examining the records, registers or other documents required by law to be maintained by the employer, and (2) by interviewing a representative number of workers in the undertaking with a view to checking the accuracy of the records. Where records are not complete or are thought to be inaccurate, it is all the more important to interview workers.

*Examination of Records, Registers and Other Documents*

The inspector's examination of records should start with the current or most recent pay period, and work backward from that point, preferably to the last pay period examined in the last preceding visit. If the time available for the visit does not permit him to check all the records concerned, he should in any case examine those covering a sufficiently representative number of pay periods. If the undertaking is one that has fluctuating periods of activity, the inspector should be sure to examine the records for peak or busy periods as it is at such times that violations are more likely to occur.

The inspector's examination of hours records should, of course, be guided by the relevant legal provisions. If, for example, hours of work are regulated on a daily or weekly basis, his interest lies in ascertaining the number of hours worked per day or per week and in determining whether they are in accordance with the law. Similarly, his examination should be guided by the legal provisions in respect of such related aspects as shift arrangements, general and particular (e.g., for women workers), limitations on night work, rest and meal breaks, etc.

If the employer is required to post schedules for the notice of the workers, showing hours of work, rest and meal breaks, shift arrangements, weekly rest days, etc., the inspector should compare details of the records with those indicated on the posted notices. If the time records are not complete a useful practice is to compare them with the records of wages paid, as wage payments in excess of normal amounts may indicate the working of illegal overtime.

Where the examination of time records indicates the existence of a violation, the inspector should make a full and
accurate copy of the details for inclusion in his report of the visit.

Finally, the inspector may have reason to believe that illegal overtime or night work is being carried out and that he cannot check the situation by examination of the time records alone. In such a case, the inspector should make a check visit to the undertaking before or after the regular working hours.

**Interviewing Workers**

One means of checking compliance with the legal requirements and the accuracy of time records is for the inspector to interview a number of workers. Normally, these interviews take place in the undertaking as part of the inspection visit, but in special circumstances the inspector may hold them outside the workplace, at his office or at a worker's home. If the interviews take place in the undertaking, the inspector should speak with a sufficient number of workers to make it impossible for any individual giving information of a violation to be identified for reprisal. If the inspector decides to interview workers outside normal working hours and outside the undertaking, he may obtain names and addresses for this purpose from the employment records of the undertaking; but here also he should take care not to identify to the employer the workers selected for interview.

Such interviews are useful in connection with a wide range of legal regulations concerning hours of work and related subjects. For example, a record of the time allowed for meal or rest breaks would not be in itself sufficient for inspection purposes; the inspector can confirm the actual practice followed in the establishment only by speaking to a number of workers employed there. This procedure is equally useful in connection with night work limitations (both those of a general nature and those applying particularly to special classes of workers—e.g., young persons and women), shift arrangements, weekly rest, etc.

Finally, it may be recalled that the interviewing of workers assumes increased importance as a means of supervising application of the legal provisions if the employer is not required to keep time records adequate for this purpose, or if the records kept are not so detailed or complete as to satisfy the inspector that the law is faithfully applied.
Posting of Schedules, Notices, etc.

The principal object in requiring employers to post notices or schedules of hours of work, rest breaks, meal times, shift arrangements, etc., is to inform workers of their conditions of work in these respects. The inspector should see that the required notices are in fact posted in prominent places; that the posters are clear and legible and not defaced; that the official form, if one is prescribed, is followed; and that all required information is given in a readily intelligible manner.

If the schedule is not posted the inspector should see that the omission is rectified before he leaves the undertaking and should also mention it in his inspection report.

Wages

Depending upon the legal provisions to be enforced by the inspection service, the inspector’s responsibilities in respect of wages may include supervision of prescribed minimum wage rates; the time, place and method of wage payments; and deductions from wages.

The procedures indicated above for supervising hours of work and related questions are applicable here, too, and the inspector should therefore extend his examination of records and his interviews with workers so as to make a simultaneous check of wages. Starting with the most recent pay period, he should check the records of daily or weekly earnings against hours worked to see that wages are computed and paid in accordance with the requirements prescribed by law. In the case of an establishment known from previous visits to have a good record of compliance, the inspector may be content with examining only a representative number of sample pay periods. In other cases he may consider it justified to make a more complete examination and to interview a number of workers to secure confirmation of the accuracy of the wage records.

If there is a legal provision requiring that the workers be informed of the particulars of the wages paid to them (e.g., the method of wage calculation and deductions, if any, from gross earnings), the inspector should examine the procedure followed in the undertaking to see that it is in conformity with the law.

Full and accurate details of any violations noted by the
The inspector should be taken down and included in his report. In such cases as incorrectly computed wages or wage payments lower than the legal minimum, it is important for purposes of remedial administrative action to have a record of the number of hours worked, the amount of earnings due to the worker and the amount actually paid.

Requirements for the posting of notices, for purposes similar to those mentioned above, may cover such subjects as minimum wage rates, the days on which wages are paid, the place of payment, etc. It is the inspector’s duty to see that such requirements are properly carried out.

EMPLOYMENT OF YOUNG WORKERS AND WOMEN

The inspection procedures for enforcing the laws and regulations dealing with the employment of women and young workers will be similar to those concerned with other branches of general labour legislation. Some mention must, however, be made of particular aspects of this type of inspection.

The inspector should take particular care to inform and advise the employers and employees concerned of their rights and obligations as laid down by the special legislation governing these groups of workers. He should also be alert to the need for co-ordinating his work with other agencies interested in the protection of women and children and, wherever possible, for referring women and young workers who stand in need of assistance to the existing social services.

In order to discharge his duties effectively the labour inspector who has to deal with the work of women and young persons should have acquired, in addition to the general training provided for inspection staff, a special knowledge of the problems involved in this particular field of work. He must, of course, be thoroughly acquainted with the laws and regulations concerning the work of women and young persons and allied matters, such as regulations relating to compulsory education for children and young persons, as well as with the problems of their application. In addition, he should have a good knowledge of the organisation and operation of other agencies, such as the employment services, school authorities and public and private social welfare and health services with which he will need to co-ordinate his work.
It may often be of advantage to entrust the supervision of the protection of women and young workers to a woman inspector, not only because a woman may have from personal experience a more intimate knowledge of the problems of women and youth but also because she may be able to win the confidence of these groups of workers more easily than her male colleagues.

*Inspection Procedures as regards Young Workers*

If effective supervision of the laws and regulations dealing with admission to work and the protection in employment of young persons is to be assured, the employer must be required by law or regulations to keep reliable evidence of the young persons in his employment (including apprentices) and to make such evidence available for inspection purposes.

This evidence may take the form of a register in which the employer enters such data as name, date of birth or age, and sex of the young person, date of entry into employment, occupation in the undertaking, and details of hours and wages in accordance with the specific legal provisions that may exist with regard to young workers.

In addition to the register the employer should be required to keep on file documents, issued by the competent authorities, the purpose of which is to prove the age of the child (for instance, birth certificates) and attest the fulfilment of other requirements that may be prescribed by law, such as compliance with school obligations, consent of the parents or guardian to the employment of the young person, and certification of physical fitness for the particular employment concerned. Where apprenticeship regulations exist the apprenticeship contracts should also be kept on file by the employer.

As regards determination of age, which constitutes a vital factor in the application of labour legislation concerning young persons, certain difficulties may arise where the system of registering births is inadequate or non-existent. Pending the full development of such registration it will be necessary to make use of any other available means of determining age, such as church and school records, medical certificates issued by a certified physician, etc.

The documentary evidence that the legal requirements
for admission to work (regarding age, schooling and physical fitness) have been fulfilled may also take the form of a workbook or employment certificate issued for each young person by the appropriate authority (e.g., the labour department, the employment service or the school authority) upon initial employment; this should be lodged with the employer to keep on file and to make available for inspection.

As regards the posting by the employer of the timetables of young workers and of the text of laws and regulations governing their work, inspection procedures will be similar to those explained above.

Age of Admission to Employment.

The abolition of child labour constitutes the primary objective of all child labour legislation and the effective enforcement of the legal provisions regarding this question will therefore be one of the most important tasks of the inspector.

Where the laws and regulations provide that the employer should keep the records discussed above, these records should be carefully examined by the inspector to ascertain that they are kept as prescribed. In particular, special attention should be paid to the careful checking of the registers with the employment permits, work books or other documents kept on file by the employer and attesting the ages of the young persons employed.

Registers should also be checked directly with the young employees concerned. For this purpose the inspector may proceed in two ways. In undertakings which are known to apply carefully the provisions on minimum ages and records, the inspector may first examine the record and then check them by interviewing a number of young workers; in this case it may facilitate the inspector's work if he can take the register or list of young persons with him when going through the workplace. If, however, the inspector has reason to suspect violation, he should not waste time checking records with the risk that evidence may in the meantime be concealed. He should at once interview young persons at their workplaces, make notes of the data so collected and then compare them with the registers or other documents to see whether all juveniles found working are duly recorded.

Where registers or documents attesting age do not exist,
or are inadequate, the inspector will have to depend primarily on information obtained by interviewing young workers. He should pay special attention to those who seem to be below the legal age of employment or who claim to be above the age for which registration is prescribed. Care should also be taken that no child uses an age certificate belonging to another or one that has been illegally issued or is fraudulent.

If he suspects a violation the inspector should have power to require the employer to furnish proof of age within a certain time and, in serious cases, to dismiss young workers or suspend their employment until such proof has been provided.

Should violations of the minimum age and recording provisions be revealed, the inspector should try to find out what steps, if any, were taken to ascertain the age of the child on his engagement; and he should discuss with the employer methods of avoiding such violations in the future. Full details of contraventions concerning minimum age and recording provisions should be given in the inspector's report on his visit.

Moreover, the inspector's duties should not end with the dismissal of a young person found to be illegally employed. Measures should be taken to ensure the moral and physical well-being of such a person by arrangements for his attendance at school when he is of school age, or by bringing the case to the attention of the public and private welfare institutions if poverty was the reason for his premature employment.

**Fitness for Employment.**

If the national laws and regulations prescribe that young persons cannot be admitted to work unless found physically fit through medical examination, the inspector's procedures will be similar to those used with regard to minimum-age provisions.

He should carefully check the medical certificates kept on file by the employer and interview the young persons to ascertain that no one covered by the provisions is working without having obtained the certificate in question or without having undergone medical re-examination if that is prescribed by law.

Where the certificate is issued subject to specified conditions of employment, or is valid only for a particular job or
occupation, the inspector should see to it that the prescribed conditions are fulfilled and that the child is actually employed at the specified work.

All violations of the provisions concerning the medical certificate of fitness for employment should be brought to the notice of the authority responsible for the issue of such certificates for further action.

If the inspector is of the opinion that the young worker is, for physical reasons, generally unfit for employment, he should refer the case to the services from which the young person may get appropriate medical treatment and such schooling, vocational training and guidance as are needed.

**Hazardous Occupations.**

In the case of hazardous occupations, too, the inspection procedures will be closely linked with the checking of the minimum age for admission to work.

When visiting the working areas of an establishment the inspector should observe the occupations at which young persons are engaged to ascertain whether any of them is employed at work prohibited for a person of his age. The inspector should also compare the records indicating the occupations of the young persons with the work they are actually doing.

As regards occupations to which the laws or regulations admit young persons under a specified age only subject to safeguarding conditions (such as medical examination, prohibition of employment in hazardous trades, special provisions respecting hours of work and rest), the labour inspector should ascertain that these conditions are actually fulfilled. He should see to it that young persons occupied in hazardous work that is nevertheless legally permissible for them have received adequate training in their work and instruction in the danger involved, and that they work under the supervision of an experienced older worker.

It will be a great advantage if inspectors have legal authority to suspend employment, or to modify conditions of employment that might be injurious to young workers. Where social welfare or health services exist in the undertaking itself, their collaboration will be of great value in assuring that young persons are given suitable work.
Hours of Work and Rest, Wages, etc.

As regards hours of work, night work, shifts, meal breaks, holidays, etc., and wages, the inspector should proceed in the case of young persons in the same way as indicated above for the inspection of these matters for all workers, having due regard, however, for the special legal provisions that may exist for young workers in this connection.

Before inspecting hours and wage conditions, the inspector should check the ages of the young persons employed in order to identify those who may be covered by the child labour provisions. When a shorter working day is prescribed for young workers than for adults, it might afford an additional control if the inspector inquired what arrangements, such as shift work of young persons or replacement by another worker, have been made to carry on with the work performed by the young person during the hours he himself is not allowed to work. A similar procedure might be adopted as regards special provisions for young persons in respect of longer night rest, breaks, annual leave, etc.

Where the law provides that the normal working hours of a young person should include the time spent at continuation classes for general or technical education that young persons are required to attend, it is advisable for the inspector to find out from the competent school authorities whether the young persons have actually attended the courses in question during the hours specified.

If the inspection service is empowered, on special application, to grant permission to employ young persons on overtime or night work, the inspector should verify whether such exceptions are really necessary and should keep a close record of the use made of this faculty by the different undertakings.

Apprenticeship.

If the supervision of apprenticeship comes within the duties of the labour inspector he should examine carefully all documents that the employer is required to keep with regard to apprentices working in the undertaking (such as a register of apprentices, apprenticeship contracts or wage records of apprentices), and should ascertain that the apprentices have reached the prescribed minimum age, receive proper train-
ing and enjoy the special protection with regard to hours, wages, health, etc., prescribed for them. He should also check whether the proportion of the number of apprentices to the total number of workers employed in an undertaking corresponds to that laid down by law or regulations.

Special Problems: Small Undertakings, Street Trading, Public Entertainment.

Special problems of supervision may arise when the inspector has to deal with enforcement of child labour regulations in a great variety of small and scattered industrial and non-industrial undertakings, including shops, workshops in houses, etc.

Here it will prove particularly advantageous for effective application of the child labour provisions if work permits or workbooks are issued to the young persons and kept by the employers at the disposal of inspectors, and if these documents are reissued or officially stamped at each change of employment—a procedure that makes it easy to identify the young worker, his age and conditions of work.

In the case of employment in street or itinerant trading or in occupations carried on in public places (cabarets, cafés, theatres, and the like), inspection will be greatly facilitated if the young persons concerned are required to obtain from a competent authority a licence or work permit certifying that the legal requirements, such as age, education and physical fitness, have been satisfied and, in addition, are obliged to wear a badge as a means of showing conspicuously that the work is exercised in conformity with the legal prescriptions. It adds to the value of the permit and the badge as instruments of enforcement if both have to be reissued at reasonably frequent intervals. However, the inspector will hardly be able to exercise supervision over such scattered places of employment alone, but will have to rely on the extensive collaboration of such other authorities as the local police, education authorities, public and private social workers and social welfare organisations concerned with the protection of children.

It is also advisable for the inspector to pay special attention to the investigation of alleged violations of the law reported by the public or by the teachers or parents of the child or young person.
Inspection Procedures as regards Women Workers

As in the case of young workers, inspection of the employment of women will be greatly facilitated if records of female workers are kept by the employer and held at the disposal of the inspector. It is most useful for adequate inspection if the records include detailed information about such items as maternity leave and other legal provisions concerning women as regards hours and shifts worked, wages, etc.

Maternity Protection.

One of the principal duties of the inspector will be to ensure the effective application of the legal provisions on maternity protection.

He should direct his special attention to the rest periods accorded to women before and after confinement, to the guarantee of reinstatement in employment after maternity leave, to the payment of maternity benefits, to special arrangements such as breaks for nursing and crèches, and to the protection of the health of pregnant and nursing women at work.

From the records kept by the employer or, if they are lacking or inadequate, from information obtained from employers and workers, the inspector should ascertain which of the women workers are eligible to benefit by the maternity provisions. If any of these women is absent, he should ask whether her absence is due to confinement and, if so, inquire about the expected date of confinement, the length of leave taken before confinement, the benefits received by the woman during her leave and the measures taken to ensure her reinstatement on her return. It is sometimes advisable for the inspector to obtain this information from the woman herself, at her home or in hospital.

When an inspector finds a pregnant woman at work he should ask her when she intends to take her maternity leave before confinement where such leave is not compulsory, and see to it that all legal requirements, such as the notification of the employer by medical certificate, the visiting of the competent services for prenatal health care, etc., are fulfilled. He should also check whether the work done by the woman is prejudicial to her condition and ask for her transfer to lighter work if necessary.
If the records show that a woman has been dismissed since the last inspection visit, the inspector should inquire about the reasons for such dismissal and, if necessary, interview the woman herself in order to ascertain that she has not been dismissed for reasons relating to maternity in contravention of legal provisions guaranteeing her maintenance in employment.

Having ascertained from the records kept by the employer (or, in default of such records, from personal interviews) which women have recently come back from maternity leave, the inspector should investigate whether they are allowed, as provided by law, to take time off and absent themselves from work in order to nurse their children, to make use of crèches existing in the undertaking or in its neighbourhood, etc. The inspector should also ascertain from payrolls and records of hours worked whether nursing breaks are counted as working hours and paid accordingly, if so prescribed by law or regulations. Where employers are required to establish crèches in their undertakings, the inspector should check the use made by the women of this facility and, if they do not avail themselves of it as fully as might be expected, should find out the reason. He should also see whether the crèches are kept in good sanitary condition.

In general, the inspector should make sure that women workers are well informed of their rights under maternity protection legislation and know how to benefit by them. Where a social service exists in the plant, its collaboration in this matter will be very useful.

In addition, supervision of maternity protection will need close co-operation with the social insurance system or public fund responsible for providing benefits. The collaboration of any other social assistance and health services concerned with the protection of working mothers and their children may also prove helpful.

It is evident that a woman inspector would be more suitable for the supervision of maternity protection.

Hazardous Occupations, Seats, etc.

The inspector should ensure that women are not employed at occupations prohibited to them as hazardous, or are not obliged to carry heavy loads exceeding weight limits fixed by law or regulation. Where their employment in hazardous work
is subject to certain safeguarding conditions concerning health and safety, such as covering of the hair, medical examination, sanitary provisions, or special working hours, the inspector should also see to it that these conditions are duly observed.

If seats must be provided for women workers, the inspector should ascertain whether there are enough of them, whether they are of satisfactory construction, and whether the women can actually make use of them.

**Hours of Work and Rest, Wages, etc.**

As regards the supervision of women's hours of work, night work and related questions as well as women's wages, the procedure will be the same as that indicated for all workers with due regard, of course, to any special provisions that may apply to women workers. Such special provisions may, for instance, concern restrictions of overtime, longer or more frequent breaks between periods of work, longer weekly rest hours and prohibition of night work (with possible exceptions from it).

Special attention should be paid by the inspector to the careful checking of records and to individual statements of women workers in order to ascertain whether the wages paid to them are in conformity with the provisions as laid down by legally binding provisions. This will call for the checking of the minimum rates of wages paid, and, where prescribed by the existing provisions, of the application of the principle of equality of remuneration as between men and women workers.

**Special Problems : Small Undertakings.**

Special problems of supervision may arise when the inspector has to visit a great variety of small and scattered industrial and non-industrial undertakings, including shops, workshops, etc. The difficulties in connection with supervision of women workers in such conditions will arise mainly from the scattered location of workplaces and the fact that the work is often carried on in private homes. The inspector should have the same authority to enter workplaces in homes where persons other than the members of the family are employed, as he has with regard to any workplaces subject to inspection. It will greatly facilitate the work of the inspector if the employers who give out home work are required to send to the inspection service at regular intervals, for instance once a year, a list of
the homeworkers employed by them during that period. Inspection can then be carried out in the workplaces concerned and when conditions are found to be unsatisfactory, the inspector should visit the employer or subcontractor in order to obtain the necessary changes.

The principal problem with respect to work carried out in homes is to see that the workers receive the minimum wages fixed for them by laws and regulations, including, where such regulations may exist, payment for travelling and waiting time in calling for and delivering work. The inspector therefore needs to have access to the wage books of the workers, and to the registers of homeworkers and the records of payments kept by the employers. He should interview a representative sampling of homeworkers in order to determine that the records are accurate. He should also inquire into such other problems as illegal labour of children.

In addition to the supervision of wages the inspection services may also be concerned with industrial hygiene and safety of homeworkers, for instance, when the laws and regulations prohibit the employer from giving out home work involving the use of poisonous or dangerous substances. In this field it might prove useful for the service to have, where possible, the assistance of the local health services.

Safety and Health Inspection in Industrial Establishments

The purpose of this section is to offer some brief general advice on the detection of occupational risks in industrial establishments (as distinct from mines, construction sites and agricultural undertakings) and to indicate in more detail some of the commonest specific risks that should be borne in mind during inspections. It would not be practicable to deal with every risk in every kind of industrial establishment, and no attempt is made to give guidance as regards the risks of any special processes, equipment, substances or working conditions.

1 It is realised that a highly developed labour inspectorate will include medical, electrical, engineering, chemical and perhaps other specialists, but it is not within the scope of this guide to discuss in detail the functions of these specialists.

2 A bibliography of general works on occupational safety and health is appended.
This section does, however, deal with some equipment in wide use and also with general classes of risk such as those from fire and dangerous substances. It also indicates measures that industrial establishments themselves can employ to promote safety and health and so lighten the task of the inspector (i.e., through the creation of a plant health and safety organisation).

Lastly, mention is made of measures designed to limit as far as possible the seriousness of injuries caused by accidents, namely medical aid, including first aid.

**General Remarks on Safety and Health**

The factory inspector who deals with safety and health in industrial undertakings has to ensure the observance of regulations having the force of law, but he must keep in mind that these regulations lay down only minimum requirements. To fall below that minimum is to break the law. The best safety and health conditions attainable sometimes represent a higher standard, and when this is so the inspector should strive to achieve more than is required by the legislation in the field of safety and health. For this, the inspector must have sufficient knowledge of the technology of the undertakings he inspects—knowledge which he may acquire from his visits to undertakings, and also from technical handbooks.¹

Experience has shown that health and safety inspection has obtained better results where inspectors have concerned themselves not only with enforcement of technical regulations, but also with advisory and educational aspects of accident prevention and health protection. The importance of these aspects is now generally recognised, but the methods that make a prevention programme successful are still often lacking in industrial undertakings, and here the assistance, advice and encouragement of experienced inspectors may contribute greatly to the spread of health and safety consciousness throughout industry. Hence the inspector should also be aware of the

¹ In matters on which there are no national regulations, useful guidance may in many cases be afforded by the *Model Code of Safety Regulations for Industrial Establishments for the Guidance of Governments and Industry*, published by the International Labour Office in 1949 (see bibliography).
factors that make for the success of a prevention programme: for instance, support from management, well designed premises, well protected equipment, well trained workers, good working conditions, and good industrial relations.

The inspector should, however, fully realise that only someone who is constantly in the undertaking can know the many small things that have often nearly caused an accident, and may cause an accident when someone acts unsafely; and this is one of the reasons why the inspector can never take the place of the safety engineer. But the safety engineer's experience will be useful to the inspector, as the inspector's will be to the safety engineer, and hence a sound basis will exist for their co-operation in the interest of safety and health.

The inspector may find it necessary to give close attention to those undertakings—they will include the majority of the smaller undertakings—where there is no safety engineer, and where in practice what is done in the interest of safety and health often depends entirely on the inspector.

Need for Co-operation

It should be realised at the outset that it is not possible for one inspector to develop suitable qualifications for the complete inspection of all types of equipment, processes and operations that he encounters. The inspector should, however, endeavour to develop a working knowledge of the different types of industrial installations and operations as well as make himself familiar with the basic requirements and principles of accident prevention and the protection of health. In addition, inspection services should, whenever necessary, have recourse to the assistance and services of specialised national agencies and international bodies. The inspection authorities should also consider the practicability of setting up advisory committees for the promotion of safety and health in a particular branch of industry, for a particular task (such as the protection of a certain type of machine) or for other purposes. Such committees might be composed of representatives of management and labour of the industries concerned, and of experts on the subjects to be studied (manufacturers of equipment, representatives of research organisations, medical and engineering consultants, etc.).
The inspector should try to acquire a good knowledge of the safety and health conditions prevailing in all establishments under his care. For this reason he should normally conduct his visits during working hours, observe the complete cycle of operations and discuss his findings with the management. His visits should not be notified in advance to the establishment concerned. He should make, within the provisions of national laws and regulations, unannounced visits to obtain a fair view of the prevailing conditions in the industry concerned. He should, if necessary, ask for essential technical information—e.g., blueprints of installations, data on the particular equipment and processes of the industry, and analyses or samples of materials used or manufactured. With this information in hand he may study the causes of defective environmental conditions and the specific hazards involved.

Although it is a function of the inspector to detect occupational risks it is not within his province to limit the right of the plant manager to select his own equipment and methods of work in so far as they are not prohibited by law. He should, above all, avoid any undue interference with production and refrain from taking any steps to relieve plant managers and supervisors of their responsibility to provide a safe and healthy working environment for their personnel.

However, the inspector should not try to make inherently faulty or unsuitable processes safe; for instance, if he finds an abrasive wheel mounted on a spindle moulding machine he should not try to devise a guard for the wheel, but should condemn the use of the wheel.

Equipment with which the inspector is not familiar should not be examined except when he can call in qualified experts to assist him. The inspector should request the assistance of the plant management for the testing, trial runs, etc., of machinery or other equipment. He should not operate any equipment himself without the consent of the management and, generally speaking, he should ask plant personnel to start up machinery and equipment, if this is necessary.

During the inspection of dangerous equipment such as machinery, elevators and pressure vessels, and operations or processes involving dangerous substances, special attention
should be given to the prevention of injuries to the inspection staff and to plant personnel. The appropriate equipment, tools and clothing should be used and all necessary precautions should be taken to ensure the protection of everyone concerned.

Recommendations with respect to hazards detected during visits to plants should be worked out in close collaboration with managements and, if necessary, with labour representatives, in order to ensure that the protective measures devised are practicable and are likely to be applied.

**Inspection Records**

The results of health and safety inspections should be recorded in an orderly manner for two principal reasons. First, the inspector should keep a clear account of his activities in the undertakings under his care. Secondly, the records will serve for reference at later dates, or may even be consulted to establish certain facts in legal or other investigations. Where possible the first inspection reports should give a clear account of the conditions obtaining, and of the operations and processes carried out. It is good practice to use standard inspection forms on which the essential items may be grouped in such a way that reference may easily be made to the various types of occupation and equipment. Special forms are often used for particular types of work or equipment. Forms provide a useful means of obviating the risk that important matters will be overlooked and assembling data on the work or equipment examined; but it should be remembered that they serve only as a guide and inspectors should not necessarily be confined to the points listed on them. Forms cannot cover every contingency and the inspector must use his intelligence and not rely on them exclusively.

The inspector should be very careful what he includes in his report: as far as possible, he should base his observations on what he actually sees and not on unauthenticated statements, and should refrain from giving opinions on matters on which his knowledge is insufficient.

He should, however, include general observations on the conditions in the plant visited (e.g., the state of the equipment, safety consciousness of personnel and supervisory staff, and other
conditions that may affect safety and health). He should include the recommendations made to the management as a result of his inspection.

The inspector should treat any information gathered in the course of his visits to plants as confidential; it should be disclosed to public authorities only in the cases and to the extent specified by law. An inspector suspected of disclosing trade secrets would soon lose the confidence of plant managers.

Frequency of Inspections

It is not possible to establish any hard and fast rule with regard to the frequency of safety and health inspections. The inspection schedule should allow for repeated visits to be made to plants where conditions are such as to require special attention. Because of the particularly hazardous nature of some operations or of special circumstances it is sometimes necessary to make inspections at short intervals. To ensure the incorporation of protective features in new factory premises, for instance, it may be necessary to visit the site during construction. Similarly, when factories are planning to introduce new processes or new raw materials, visits might be made for the purpose of examining the plant changes involved or having analyses made of the new substances, or surveys conducted of the new environmental conditions.

When it has been found necessary to make changes in existing structures, equipment or processes, reinspection may become necessary to ensure compliance with requirements previously laid down. In such cases previous inspection records will be found a most valuable aid.

Equipment Required for Inspections

The equipment and tools required for the inspection vary widely, depending on the nature of the industry and on the type of operation being examined.

The inspector should carry with him, in so far as is practicable, the tools and equipment he may need for the type of examination or test he expects to perform during any particular inspection. Measurements are commonly made of the dimensions of workrooms, guard clearances and distances,
lighting, temperature, humidity and airflow and dust concentrations among other things.

If the instruments are only used from time to time, they can be kept in a central place where due attention can be given to their maintenance, checking and, if necessary, repair.

**Accident and Health Records**

Where statutory provisions for the reporting of industrial injuries and occupational diseases do not exist, or where the existing provisions such as those laid down by compensation boards or other bodies are not found adequate for prevention purposes, the inspection authorities should take steps to promote a suitable voluntary system. Essential features of such a system are the prompt reporting of injuries by the plant management, a good investigation procedure and the adoption of adequate measures to prevent recurrence.

Standard injury report forms, such as those used by many inspection authorities and adapted to the particular conditions of the industry, should be employed. Often it will be found that reports lack essential information. To lessen the difficulties inherent in the accurate reporting of accidents and injuries to health, the inspector may need to spend some time showing the responsible persons in industry, either on the occasion of visits or in the course of health and safety training programmes, the manner in which report forms should be completed. All the circumstances that may have some bearing on the causation of an injury should be mentioned in the report to ensure that all the facts required for taking the appropriate corrective measures will be available.

Periodical analyses of records of accidents and cases of occupational disease will reveal to the inspection authorities the commonest types of risk and causes of injuries for a given industrial undertaking or for a group of undertakings manufacturing similar products or operating similar machines and equipment. These records will also give valuable assistance to plant managers in several ways, but especially by keeping them informed of the trends in injury experience and providing necessary data for the determination of a suitable prevention policy.

As a great number of industrial injuries are due to human
failure, accurate and detailed statistics will also prove very useful in campaigns to develop safety and health consciousness among workers.

It is good practice to complete the records of injuries and illnesses by analysis of their aggregate cost to the industry concerned. Such analyses often help to convince managements of the advantages of sound prevention policy.

In short, the inspection authorities should require a standard procedure for the compilation of industrial injury statistics, ensure that injuries are adequately reported and investigated, and try to ensure that the information gathered as the result of investigation is put to proper use.

Promotion of Safety and Health

As already suggested, great emphasis should be laid on safety and health education as a most effective means of preventing employment injury. Substantial benefits may derive from appropriate instruction courses for safety and health officials, for plant managers and supervisors, for workers in general, and for specialists. The inspection authorities should take a keen interest in the development of training programmes and, if possible, participate actively in them.

Experience has shown that training courses in first aid have done much to interest workers in accident and disease prevention. There are other means (talks to trade union meetings, showing of films in places of public assembly or on plant premises, public address systems, etc., requiring in one form or another the participation of workers and employers) that are likely to further the safety and health movement, especially in countries where the development of such activities is still in the preliminary stage. The inspector can usefully advise on the most appropriate methods by which safety and health may be furthered.

But whatever his technical qualification and his personal qualities of judgment, tact, firmness, integrity and energy, success in the prevention of industrial injuries cannot be attained by the inspector alone; it depends to a great extent upon the organised co-operation of employers and workers with inspection authorities.
BUILDINGS AND OTHER WORKPLACES

Notification of the Commencement of Operations

When the notification of the commencement of factory operation is required by law, the inspector should ascertain that the employer has sent to the competent authority a written notification containing the prescribed particulars, including a description of the work to be carried on in the establishment. This also applies to subsequent changes in the type of work and to extensive alterations and extensions to the factory buildings.

It should be noted that it is generally very difficult and costly to introduce alterations in existing buildings, in buildings under construction or in plant layout once operations have begun. It is therefore important that building plans and plant installation drawings should be carefully examined immediately on receipt by the inspection authorities so that any alterations required for safety or health considerations may be suggested in due time.

General Provisions concerning Buildings and Other Workplaces

All buildings and workplaces should be so constructed and maintained as not to constitute risks of accident or injury to health.

The inspector should pay attention to the height of the workrooms and the space available per person working in them, and take measurements when the standards set by legislation do not appear to be complied with.

Floors should be firm, level, clean and non-slippery, and there should be sufficient space around the machines and adequate unobstructed aisles, preferably clearly marked by painted lines.

As a general rule openings in floors should be protected by railings and toeboards or by hinged covers or panels to prevent the fall of persons and to protect persons underneath against falling objects. If elevated walkways are made of gratings, the openings in the gratings should be sufficiently small to stop falling objects, or else screens should be installed under them. Floor and wall openings should be inspected with care to see whether they are guarded and if so whether guards are suitable and effective.
Stairways should be of sufficient strength and width to afford safe passage to workers. Exposed sides should be protected by railings. Winding stairways should be prohibited.

Though most regulations indicate that wall openings from which there is a drop of a certain height must be guarded, it should be kept in mind that there is not necessarily a direct relation between the height of a drop and the seriousness of an accident.

When inspecting a factory the inspector should also give his attention to the factory yards, noting the condition of the ground, storage arrangements for material, movement of vehicles and possible danger points, such as factory entrances and exits and blind corners of buildings.

**Lighting**

To the greatest extent practicable, a workroom should be lighted by natural light. The psychological effect of natural light should be kept in mind.

Natural light should be augmented as required to ensure adequate illumination of workplaces. Sufficient lighting should also be provided for passages, stairs and yards. As a general indication, from 100 to 300 lux (10 to 30 foot-candles) should be provided for ordinary shop work where discrimination of detail is not essential.

Glare should be avoided and the eyes of the workers should not be exposed to strong contrasts. On the other hand it must be remembered that the easy perception of objects is not obtained in all cases by means of intense illumination; moderate contrasts in colours are often very useful. The use of eye-shields or of shading or diffusing devices should be encouraged where necessary, and walls and machines should be painted in pale colours.

Where large numbers of workers are employed in a building, emergency lighting, independent of the general lighting system, should be provided in all important stairways, exits from workplaces and other passageways.

It is important to maintain all lighting equipment and windows in a satisfactory state of repair and cleanliness. The best lamps will not provide good lighting unless the glass is kept clean.
General Ventilation

In workrooms where the atmosphere is not permeated by dust, fumes, etc., suitable atmospheric conditions can usually be maintained by natural ventilation, which should if possible come from or near the ceiling to prevent harmful draughts.

Where artificial ventilation is used, the inspector should see that the place from which the air for the workrooms is taken is such as to guarantee a supply of pure fresh air. The ventilation system should be kept in effective operation during working hours. In addition, the inspector should ascertain that air in crowded rooms is renewed with sufficient frequency during working hours.

The following figures are given as a guide for maintaining suitable atmospheric conditions in workrooms: the minimum distance between floor and ceiling should be 3 m (9 ft. 10 in.); the minimum cubic space per worker in an enclosed room should be 11.5 m$^3$ (400 cu. ft.); where the ceiling is high, heights above 4.5 m (14 ft. 9 in.) should not be taken into account in measuring this cubic space. The minimum rate of air supply should be 30 m$^3$ (1,000 cu. ft.) an hour per worker. In any case the ventilation system should be such as to avoid insufficient air supply, vitiated air, harmful draughts, excessive heat or cold, sudden variation in temperature and objectionable odours.

Temperature and Humidity

A temperature suitable for the type of work performed should be maintained in enclosed workplaces. Heating of workrooms in cold weather, and air movement and ventilation in warm weather, should be so arranged as to provide reasonable comfort. Relative humidity under 20 per cent. or over 80 per cent. should be avoided. When use is made of local heating, care should be taken to ensure regular elimination of combustion gases.

Noise, Vibration and Shock

Noise, vibration and shock have a detrimental effect on health and should, as far as possible, be suppressed by insulation of flooring, walls and ceilings, and by other technical measures
such as placing machines on bases constructed independently of the flooring, or isolating them in separate chambers. Workers may to some extent be protected by personal protective devices such as ear plugs. Those exposed to excessive noise should be medically examined regularly.

Ladders and Platforms

Ladders are in very common use and should be carefully inspected since they are the cause of a great number of accidents. They should be well constructed and maintained, and the right type should be selected for a given job and used with all necessary precautions. Workers should be instructed in the proper use of ladders.

It is preferable to obtain ladders from specialised manufacturers who are in a position to furnish industrial establishments with a complete set of ladders and stepladders of the correct size and strength for the types of work to be performed.

Ladders should be regularly examined by a plant official, and only qualified workers should be permitted to repair them.

Working platforms of temporary construction are often found to be improperly constructed: the platform boards may consist of damaged timber or be too thin or too short, and the whole platform may be shaky or otherwise insecure. Platforms should be solidly constructed of good material and provided with proper railings and toeboards on exposed sides.

Housekeeping

In the interests of a safe and healthful working environment, managements should take adequate measures to maintain the cleanliness of premises, including floors, work benches, windows and equipment, and the orderly arrangement of raw materials, products, mobile equipment, tools, etc. It is important to keep all passageways and exits clear.

Where floors are washed with streams of water or are continuously wetted in the industrial process, an adequate drainage system should ensure that pools of water cannot form and that the water is speedily removed from the floors, or suitable footwear should be provided.
Fire Prevention and Protection

General

In many countries fire precautions in industrial premises are a matter partly within the jurisdiction of local authorities and partly within that of the labour inspectorate. The present section does not attempt to apportion responsibility in this field between the two authorities, but indicates matters that will need to be covered by inspection.

Before starting out to inspect an industrial establishment, the inspector should acquaint himself with the fire hazards of the industry concerned. In this way he will know better what particular matters to look into, and the inspection is more likely to be efficient.

The matters to be covered by the inspection will include exits and the organisation of evacuation arrangements in case of fire; alarm systems; fire-fighting facilities (including any automatic sprinkler system, water supply, hydrants, hoses, and portable extinguishers); storage arrangements for flammable and explosive substances; arrangements for disposal of waste; lightning protection; and fire-fighting personnel.

Smoking

If there is a dangerous area where smoking is forbidden, attention should be given to the possibility of providing the workers with a place, e.g. a canteen, where smoking is allowed. In factories where smoking does not offer a direct risk, smoking is sometimes allowed till one hour before rest time or stopping time. In this way the employer tries to minimise the risk that a burning cigarette may be thrown away, shortly before the workers leave, somewhere in a corner or other place where it might be unobserved and cause fire, possibly after the workers have left.

Fire Brigades

In all industrial undertakings a sufficient number of men should be trained in the use of the fire-fighting equipment provided and in the procedure to be following in the event of a fire. Large undertakings should have properly trained fire brigades.
Exits

It is of particular importance that adequate exits, such as stairways and passageways, should be provided in order to allow all persons to leave their places immediately and in good order when a fire warning is given.

These exits should be so designed that congestion is avoided, and the inspector should see that they are unobstructed by piles of material, packing cases, etc., that doors open easily, and that exits are clearly marked as such.

All stairway enclosures and fire exit partitions should have fire doors of the self-closing type that can be easily opened from either side. The inspector should see that there is ample space between fire doors and goods piled on the floor.

Horizontally sliding doors are inadvisable since they can be blocked by persons pressing against them. Where they exist the inspector should carefully verify that they slide easily.

Alarm Systems

The fire alarm system of an industrial establishment should have signals that are audible over the whole building, and a sufficient number of easily accessible signal-sending stations. The system should be in good working order at all times.

Fire Drills

Exit drills should be held often enough to ensure orderly exit in the event of fire.

Fire-Fighting Facilities

Pumps and Hydrants.

Fire pumps, if any, should be so located or protected that their operation will not be impaired by a fire in the establishment. The inspector should see that they are maintained in good working order. Hydrants should be free of sediment and should be protected against freezing in cold weather.

Hoses.

Fire hoses should be kept clean and dry, with the nozzle attached, either connected to the water piping or on suitable
and readily accessible racks, so as to be immediately available for use. It is important that all hose couplings for use outside and all hydrants or stand-pipe nipples are of the same types as those used by the local public fire department which may be called upon for aid.

*Use of Water.*

The inspector should verify that an adequate water supply at the necessary pressure is maintained at all times. In some fires, however, water should not be used and it is very important for the safety of workers to have notices posted, when appropriate, at the entrance and inside the building stating that water should not be used in such fires, e.g. fires involving aluminium or magnesium powder, calcium carbide or, as a general rule, live electrical equipment.

*Sprinklers.*

Where automatic sprinkler systems are used, the water-control valves on such systems should be kept open and water supplied at all times. Sprinklers should be checked to see that effective spray action is ensured, and that the sprinklers are not painted, whitewashed, corroded, damaged or heated in such a way as to endanger their normal functioning.

The distribution of water discharged from sprinklers should not be obstructed by stock or partitions. The inspector should see that a clearance of at least 60 cm (24 in.) in all directions is maintained around automatic sprinkler nozzles.

*Extinguishers.*

Industrial establishments, including those with approved automatic-sprinkler protection, should be equipped with portable fire extinguishers suitable for the types of fire liable to occur, having regard to the nature of the processes or the contents of the establishment.

The inspector should verify whether fire extinguishers are conveniently and conspicuously located and maintained in good working order. He should note the date of the last charge, which should be recorded on a label, and see that all fire extinguishers have a plate giving the instructions of the manufacturer for filling, maintenance and use.
Special attention should be drawn to the fact that the charge in portable extinguishers may itself cause a hazard under certain circumstances; for example, carbon tetrachloride and methyl bromide form dangerous gases if used in a confined atmosphere.

**Flammable and Explosive Substances**

Minimum requirements for the storage of flammable and explosive substances are set out below. The inspector should bear in mind that these requirements are meant to apply to industry in general and are not confined to specially dangerous establishments.

In the first place explosives, flammable liquids, compressed gases, coal and other flammable materials should be stored in accordance with any special regulations issued by the competent authority. Where flammable liquids are used it should be considered whether these liquids are really necessary for the work, and cannot be replaced by liquids causing less or no risk of fire, e.g. for cleaning purposes benzene (benzol) could be replaced by trichloroethylene or another non-flammable product. In some cases (e.g. garages) the replacement of petrol (gasoline) for cleaning machine parts by paraffin (kerosene) has been a considerable improvement. The inspector should see that flammable liquids are not stored in workrooms, where only a small quantity for immediate use should be kept.

Even small quantities of flammable liquids, e.g. quantities used for cleaning purposes, should not be stored in glass containers, for if they break the liquid may perhaps spread on the clothes of the worker and catch fire. Fatal accidents have resulted from the breakage of such containers.

Above-ground tanks for storing flammable liquids should be—

(a) placed on firm foundations of non-combustible material at a safe distance from any building;

(b) surrounded with pits, catch basins or depressions of sufficient size to hold the contents of the tanks in the event of rupture;

(c) provided with adequate fire-extinguishing equipment; and

(d) equipped with effective protection against lightning.
If cylinders containing flammable or explosive compressed gases are stored inside the establishment, the storage place should be isolated by fire-resisting and heat-resisting partitions or walls. They should be so stored that they do not fall over and yet can be easily removed in case of fire.

It is also important to see that combustible dry materials should be stored in fire-resistant bins provided with lids.

The inspector should see that quantities of packing material of a flammable nature are stored in separate buildings or in non-combustible or metal-lined rooms. If small quantities of such material are to be stored, metal or metal-lined bins with self-closing covers can be used.

Special attention should be given to the prohibition of smoking in the neighbourhood of flammable substances.

Processes involving explosive or flammable substances, for example the manufacture of acetylene and the charging of acetylene cylinders, should be reported by the inspector to a specialist inspector competent to deal with them.

**Waste**

Waste material of a flammable nature should not be permitted to accumulate on the floors. It should be removed as often as possible, and the inspector should see that it is placed in suitably covered metal containers. It is important in the interest of fire prevention that all oil-soaked waste, rags or other material subject to spontaneous combustion should be placed in self-closing metal receptacles, the contents of which should be removed at suitable intervals.

**Lightning**

All industrial buildings, storage tanks containing flammable liquids, and tall chimneys or stacks should be protected against lightning.

**Elevators and Hoists**

**General**

The inspection of elevators calls for special knowledge, and in some countries is only undertaken by special elevator inspectors or by specialist engineers. The following recom-
mendations should not be taken as complete, but they may be of use where specialist inspectors are not available.

The principal parts of elevator installations to which attention should be given during inspections are the hoistways, landing doors, car or cage, guides, buffers and counterweights, ropes and machinery. The inspector should also see that the signs and notices required by law are in place. The inspector should post a notice on every floor or landing indicating that an inspection is taking place.

**Hoistways**

The hoistway should be enclosed by a continuous wall or a substantial grill work, metal bars, or wood slats, with no interior projections and no large openings except for the necessary doors, windows or skylights. An inspection should be made outside the hoistway, at all floors, in order to verify that the enclosure complies with these requirements and is of sufficient strength.

The inspector should see that there are ample top and bottom clearances for the car.

**Landing Doors**

Landing openings in power-elevator hoistway enclosures should be protected by doors or gates, which should be provided with interlocks to hold the elevator car immovable while the doors are open and to make it impossible to open any landing door when the car is more than 7.5 cm (3 in.) from that landing. The inspector should ascertain, at each floor, whether these devices are in good working order.

**Cars**

The inspector should see that the elevator car is enclosed at sides and top, except for the necessary door openings.

Power-elevator cars, except those of direct lift plunger elevators, should have safety gear capable of stopping and holding the car with full load in cases of overspeed, free fall or slacking of cables. The inspector should verify whether this gear is in good operating condition by calling the necessary technical assistance.
Guides, Buffers and Counterweights

The inspector should see that appropriate material is used for the guides and should verify their alignment over the whole length of the hoistway. He should also examine the joints and fastenings and see that the rails are clean and adequately lubricated where necessary.

Ropes

Car and counterweight ropes should be examined very carefully, as they are vital to the safe operation of elevators. The inspector should look for worn or flattened strands and broken wires. The proper lubrication of ropes is very important since it will retard deterioration and corrosion.

A careful examination should also be made of rope fastenings. The inspector should see whether bolts are tight and clamps are properly attached. He should examine the sheaves for wear and make a hammer-test of the rim and spokes to detect cracks.

Machinery

The hoisting machine should be examined thoroughly to see that it is safely installed and is in good working order. In the case of a winding-drum machine the inspector should examine the rope fastenings on the drum and see that there are at least two turns of rope when the car and counterweights are at the bottom of their travel. All gears should be properly guarded and lubricated.

In the case of hydraulic elevator machines, the inspector should examine the elevator pumps, automatic by-passes, valves and pressure tanks. He should look for leaks in valves and pressure tanks, and see that all parts of the machine are properly lubricated in order to avoid corrosion.

Notices

The inspector should see that notices indicating the maximum permissible load to be carried are conspicuously posted in all elevator cars, and that all power elevators that do not conform to the regulations for passenger elevators have notices posted at every landing and in every car, prohibiting all persons except the operator from riding in them.
Machine Guarding

General

Machine guarding is a large and complex subject and it will not be possible to deal here with methods of guarding all the types of machine now in use. However, transmission machinery is in universal use and is moreover responsible for large numbers of accidents; consequently considerable space has been devoted to it.

All dangerous parts of prime movers (engines, motors, etc.), of transmission equipment (shafting, gears, belts, etc.) and of power-driven machines should be effectively guarded unless they are so situated that it is quite impossible for the workers to reach them. Special attention should be given to revolving and other moving parts such as belts and shafts which, by reason of a worker's duties, may become accessible.

A highly dangerous condition exists where setscrews, keys, bolts, grease cups, etc., protrude on moving parts. Setscrews, if practicable, should be countersunk and other protruding elements should be covered by sleeves or other devices.

Maintenance of Machinery

In the course of his visit to a factory the inspector should verify whether there is a safe system of performing machine maintenance work, such as repairs, adjustments and oiling. As a rule these operations should not be carried out while the machinery is in motion.

A system that has gained universal favour is the one under which a worker who is about to perform maintenance or repair work on or near machinery has the machinery stopped by disengaging the power transmission equipment or by bringing the prime mover to rest, and then puts the starting mechanism under his own lock and key. Specially designed switch boxes or other arrangements on clutches and drives should then be provided, to facilitate the attachment of the maintenance worker's lock.

It is not always possible or practicable to stop machinery for oiling and greasing purposes. If such is the case the grease cups and oil pipes should be extended to a length well out of
the danger zone, or a self-lubricating or central oiling system should be installed.

Oilers, cleaners and maintenance workers who carry out their work from ladders, scaffolds or platforms are particularly exposed to danger. The safety of men on such supports should be ensured by means of portable screens, or by railings, or else the moving parts to which a worker may be exposed should be stopped before he begins work.

**Clothing**

A common source of injury to workers around machinery is loose-fitting clothes. Revolving parts of machinery easily pick up loose parts such as sleeves, ties, collar ends, gloves, coats and even the hair, especially the long hair of female workers. All clothing should be tight-fitting; gloves and rings should not be worn and women’s hair should be well tucked in under suitable caps or scarves.

**Power Control**

There should be means of effectively controlling the speed of prime movers under varying conditions of load. Speed-limiting devices and safety stops when not operated automatically should be provided with remote controls so that they can be brought into action from a safe place.

Where machines are not driven by an individual motor they should be equipped with a clutch, a loose pulley or any other adequate device for controlling the movement of the machine from the position of the operator at work. On large machines where two or more operators may be endangered by the motion of the machine there should only be one starting device (e.g., push-button) but there should be readily accessible means by which the machine can be stopped by each operator. The inspector should see that these controls are in such a position and so designed that they cannot be operated inadvertently by persons or objects around the machine. It is also good practice to adopt a system of identification of the controls in order to avoid mistakes.

A case in point is where several operators are engaged in operating a large press; here push-button controls accessible to all the operators can be provided. Another system requires
all operators to actuate simultaneously an individual control device to keep the machine in action. On equipment such as rolls and calenders, there should be a safety trip control placed in the immediate vicinity of the operator and easily actuated by a slight movement of any part of his body to bring the machine to a quick stop.

Guards

The point of operation on machines can be protected in many ways—by interlocking or fixed guards, by automatic feeds, etc. Two-hand controls are not recommended if they can be put out of action by the machine operator.

Interlocking devices that disengage the driving mechanism while the dangerous parts of a machine are exposed are used, for example, on presses, and on agitating and mixing machines in which the blades come to rest when the cover of the machine is lifted.

To be effective, guards should fulfil a number of requirements in addition to that of merely covering a dangerous moving part of a machine. The protection provided by the guard should be positive, i.e. not depend upon some other mechanism being brought into action, and should prevent all access to the danger zone during operation. The design and construction of guards in general should be such that they will not hamper production or constitute a hazard in themselves. They should operate automatically where possible, and in any case should not require special effort or attention on the part of the operator. Guards that cause discomfort or inconvenience to the operator will sooner or later be discarded.

They should be strong enough to fulfil their purpose, e.g. afford protection against the breakage of an abrasive wheel or of a saw band.

The inspector should bear in mind the advantages of machinery having built-in safety features, since it is much easier to achieve safety with such machines.

It is sometimes necessary to fence off the approach to machinery instead of providing individual guards for all its moving parts. This is often the case with machines having large flywheels, cranks, rods, etc. Suitable railings and toe-boards should then be provided so as to prevent persons from
coming into contact with dangerous parts. Special attention should also be given to the provision of safe passageways over or around such machines.

**Transmission Machinery**

The risks caused by different parts of mechanical power transmission equipment are so serious that from the point of view of accident prevention the use of mechanical power transmission should be limited as far as possible. Individual electric drive is preferable. Moreover, this type of drive has other advantages: better and simpler lighting of the workroom can be achieved; it requires less room; there is a considerable saving in mechanical power; there is less restriction on the positioning of machines; machine maintenance is simpler; and machine speeds can be changed more simply.

If mechanical power transmission has to be employed sufficient care must be devoted to construction and installation. Special attention must be given to the situation of the bearings and pulleys. No pulley should have a broken rim, for this might damage the belt or even break it; moreover, the belt or the metal lacing might hook into the pulley and lead to breakage of parts of the mechanical transmission equipment. Dirty or improperly aligned bearings may become heated and cause trouble. Someone may then be tempted to expose himself to danger by approaching pulley drives and revolving shafts for inspection purposes.

As a rule it should be possible to stop every machine individually without affecting other machines. In this way the necessity of performing maintenance and repair work on or near a machine in motion will be reduced. If, for the individual stopping of machines, fast and loose pulleys are used the machine should be provided with a permanent belt shifter and mechanical means of preventing the belt from creeping from the loose to the fast pulley. Then the machine cannot be started unexpectedly. A clear warning signal should always be given before transmission equipment is set in motion.

Accidental movement of the machinery may also occur when the fast pulley is set in motion by the loose pulley as a result of friction due to bad alignment or insufficient oiling. The best solution is to place the loose pulley on a separate
shaft; this solution is the only correct one in the case of a shaft running at over 800 revolutions per minute.

With a well-designed oiling system the oiling devices do not move when the belt is on the loose pulley and do not constitute dangerous protruding parts when the belt is on the fast pulley.

It must be possible to stop different sections of mechanical power transmission equipment separately. For this reason suitable couplings that can be handled from the floor should be built in. To stop a shaft quickly it will sometimes be necessary to have a brake, especially when the machines driven by the shaft have accumulated a great amount of energy.

Stopping the different sections separately is necessary not only in the case of an accident, but also during repair work in the neighbourhood of the shaft. Unshipped belts can only be replaced safely while the transmission is at rest. If the shaft must turn during the replacement of a belt, it should be turned very slowly. If a belt pole is used by a worker standing on the floor for unshipping a belt while the shaft revolves, the pole must be of such a length that it extends from the top of the pulley to within about 60 cm (24 in.) of the floor. This means that the bottom of the pole is not higher than the worker's knee. In this way, if the top of the pole is caught by moving parts, the bottom will not strike the worker's body.

Belts should be unshipped from revolving shafts only when stopping the shaft would create serious practical difficulties, e.g., by stopping mechanical agitation in vessels and thus causing loss or danger. In any case belts should be unshipped only by men experienced in this kind of work. Transferring belts by hand on cone pulleys is more dangerous than is usually realised. A simple and safe system of unshipping belts on normally rotating shafts is unknown.

Belts that are temporarily not in use must be taken away from the transmission. If this is impossible the belts must be suspended on fixed posts. In some cases a bearing can be used for this purpose; in other cases it will be necessary to make a special belt support. These supports, whether hangers or perches, must be sufficiently rigid and 15 mm to 20 mm (0.6 in. to 0.8 in.) larger than the belt to prevent contact between belt and pulley. The support must reach a few centimetres under the rim of the pulley to prevent nipping of the belt between
support and pulley and to prevent the belt falling on the shaft. When unshipping the belt is an exception, the disadvantage of this system is that it requires a permanent construction for an operation which seldom occurs. In such a case a semi-circular screen connected to a long pole can be placed on the shaft temporarily.

It is not sufficient to protect only the parts of the transmission that are dangerous if touched during normal operations, but it is also necessary to protect those that are dangerous if touched during cleaning or oiling the machines and the transmission.

Protection by complete enclosure is required for all those moving parts of a transmission near which people pass with loose yarns, steel wire, fibres or other articles that can easily be caught by rotating parts.

The guards must be suitably constructed. The following materials can be used: angle iron 25 \(\times\) 25 \(\times\) 3 mm (1 \(\times\) 1 \(\times\) 0.125 in.) to 40 \(\times\) 40 \(\times\) 4 mm (1.6 \(\times\) 1.6 \(\times\) 0.16 in.), pipe 19 mm to 38 mm (\(3/4\) in. to 1\(\frac{1}{2}\) in.), perforated plate, or woven wire 2 mm (0.08 in.) in diameter. If wood is used, it must be sound; the guards must be of robust construction.

The guards should not be placed at a distance of more than about 30 cm (12 in.) from the dangerous parts, so as to prevent persons from standing between the latter and the guard. The meshes of woven wire used for screen should not be more than 5 cm (2 in.), but if the guard is less than 10 cm (4 in.) from the dangerous part, the openings in the screen should not be more than 12 mm (0.5 in.).

In general, belts 5 cm (2 in.) or more wide and running at a speed of 5 m/sec. (16.5 ft./sec.) or more must be guarded by enclosures 1.80 m (6 ft.) high. In most cases it will be sufficient to protect only those parts of the transmission that are at a height of less than 1.80 m (6 ft.) above floor, staircases, platforms, etc. However, if goods are stored in the neighbourhood of parts of the transmission, protection is necessary (unless the dangerous parts are situated more than 1.80 m (6 ft.) above the top of the pile of goods) because workers may stand on the pile to handle the goods.

If the breaking or falling of a belt would endanger persons, suitable protection under the belt is necessary. For instance, a trough-type guard can be installed over places where persons pass or work.
Guards and oiling and greasing cups must be placed in such a way that it is unnecessary to go or to reach behind the guards during normal work and during oiling.

Guards that must be removed and replaced frequently for repair and maintenance purposes must be so designed that they can be replaced quickly and easily. If the guards can be made in such a way that when opened they obstruct an aisle, their replacement at the completion of repairs or examination becomes almost automatic.

The safest belt joint or fastening is glue or rawhide or leather lacing. If the belt is glued, the seam must be made in such a way that it cannot be damaged when running on the pulley.

The protruding parts of the transmission are not the only dangerous ones: smooth shafts may also cause accidents by wrapping of a belt, of clothes, of threads, steel wire, fibres, etc. Smooth shafting is particularly dangerous because it looks safe and is so widely believed to be safe. Such shafting not more than 1.80 m (6 ft.) above the floor or near places where goods are stored should be guarded by complete enclosure.

All parts of the transmission should be easily accessible for maintenance and oiling. Where necessary a safe passageway should be provided. Ladders should be fitted with hooks to prevent slipping, and if necessary have non-slip bases. For work near rotating shafts, ladders should be provided near the top with movable screens giving temporary protection from the shaft on both sides of the ladder.

Work on transmission equipment should only be done by experienced men familiar with the work. Work that must be done when the transmission is running should only be done on a special order and under the direct responsibility of a competent person.

The dressing of a belt should be done at the place where the belt leaves the pulley and during this work the belt must run slowly.

Painting, cleaning and similar work should, if possible, be done with the transmission stopped.

Electricity

The inspection of electrical installations requires special knowledge and measuring equipment, and for this reason
specialised technical inspectors are often appointed for the purpose. An examination of some parts of electrical installations by an inspector making a general inspection of industrial establishments may be a means of detecting dangerous conditions before the occurrence of an accident, but only a specialist can make a proper examination.

*Installation of Electrical Equipment*

Electrical equipment must be suitable for the work it has to do and for the premises in which it is used. It should be protected against mechanical damage, capable of resistance to environmental heat, humidity, etc., as well as to chemical agents to which it may be exposed, and should not be liable to ignite flammable dusts, gases or vapours. There is electrical equipment specially designed for safe use in dangerous atmospheres, for example dust-, water-, explosion- and flame-proof equipment.

The inspector should ascertain whether electrical equipment accessible to workers presents any danger of shock. He should, for instance, draw the attention of responsible persons to the danger involved in the use of unprotected lampholders, defective portable lamps and makeshift fuses and to the importance of checking electrical hand tools when delivered by the tool store.

Temporary electrical installations, such as those used during ship construction and on building or civil engineering construction sites, need particularly careful inspection.

Portable electric tools and lamps used in boilers, tanks or other vessels should be supplied only with current of a very low voltage through an isolating transformer.

*Electrical Equipment in Use*

The inspector should ascertain the condition of electrical equipment. The inspection should be concerned principally with the external examination of the sheathing of cables and flexible conductors, outlets, plugs, connections to appliances, switches and other control equipment, etc.

The insulation of electrical systems should be controlled with the help of appropriate measuring devices.
Permanent enclosures, covers or other suitable guards should be provided, where practicable, for all current-carrying parts operating at 50 volts A.C. or more to earth.

Portable electric tools and lamps should be carefully examined, especially with regard to the integrity of the earth (ground) connections of the frame of the tools (control of the earth wire included in the supply cable and of the earth pin which forms a part of the plug).

**Protective Devices**

The inspection of automatic protective devices of electrical installations should be concerned primarily with the rating of fuses and circuit breakers for protection against overload, and with the testing of protective devices having mobile parts (thermal and magnetic switches, etc.).

The continuous integrity of the earthing (grounding) system should be verified as well as the earth connections of equipment frames, enclosures, sheathing and other metal non-current-carrying parts receiving current from a supply system with the neutral to earth. It is important to examine the position and area of earth plates, and the nature of the surrounding earth. A more complete control of earth connections and their resistance should, however, be made with appropriate measuring devices.

**Fire-Fighting Equipment**

Fires involving electrical installations or originating in buildings containing much live electrical equipment, such as power stations and substations, should be fought with extinguishers containing non-conducting and non-toxic substances, such as carbon dioxide or dry chemicals. These extinguishers should be readily available close to the installations.

**Work on Electrical Installations**

The inspector should ascertain whether suitable precautions are taken to protect men working on electrical equipment and conductors. As a rule work should not be done on live equipment or conductors where the pressure exceeds 250 volts A.C. or D.C. to earth.
Static Electricity

Appropriate measures should be taken in places where there is a risk of explosion or ignition to guard against sparks resulting from static electricity. The accumulation of static charges can be avoided, for instance, by maintaining an appropriate relative humidity (not less than 50 per cent.), by earthing all metal parts, by installing metallic collectors (combs) on belts, and textiles, paper, etc., in course of manufacture, or by using radio-active eliminators.

Boilers and Pressure Vessels

The inspection of boilers and pressure vessels, like that of elevators, calls for special knowledge and cannot be thoroughly carried out by the ordinary inspector.

However, the inspector, if suitably qualified, may carry out an external examination of the boiler or pressure vessel as suggested below, and if he suspects that anything is wrong he should call in a specialist. Internal examinations must be left to specialists.

Safety features should be incorporated in boilers and pressure vessels in the design and construction stages. It is therefore important for the inspector to verify that the user has not removed any safety devices or rendered any of them inoperative.

Steam Boilers

Boiler Rooms.

The design and construction of boiler rooms should be such as to reduce to a minimum the risk of fire spreading to the building in which the boiler is housed or to adjacent buildings or workrooms.

There should be at least two exits from all boiler rooms, placed so as to permit easy and rapid evacuation of the room in the event of an explosion or a rupture of steam lines.

Means such as stairs or platforms should be provided to ensure safe access to equipment that is out of reach, or else remote control devices should be provided.

A careful examination should be made of the foundations and supporting structures of boilers to ensure that they are of
adequate strength. Measures should be taken to prevent the furnace heat from impairing the strength of the boiler supports.

**External Examination.**

A careful external examination will reveal any surface cracks, broken attachments, defective fittings, structural defects, leaks, etc. All defects noted should be recorded by the inspector. The examination will also afford an opportunity to compare the setting of valves, the markings the boiler should bear, etc., with the manufacturer's specifications. All these matters should be verified in accordance with the requirements of national regulations, where these exist, or with the provisions of recognised standards.

During the external inspection of a boiler in service examinations and tests should be made of safety and other valves, water and steam gauges, fittings, openings, piping blow-off and water-column pipes, connections and cocks, in order to ascertain that these parts meet the requirements of official regulations or recognised standards. The inspector should ascertain whether the boiler has the openings necessary to allow complete cleaning of the boiler for examination purposes. Manhole openings should be of sufficient size to allow easy ingress and egress.

**Safety Valves.**

The inspector should ascertain that all steam boilers as well as economisers and superheaters have at least one safety valve of suitable capacity, which is kept in good operating condition at all times. Safety valves should be kept free of obstruction of any kind, and should be placed as close as possible to the boiler or other equipment concerned and independently of any other steam connection valve or fitting. No stop valve should be inserted between the boiler and the safety valve. Safety valves should be tested to ensure that they will function rapidly at the pressure for which they are set, and that any fittings attached to them such as mufflers or discharge pipes will not interfere with their discharge capacity.

**Water-Column Pipes and Water-Gauge Glasses.**

The steam and water pipes leading to the water column and gauge glass should be of ample diameter (at least 25 mm
or 1 in.) and be mounted in such a way as to ensure proper functioning. The try-cock and gauge cocks (which should be placed within reach of the boiler attendant or be equipped with extension rods or other devices permitting operation from the floor) should be tested, and the water-column and gauge glasses should be blown down when the boiler is under pressure to check the performance of the blow-off piping and of the water gauge.

*Steam Gauges.*

All boilers should be equipped with a steam gauge, the performance of which should be periodically checked against that of a standard testing gauge to be mounted on the same steam gauge connection. Steam gauges should be so designed and placed as to afford easy reading by boiler attendants, and have the maximum permissible working pressure indicated in red on the dial.

*Other Devices and Equipment.*

All gauge cocks, stop, check and pressure-relief valves, fusible plugs, blow-off pipes, vent pipes, pressure gauges and other fittings on steam or hot water boilers should be examined to ascertain their working condition and to enable the inspector to form a general opinion of the maintenance and operation of the equipment by the user. Adequate means should be provided to permit easy identification of all control valves and equipment by the operators.

*Hydrostatic Tests.*

In some cases when there is doubt as to the extent of a defect found in a boiler, the boiler may have to undergo a hydrostatic test by a competent person or firm.

*Boiler Records.*

The boiler records should include the manufacturer's certificate showing (1) all the technical specifications of design and construction; (2) the results of tests carried out on the materials of construction and on the various parts of the boiler in the construction stage before being placed in service or after installation, reconstruction or repairs; and (3) the results of all tests, periodical examinations, cleanings, repairs, altera-
tions, etc., that have been made on the boiler since the date of installation.

It is important that all the findings reached on the occasion of an inspection, as well as all the recommendations made and the repairs ordered, should be carefully noted in the records of the boiler, or on special inspection forms, to ensure that a complete history of the life of the boiler is available for future inspections.

Operation and Maintenance.

Safety in the operation of boilers is dependent to a large extent on the manner in which they are operated and maintained. The inspector should therefore ascertain that there is adequate supervision and that the workers in charge of operation and maintenance of boilers possess proper qualifications to meet standards established by national laws and regulations, where these exist, or other recognised standards.

Pressure Vessels

General.

As with boilers, the general purpose of an inspection of pressure vessels is to ascertain that they have been designed, constructed and installed, and are operated, in accordance with statutory requirements, where these exist, or with recognised standards.

The pressure vessel records should be studied systematically. The use to which the vessel is put often plays an important part in its actual condition, irrespective of its age. Vessels used for corrosive substances, for instance, or in corrosive atmospheres will deteriorate rapidly, especially if not protected by suitable coatings and linings. Even in the case of protected vessels the coverings or linings may have to be removed in order to determine the condition of the walls, especially, when there is doubt as to effect on the safety of the vessel of corrosion, erosion or electrolysis.

External Examination.

The pressure vessel and its parts, fittings and attachments should be thoroughly cleaned before the inspection takes place.
The inspector should satisfy himself that the materials of construction of the vessel and its equipment are adequate for the use to which the vessel is put. For instance, a pressure vessel suitable for use as an air receiver might be quite unsuitable for use with acids, which would attack the material of which it was made.

**Safety Valves.**

The safety valve should be of an approved type and be free to operate at the pressure for which it is set.

It should be ascertained whether precautions are taken against possible clogging of the connection leading to the safety valve by the material contained in the vessel or where the surrounding temperature is likely to freeze the valve. In some cases, e.g. when there is danger of clogging, freezing or sticking, rupture discs of suitable material are used.

**Other Precautions.**

Some means should be provided to protect operators in workrooms where hazardous substances are being processed against possible loss of control of the processes under way. This may be done by providing facilities for drowning any charge, or dumping it in a pit or trough to prevent the spread of the material to the workroom.

The inspector should satisfy himself that vessels cannot be opened while they are under pressure. In the case of revolving vessels or vessels with agitating or mixing mechanisms, interlocks or other positive devices should be provided to ensure that operators will not be injured by driving or stirring mechanisms or any steam, hot water or chemical.

Where steam-heated pressure vessels are operated at a pressure less than that of the steam supply line, an effective reducing valve, followed by a safety valve, should be installed in the line leading from the main line to the vessel. These two valves should be tested by the inspector and reset if necessary.

The inspector should satisfy himself that necessary protection is provided against hazards from exposed moving parts of machinery or hot surfaces of the vessels or pipes leading to them.

Where there is danger of spontaneous combustion, splashes
or sprays of hot water, acids, steam or other substances during operations, adequate means, including personal protective equipment, should be provided for the protection of the operators in the workrooms. Stop valves and other control equipment should be so located that they can be safely operated.

Hydrostatic Tests.

It may be necessary to submit the vessel to a pressure test if there is doubt about the safe working pressure in view of internal erosion or corrosion, or after major repairs.

Inspection Records.

The findings made on the occasion of an inspection of pressure vessels should be recorded in accordance with provisions similar to those laid down for boilers.

Additional Requirements for Other Types of Pressure Equipment

Compressors.

Compressors are submitted to considerable vibrations which may easily damage the foundations on which they are installed. The inspector should see whether the foundations, supporting structures and anchorages are of adequate strength. Cracks may develop in parts of the machine that are bolted or otherwise attached to the flooring, and particularly in machine supports.

Means should be provided to ensure that the discharge pressure of the compressors will not exceed the allowable maximum pressure of the system. Where a stop valve is installed in the air discharge piping of the compressor, a safety valve should be installed between the stop valve and the compressor. These valves should be carefully examined.

The inspector should ensure that the air intake for air compressors is at a place where the air is as pure and clean as possible and free from any flammable or toxic gases or fumes. At the discharge end of the compressor, an oil separator or trap should be installed to avoid carry-over of cylinder lubricant to receivers and other parts of the system.

As special hazards exist when dangerous gases are being compressed, the inspector should verify whether adequate pro-
Protective measures have been taken and, in particular, whether a safe escape has been provided for dangerous gases from safety valves, blow-down valves, traps, etc.

**Air Receivers.**

When inspecting air tanks, special attention should be given to the supports or hangers of tanks as these are often subject to a considerable amount of vibration, which may cause the supports to fail. Safety valves and stop valves should be checked and, if necessary, reset.

A particular hazard exists with compressed air tanks in that explosions may result from a mixture of the air with oil which may be drawn into the supply piping during the compression cycle. All receivers should be equipped with a drain trap at their lowest point. The drain trap, which may be an automatic device or a simple valve, should be checked to ensure that it has not become clogged by dirt or otherwise been rendered inoperative.

**Refrigeration Tanks.**

Factory rooms in which refrigeration tanks and other parts of refrigerating systems are permanently installed and operated should be completely enclosed to ensure that in the event of severe leaks the refrigerants will not pass into other parts of the factory building. These rooms should be well ventilated; they should not be used as a passageway.

Careful examination of the tanks and equipment is necessary to detect leaks and consequent respiratory hazards.

**Gas Cylinders.**

The control of the construction and the testing of cylinders for compressed, liquefied and dissolved gases should be left to inspectors with special experience in this field. However, the requirement that cylinders should be suitably handled should be enforced by every inspector.

The design and construction of cylinders used for compressed gases should meet the requirements of national regulations, where such exist, or of recognised standards. All cylinder specifications should be made available to the inspector. It is important for the inspector to examine the records of the cylinders to verify the purpose for which the cylinders were
made and that for which they are used in an industrial establish­
ment. The markings on the cylinder applied by official testing authorities or by the manufacturer should indicate the maximum charging pressure of the cylinder, the name of the gas for which it was made and the dates of manufacture and of the last test the cylinder has undergone.

Cylinders that are severely dented or scored or that show a marked degree of corrosion, scaling or lamination or doubtful welded seams should be immediately taken out of service and returned to the manufacturer for repair. The user should not be permitted to perform any repairs on gas cylinders, because they are precision-built appliances that require expert work­
manship and must be submitted to exhaustive tests before they are filled and shipped to any industrial establishment.

The inspector should see that all gas cylinders are pro­
vided with pressure gauges and suitable reducing valves, and with ventilated valve-protecting caps when not in use. He should also examine all fittings and gas lines for possible leaks and damage.

The inspector should ascertain that suitable handling equipment and methods are employed in establishments that use gas cylinders. Precautions should be taken to guard against knocking, dropping or rolling cylinders, and properly designed trucks, cradles and tools should be available to trans­
port cylinders from one workplace to another.

In storage, oxygen and other oxydising-gas cylinders should be separated from other cylinders, especially from those containing flammable gases, and should be stored away from oil, grease and volatile liquids. Storage rooms should be well ventilated, protected against heat and plainly marked on the outside with appropriate and clearly visible danger signs.

Suitable clamps, chains or hooks should be used to fix vertically placed cylinders to a wall to prevent dropping. The connection to the wall must be made in such a way that the cylinder can easily be removed if necessary, e.g. in case of fire. Cylinders should not be used for a purpose for which they were not made, e.g. as rollers to transport heavy objects.

When stored in the open air cylinders should be adequately protected against excessive variations of temperature, direct rays of the sun, accumulation of snow and ice and continuous dampness.
**Water Tanks.**

Devices should be installed on hot water pressure tanks to prevent the generation of steam in the water space of the tank. Considerable pressure could develop in tanks which are not equipped with automatic temperature regulators or other devices to prevent a possible rise in pressure due to high temperatures. A pressure gauge should be mounted between the reducing valve and the relief or safety valve in such a way as to afford easy reading, and should be examined and tested by the inspector at the same time as the reducing and safety valves.

**Furnaces, Kilns and Ovens**

The following points, common to furnaces, kilns and ovens, should receive attention in the course of inspections.

*Floors*

Floors around furnaces, kilns and ovens should be of non-combustible material and kept free of obstructions to ensure safe working conditions at all times.

*Protection against Atmospheric Hazards*

The inspector should ensure that the atmosphere of adjacent workrooms is not contaminated by fumes, gases and smoke that may be emitted by heating equipment. He should have available suitable means of carrying out simple air analysis as occasion arises. Natural or mechanical ventilation should be such as to eliminate the possibility that workers will be inconvenienced by such emanations or prevent the formation of explosive mixtures in the equipment and in the workrooms. Suitable respiratory equipment should be made available for workers who must enter hazardous atmospheres to perform their duties. A person with adequate first-aid training should be readily available.

*Protection against Heat*

Devices should be provided to protect workers against radiant energy and hot substances and equipment, special attention being given to the protection of the eyes.
**Fuel Control**

Means should be provided on gas and oil-fired heating equipment by which, in the event of failure of the heating equipment or of any of its parts to maintain proper combustion of fuel, the feed lines can be immediately cut off. Where automatic cut-off valves are used for this purpose they should be examined by the inspector to ensure that they have not been rendered inoperative.

**Fire Protection**

The inspector should ascertain that a safe clearance is kept between all heat sources and any flammable substance or unprotected combustible material, and that fire-extinguishing equipment, suitable for the class of fire to which the process is exposed, is available and kept in serviceable condition.

**Handling, Transportation and Storage of Materials**

**General**

A very large proportion of all industrial accidents occur in the handling and transportation of materials, and it is therefore desirable that the inspector should pay close attention to these matters. The application of certain basic principles to handling and transportation will greatly help to reduce the frequency of the most severe types of accidents in these operations. Generally, the inspector should favour the replacement of manual by mechanical handling where practicable.

The inspector should ascertain whether transport and hoisting equipment operators have been properly instructed in their work because the safety of other people in the vicinity of the workplace often depends on these operators. Workers should also be properly instructed in safe methods of lifting and handling heavy objects. The inspector should take into account the weight and nature of the objects to be lifted, the distances they are to be carried, and the frequency of lifting and carrying. Special attention is needed in the case of women and young workers.

Suitable personal protective equipment should be supplied to workers handling objects with sharp edges, fins, slivers,
splinters or similar projections, or handling hot, caustic or corrosive materials. This equipment includes gauntlets, aprons, leggings, goggles, hard hats, and safety belts for workers handling bulk materials in storage bins, or on exposed heights such as roofs.

The inspector should examine the equipment and appliances used for handling and transporting materials to ascertain that they are adequate for the work required of them, and are maintained in good working order. The equipment most commonly used for handling and transportation of materials in industry includes cranes, hoists, crabs, winches, blocks and tackle, conveyors, power tractors and power or hand trucks.

The inspector should ascertain that the following basic provisions are adhered to.

(a) All hoisting and transporting appliances should be plainly marked with the maximum safe loads that can be lifted or carried by them.

(b) Moving parts of machinery should be adequately guarded by machine guards, by barriers or by position.

(c) Electrical, steam or pressure equipment used in connection with hoisting or transportation equipment should conform to the requirements laid down in the sections above concerning electricity, and boilers and pressure vessels.¹

(d) There should be adequate means to stop and hold in position any equipment under load, and the controls should be arranged and marked in such a way as to reduce the risk of inadvertent or erroneous operation.

(e) There should be a uniform code of signals throughout the establishment for the operation of equipment. The inspector should ascertain that the code adopted is understood and used by all concerned.

Measures should be taken to ensure the safety of workers having to perform their duties in the vicinity of or in the path travelled by lifting and transport equipment.

_Hoisting Appliances_

The framework, working gear and accessories of hoisting appliances should be of good mechanical construction, sound

¹ See above, pp. 72 and 75.
material and adequate strength. Electrically operated hoisting appliances should be equipped with limit switches or other devices limiting the travel of the load. All hoisting appliances should be thoroughly inspected and tested by competent persons before being first taken into service and at suitable intervals during use. A certificate should be drawn up for such inspection and test and kept available for the labour inspector at the industrial establishment.

Strain-bearing structural members of cranes, if subject to shock, should be constructed of steel or equivalent metal. Crane cabs or cages should be so situated that the operator always has a good view of the operations.

Travelling cranes should be so designed and installed that there is always adequate clearance between the crane and roof trusses, walls, columns and other structures. The hooks, gear, shafting, ropes and structural members of travelling cranes should have adequate factors of safety as laid down in national regulations or in recognised standards.

The runways of travelling cranes should be provided at both ends with adequate rail stops or bumpers.

Safe access to overhead cranes by means of suitable ladders, stairways, platforms, etc., should be provided for operators and maintenance or repair workers.

Plant Railways

When inspecting plant railways the inspector should observe matters such as the general soundness and strength of construction; clearances between buildings, structures and piles of material on the one hand and the tracks on the other; the protection of level crossings; the construction and equipment of the locomotives and other rolling stock; and the standard of maintenance. He should also see that the operating rules are satisfactory and are enforced.

Constructional matters needing attention include the type and condition of the rails, guard rails on curves, the safety of overhead tracks, the guarding of frogs and points, the protection of exits opening directly on to the tracks, the provision of stout buffers at the end of tracks, and the provision of warning signs, gates and barriers where required to prevent danger.
Piling and Storage of Materials

The foundations and floors of storerooms, warehouses and buildings generally should be strong enough to eliminate any risk of collapse under the weight of the materials they will have to carry. Systematic control of the weight of all materials resting on the floors of a building should be maintained to ensure that not more than the maximum safe load (static and dynamic) is carried. Materials should not be piled against partitions, walls or structural columns unless these parts of the building have been designed to withstand such pressure as may be applied to them by the materials.

It is important to verify that piles of materials do not interfere with the lighting, impede the operation of machines and equipment, obstruct passageways and exits, impair the efficient functioning of sprinkler systems or constitute an obstruction to the ready use of other fire-fighting equipment.

Special precautions should be taken to avoid building unstable piles of certain types of articles, such as bags, collapsible boxes and cartons, pipes, drums, bar stock and round objects. Tie pieces, specially designed racks, wood strips and stop blocks should be used for such articles where necessary.

When necessary to ensure safety, precautions should be taken in storage to protect materials against atmospheric conditions; calcium carbide, for instance, is particularly sensitive to damp; and other substances, such as explosives, compressed gases and flammable liquids, should be protected against the heat of the sun or of heating appliances. Closed drums or vessels may, under the influence of temperature, develop appreciable internal pressure.

Where no official regulations exist on the storage of hazardous substances the inspector should endeavour to ascertain that the storage conditions provided for substances with a special fire or explosion risk are such as to eliminate the risk. The storerooms and warehouses for them should be remote from any workplace, and properly protected by signs, barriers, fences, etc. Access to such buildings and rooms should only be permitted to experienced workers who have been trained to cope with the special hazards that may develop as the result of any accidental occurrences.
As regards the special precautions which should be taken against fire, reference should be made to the section on fire prevention and protection.¹

**DANGEROUS SUBSTANCES AND RADIATIONS**

*Dangerous Substances*

The inspectorate should gather adequate information on the properties of all harmful substances used in the industrial processes within its jurisdiction. A careful examination should be made of all processes and operations in which flammable, infectious, irritating, offensive or toxic dusts, fibres, fumes, gases, mists or vapours are generated or released in dangerous quantities.

Attention should be paid to new processes or substances introduced into industry, and some means should be devised to determine the hazards of the new processes or substances before operations are started. Where the substances to be used appear to be harmful, or where means are not available to determine the characteristics of the substances, protective measures should be taken in accordance with recognised safety and health standards.

*Health Risks.*

Toxic substances occur in the form of solids, liquids, dust, gas, fumes or radio-active emanations. They have a triple path of entry into the system: by inhalation, by ingestion, or by skin absorption, of which the first is by far the most important.

A high percentage of all cases of industrial poisoning is attributable to the *inhalation* of dust, fumes and gases. *Ingestion* of toxic substances, due in large measure to eating with dirty hands or to consuming food in the workroom, can be almost entirely avoided by education of workers in personal cleanliness, hygiene and provision of a canteen.

Certain poisons can be absorbed through the *skin*, for example aniline, tetraethyl lead and nicotine. Some toxic substances cause ulceration of the skin, for example compounds of chromium or arsenic.

¹ See above, p. 59.
The risk of dermatitis is present in a large variety of processes involving the handling of irritants such as dyestuffs, cements, mineral oils, turpentine and its substitutes, organic solvents, alkalis and acids and poisonous woods, to mention but a few of the processes. Dusts, sprays or splashes of various substances can also cause dermatitis if in contact with the bare skin for long enough.

Health risks are also present in the handling of animal hides, wool, hair or hooves, which may contain anthrax spores, and of grain containing mycotic organisms.

Work in compressed air may cause illness if not properly organised and supervised. The physical fitness of men to be employed on such work should be examined.

**Cleaning.**

When inspecting workrooms where dangerous substances are handled or processed, the inspector should note whether the maintenance of the rooms is such as to avoid unnecessary exposure of the workers to the substances. The floor and walls should be kept clean. Places where dust can accumulate should be eliminated and, when this is impossible, the places systematically cleaned at suitable intervals. The methods used in cleaning up dangerous dusts or liquids must also be inspected, as these may be dangerous to the cleaners.

**Isolation from Exposure.**

Processes involving hazards due to the nature of the substances used should, as far as practicable, be carried on in separate rooms, with a minimum number of workers and with special precautions. Where there is dust or fumes, precautions include the use of airtight apparatus, fume chambers, suction hoods connected to exhaust systems, or wet methods. In all operations where it is not practicable to use such equipment, suitable personal protective equipment such as masks and goggles should be available and used. Short exposure on isolated and infrequent occasions may sometimes be the only remedy. In some cases it may be sufficient if the operation can be performed in the open air.

**Identification.**

There should be means of identifying containers, pipelines, apparatus and other equipment in which dangerous
substances are placed or processed. This may be done by using suitable labels, possibly combined with a colour scheme. The inspector should ensure that all workers engaged in operations involving dangerous substances are thoroughly instructed in the handling and use of these substances and in the requisite safety, fire-protection and first-aid measures. Identification by colour should not be accepted as a substitute for proper instruction and supervision of workers, particularly in plants with a high risk of explosion or fire.

Air Sampling.

Atmospheric samples should be taken in workrooms where harmful dusts, fumes, gases or vapours arise to ensure that the concentration is kept within permissible limits. Ventilation and exhaust equipment should be examined, and tested if necessary, to ensure that harmful substances do not leak through into the atmosphere of the workrooms, or that contaminated air is not recirculated into workrooms.

Fire and Explosion Risks.

Operations involving an explosion risk should be carried on in separate buildings situated at such distances from other buildings as may be specified by the competent authority or recognised standards, or in rooms separated from one another and from other rooms by adequate fire-resisting walls. Buildings or premises containing flammable or explosive liquids should be so constructed or so surrounded by a wall that no liquid can spread outside the building. In every room there should be adequate means of escape from every point at which a person is employed. The buildings should be provided with suitable explosion vents, and precautions should be taken to ensure that ignition or explosion is not caused by electrical equipment, smoking, open lights, heating equipment, static electricity, etc. Automatic fire alarms should be installed. Numerous precautions are required in connection with the manufacture of acetylene, spray painting with volatile flammable liquids, the manufacture of explosives, the working of magnesium, manufacturing processes liberating organic dusts (flour, starch, pulverised coal, etc.), and other processes with explosion risks. In the absence of national regulations the inspector
Substitutes for Harmful Substances.

If workers' health is endangered by the use of harmful substances, an attempt should be made to substitute harmless or less harmful substances. This is particularly important where solvents are used: some solvents, in addition to creating high explosion and fire risks, are also very toxic. There are available in industry several types of low-hazard solvent, which can replace high-hazard ones with advantage. Another example is the replacement of sand in sand-blasting by steel shot or grit.

Dangerous Radiations

Infra-Red Radiations.

All workers frequently exposed to sources of intense heat need protection of the skin and especially the eyes, owing to the presence of infra-red rays. They should wear goggles or shields having appropriate absorption standards. The inspector should ascertain that such eye-protection equipment is available and used where required.

All sources of intense infra-red radiation should, as far as practicable, be shielded near the source by heat-absorbing screens, water screens or other suitable devices to prevent such radiation striking the eyes of workers not wearing suitable eye protection. It may be advisable to provide salt tablets for workers engaged in work involving exposure to intense heat.

Ultra-Violet Radiations.

In industrial establishments where operations such as arc welding are carried on entailing a dangerous emission of ultra-violet radiation, the inspector should ascertain that precautions are taken to prevent the diffusion of such radiations, especially of radiation liable to reach the eyes of the workers. Protective measures include placing suitable cabinets or screens around the sources of emission, interposing a screen—absorbent glass or other material—between the source of radiation and nearby workers, and limiting the area of irradiation to the minimum. When these methods are inapplicable, goggles conforming to suitable absorption standards should be worn by all exposed
workers, who should also be required to protect their hands and forearms with gauntlets or suitable barrier creams.

**Ionising Radiations.**

For all industrial establishments where ionising radiations are used or generated or where radio-active substances are manufactured, stored or handled, the inspector should call for the necessary technical assistance to determine whether the workers are adequately protected against the effects of ionising radiations. Such protection requires special protective materials and expert knowledge of the operation of detection and measuring devices.

**Health and Welfare**

Some aspects of the working environment that have a bearing on health and safety (lighting, ventilation, temperature and humidity) as well as dangerous substances and radiations have already been dealt with. This section therefore deals only with general measures for protecting the workers' health and for promoting their welfare.

**Medical Examinations**

One of the inspector's main tasks is to ensure that all medical examinations required by law have been carried out. These usually include—

(a) Pre-placement examinations. All young workers entering industry for the first time should have procured a medical certificate of fitness.

(b) Periodic re-examinations. All young workers below a certain age, and all workers of any age in certain dangerous or unhealthy occupations, must be re-examined from time to time. The time between re-examinations depends on the type of trade. It may be fixed by regulations, or the factory medical officer may decide how often such re-examination is necessary.

(c) Special examinations. Other categories of workers who should be medically certified fit for their work are those resuming work after an illness, and physically handicapped workers.
There should also be a record of those who have requested a special examination.

The inspector should see that all statutory obligations with regard to medical examination are complied with. He should therefore ask to see the examination records showing—(1) names of workers examined; (2) their age; (3) dates of examinations; (4) whether special examinations have been made as required by law, e.g. X-rays, laboratory tests, etc.; (5) doctor’s decision concerning fitness for employment in each case.

Medical data such as details of the doctor’s findings are confidential and may be seen only by a medically qualified inspector.

Where the law does not require compulsory medical examination the management may be persuaded, in their own interest, to institute a voluntary system.

**Exclusion of Workers from Dangerous, Unhealthy and Unsuitable Work**

The inspector should know the industries in which dangerous or unhealthy processes are carried on, and give them special attention, visiting them more frequently or at special times. Where regulations prohibit the employment of certain persons on dangerous, unhealthy or physically unsuitable work, the inspector should see that these are complied with.

**Notification of Occupational Diseases**

The inspector should, by examining the records or other sources, find out whether any occupational diseases have occurred, and whether they have been reported to the proper authority if this is required by law.

**Medical Aid**

Where the law requires that medical aid should be available, the inspector should see that it complies with the standards laid down, be it a complete medical service with a doctor in charge, or a sickroom in the charge of a nurse or other competent person. The inspector has not, however, to judge the standard of medical work performed.
Where no arrangements for the care of the sick or injured are required by law, the inspector should endeavour to persuade the management to make suitable arrangements, bearing in mind the size of the factory and the type of work done. Where there are several small neighbouring establishments, or where there are difficulties in establishing a medical service, he may, for example, take the initiative in organising inter-works co-operation in this matter. He may also suggest how suitable arrangements can be made with a nearby hospital, clinic or health centre.

In any medical service accurate records on proper forms are essential. The inspector should see that such records are being kept, as they will enable him and the authorities to make a fair appraisal of the general health situation, and to detect possible sources of injury.

Even where there is no organised medical service, every undertaking should have readily available adequate supplies of first-aid equipment. Ordinarily, small undertakings (e.g., with less than 25 workers) keep a box containing the medicaments, dressings and instruments needed to treat minor injuries, cuts, abrasions, burns, etc. One person, trained in first aid, should be in charge of this equipment; he should have at least one deputy, in particular since a number of workers may be injured at the same time.

In larger undertakings a suitably equipped first-aid or ambulance room should always be available, and there should be a sufficient number of workers trained in first aid. Where there is a risk of asphyxiation, electrocution or other special hazard, suitable rescue and resuscitation apparatus must be available and in working order, and the first-aid workers must be trained in their use. A doctor or nurse, or trained attendant, should be on call at short notice.

The inspector should make sure that all the workers know that first-aid treatment is available and that they understand the importance of reporting even apparently trivial injuries.

The inspector should satisfy himself that the first-aid and rescue equipment prescribed by regulation is duly provided, properly stocked, in working order and kept in a suitable place. He should make sure that personnel have been designated to take charge of it and are properly trained or qualified.
Drinking Water

The inspector should see that an adequate supply of safe drinking water is readily accessible. The public health authority may be consulted with regard to its purity. Taps or sources of water unsafe to drink must be conspicuously labelled, and workers warned against their use.

Wherever possible the water should be supplied by fountains, such as the jet or bubble type. If cups have to be used, workers should either provide their own, or disposable paper cups should be provided by the management. Sharing of cups should be forbidden.

For men (e.g., furnacemen) working in hot and humid conditions, where perspiration is rapid, salt tablets, preferably coated ones, should be supplied to prevent heat exhaustion and cramps.

Cleanliness

Cleanliness plays a considerable part in keeping any workplace in a healthy condition, and is especially important where harmful, noxious, offensive or putrifying materials are used. In such cases special methods of cleaning may be necessary.\(^1\) Attention should be drawn to the risks that may be involved in the cleaning operation itself, e.g. in the cleaning of toxic dusts. The cleaning devices and exhaust systems must be inspected regularly.

Clean and tidy floors and clean, tidily arranged tools help in reducing accidents. Good "housekeeping" has a favourable psychological effect, which helps in the same way.

Windows, skylights and lamps must be kept clean so that lighting is adequate.

Workbenches and Seating

Much fatigue and ill-health and some accidents can be prevented if workbenches are of such a height and so placed in relation to the worker's eyes and arms as to enable him to work with the maximum efficiency. Where the work can be performed in a sitting position, seats, with back and arm rests if possible, should be provided.

\(^1\) See above, p. 89.
On an average, work should be 107 cm (42 in.) above the floor for men, and 100 cm (39 in.) for women. Seats should be of such a height that the elbows are level with the work.

Sanitation

A sufficient number of latrines should be available for the workers. For male workers one latrine for every 25 persons or less, employed at any one time, is usually sufficient, provided there is also one urinal for every 15 men. There must always be separate latrine accommodation for women, however few are employed; at least one latrine should be provided for every 15 women or less. A small closed disposal bin should be provided in every closet used by women workers (or a small gas or electric incinerator may be installed in their changing-room for this purpose).

Latrines should be readily accessible in all weathers, and be well lighted at all times. They should have impervious floors and walls of a finish that can easily be cleaned. Each unit should be screened from view, have a door with a latch for privacy and be supplied with toilet paper. Closets should never open directly on to the place of work, but on to a room or screened passage. There should be a wash-basin and soap available near at hand for use after going to the latrine, especially in factories where food is processed or manufactured. Separate washing facilities should be provided for women workers.

The type of latrine most suited to the locality will depend on the finances available, the availability of water, the drainage system, the religious scruples of the workers, and other factors. Generally speaking those of the water flush type are the most hygienic, provided the workers know how to use them. A public health expert should advise on this matter.

It is in the small factories, with only one or two latrines, that the greatest nuisance is often found.

Washing Facilities

Washing facilities should be conveniently situated. Their type and number may be regulated by law. If there are separate basins, which is desirable, there should be one for every seven workers. If there is a sink or trough used in common, there should be 60 cm (24 in.) to every seven workers. Where there
are no regulations the inspector should estimate the type and number required, depending on the kind of work, danger of poisoning, etc.

Running water should always be available. In cold climates warm water should also be provided.

The wash-place drainage should be trapped and should discharge outside the premises into an open gully before entering the main drainage system; the public health officer will advise on this.

The walls and floors should be of impervious material, easily washable, and the floors should be non-slippery.

In some industries shower baths are necessary. There should be hot and cold water—the hot tap being valved to prevent scalding. Each shower should be screened.

Soap and, if necessary, nailbrushes, should be provided. Soap or detergent from a dispenser, rather than individual cakes, is preferable to avoid loss and misuse. Towels should preferably be individual or disposable; otherwise towels must be frequently changed.

Changing-Rooms

Workers should not have to change into their working clothes, and hang their private things, in the actual workroom.

There should be changing-rooms adjoining the washrooms, and preferably near the factory entrance, provided with well-ventilated lockers or boxes for each worker or pair of workers. There should be artificial heating for cold, wet weather.

The women's changing-rooms should always be entirely separate from the men's.

A person should be specially designated to look after the washing and changing facilities, and latrines; he should be responsible for cleaning, keeping the floors dry, disinfecting, and replenishing soap and towels.

Women's Restrooms

Where more than ten women are employed, there should be a restroom adjacent to their toilet accommodation. A couch, screen and blanket should be provided. If there is a medical aid station the restroom is usually combined with it and placed under the supervision of the nurse.
Canteens and Messrooms

Workers should always be discouraged from taking meals in the actual workplace and, where dangerous or toxic processes are carried on, they should be forbidden to do so. Instead the management should provide separate accommodation where the workers can eat their own food in comfort and cleanliness. In sunny climates, in addition, outdoor accommodation may well be provided.

Canteens and messrooms should be well ventilated and lighted and large enough to avoid overcrowding. The furnishings, walls and floor should at all times be kept clean.

Where meals are provided the hygiene of the kitchen and food storage facilities should be inspected, unless this is done by the public health authority.

General Hygiene

The inspector should see that the workers do not contravene the ordinary rules of hygienic behaviour. There should be no spitting, latrines should be properly used and ventilation maintained, and there should be no smoking where smoking is forbidden. The inspector should watch when the workers come off shift to note the use made of wash-basins, changing rooms, etc.

It may be necessary to suggest that a meeting of workers be called to explain points of this sort, which are not always readily appreciated. It is difficult to enforce compliance with rules that are not understood by the workers.

Safety and Health Organisation and Training

Organisation

While the elimination or correction of unsafe and unhealthy conditions and practices is a normal function of management, long experience has shown that the standard of industrial safety and health in undertakings can be raised considerably by some kind of specific safety and health organisation. This organisation may consist of delegates appointed by the workers, special committees, a responsible officer appointed by the management, or combinations of these.

In small undertakings employing not more than, say,
25 workers the workers should appoint one of their number to be their delegate. In larger undertakings there should be a general safety and health committee, and it has been found that such committees usually give better results when they are joint bodies composed of representatives of both management and workers. In certain countries, such committees are a statutory requirement.

In all industrial establishments, there should be an official specially appointed to deal with matters relating to industrial safety and health. In large or dangerous undertakings this official should devote all his time to safety and health problems: he should, in fact, be the safety and health officer. If an undertaking comprises a number of separate departments, there should be a separate organisation for each department in which a considerable number of workers are employed, and a central safety and health organisation for the whole undertaking.

The inspector should be provided with such information as he may require on the appointment of safety and health delegates, committees and officials.

Whatever form of safety and health organisation exists in a particular undertaking, its duties should include the following:

(a) To participate in drawing up rules for each occupation represented in the undertaking. These rules should include appropriate extracts of all official safety and health regulations relating to the occupation in question.

(b) To keep itself well-informed of safety and health conditions in the undertaking, and endeavour to promote all improvements that it considers necessary.

(c) To endeavour to secure the co-operation of all workers in the promotion of safety and health.

(d) To report unsatisfactory safety and health conditions to the employer or his authorised representative, and endeavour to have them remedied.

(e) To participate in the investigation of all accidents in the undertaking and make recommendations for preventing recurrences.

(f) To make periodical inspections of the undertaking and all its equipment, in the interest of safety and health.
(g) To watch over compliance with official regulations, instructions, etc., relating to safety and health in the undertaking.

(h) To study the statistics of accidents and diseases occurring in the undertaking.

(i) To see that all new workers receive adequate safety and health training, instruction and guidance.

(j) To see that all official regulations, instructions, notices and pictorial material, relating to safety and health in the undertaking are brought to the notice of all the workers concerned.

It is only at intervals that the labour inspector visits each of the undertakings placed under his supervision to observe whether the workers are adequately protected against occupational hazards. Matters relating to safety and health should, however, be under constant supervision in every undertaking, and the inspector should be at particular pains to encourage and help management and workers to establish and maintain such supervision. Safety and health committees will greatly contribute to this end.

All undertakings should keep records of all lost-time accidents, cases of occupational diseases, minor accidents and dangerous occurrences, and compile statistics that will show the accident record of every department, occupation and individual, and the distribution of accidents by causes so that attention is drawn to matters demanding action from the standpoint of safety and health.

In undertakings where no organisation of the kind described above exists, the inspector should, unless he thinks that such a course is inadvisable for any reason, draw the employer's attention to the advantages attaching to the creation of such an organisation and, if appropriate, offer to give such assistance as may be proper in setting one up.

In undertakings where a safety and health organisation does exist, the inspector should acquaint himself with its composition and functions, obtain copies of the undertaking's safety and health rules, inspect the accident statistics and more generally display an interest and give encouragement and, if appropriate, tactful advice.
Training

It should be fully realised that accident prevention is one of the most important subjects in training courses and that it cannot be separated from production.

It is a well established fact that by far the greatest number of employment injuries can be attributed to human failure—wrong attitude of the employer, the foreman or the worker, lack of knowledge or skill, unsafe or unhealthy practices, etc.—and can only be corrected by the adequate training of management, supervisors and workers.

Where plant training programmes exist the inspector should ensure that safety and health matters are adequately dealt with in the general training programme. Where such programmes do not exist the inspector should endeavour to institute within the general safety and health organisation of the establishment an adequate system by which new workers will be given proper instructions before being assigned to work, and particularly to work involving special hazards.

This system of training new workers could, with advantage, be extended, through works safety and health committees or otherwise, so as to cover all workers.

There is no doubt that a good training programme in an undertaking will not only make the undertaking safer and healthier but will also lighten the task of the inspector.
APPENDIX

SELECTED BIBLIOGRAPHY

The purpose of this bibliography is to furnish a short list of works of a general character dealing with questions of occupational safety and health. Accordingly, the list does not comprise specialised publications on matters such as boilers, electrical installations, ionising radiations, and toxicology, of which the general labour inspector is not usually expected to have expert knowledge. A detailed bibliography covering the whole field of occupational safety and health would be much too long to be included in this guide, but the references included, many of which themselves have bibliographies, will doubtless provide much useful information on the commonest problems faced by labour inspectors.

Particular mention may be made of the following three I.L.O. publications:

The *Model Code of Safety Regulations for Industrial Establishments for the Guidance of Governments and Industry* (Geneva, 1949), on which Part II of the guide is largely based, contains over 240 sets of regulations grouped in 16 chapters.

The *Law and Practice Relating to Safety in Factories* (Montreal, 1949) includes a detailed analysis of the safety regulations of 14 industrialised countries grouped in 43 chapters, together with much information on agencies and methods for promoting safety in the countries concerned.

*Occupational Safety and Health*, published quarterly, provides current information on legislation, inspection activities, and safety and health activities generally all over the world, together with numerous abstracts of literature and should be of assistance to inspectors who are seeking up-to-date information on particular problems.

General


**Industrial Premises**

**Ventilation, Heating, Air Conditioning.**


**Lighting and Colour.**


— *Colour in Factory and Office.* Industrial Data Sheets, Series C.I. Sydney, 1953.


APPENDIX


Floors, Stairs.


Sanitation.


Industrial Processes

Handling and Transport of Materials.


Welding.


Industrial Equipment

Electrical Installations.


Elevators, Lifting Appliances.


Ladders.


Machinery.


Fire and Explosion Risks—Harmful Substances—Radiations

Fire and Explosion Risks.


Harmful Substances.


Head and Eye Protection


**Compilation of Accident Statistics**


Standards applying to construction, equipment and working conditions in industrial establishments, brought together as a contribution towards eliminating danger to life and securing the safety and health of workers. The Code was approved by a Tripartite Technical Conference which met at Geneva in September-October 1948; in June 1949 the Governing Body of the Office authorised the Director-General to distribute it to governments. In order to facilitate keeping the collection up to date it has been published in loose leaf form with a cloth-covered binder. An index is included.

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