

The TYTA MODEL

-Implement for Evaluating the Company's Working Environment Costs

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PREFACE

Accidents, absenteeism and labour turnover can cause companies high costs. To acknowledge these costs and to analyse their impact, companies and other organisations need different kinds of tools. By means of the TYTA model it is possible to analyse the economic effects of the working environment. The name of the model comes from the Finnish abbreviation of working environment and economics. The TYTA model produces information on costs caused by absenteeism due to illness, accidents, turnover, disability and development of working conditions. At the same time the model is a tool for the management to plan steps to be taken concerning the working environment and to develop working conditions more systematically.

The Occupational Safety and Health Division of the Ministry of Labour and the Occupational Safety and Health Inspectorate of Uusimaa started a project in 1994. The objective of the project was to develop a model which could be used both by the Occupational Safety inspectorates and workplaces for analysing costs and benefits of the working environment. The first version of the TYTA model was ready in 1995 and its aim was to describe the working environment costs and inputs on the working conditions by means of a spreadsheet computation program.

A large group of occupational safety experts participated in the development work of the first version of the TYTA model. Responsible for the planning and writing of the model is Juha Sumelahti, researcher at the Occupational Safety and Health Division of the Ministry of Labour. Keijo Päivärinta, Inspector, Jan Rosqvist, Safety engineer, Tapio Luoto, Chief Inspector, Markku Marjamäki, Assistant Head of Inspectorate, Kaarina Myyri-Partanen, Chief Inspector and Saini Rautaharju, Inspector at the Occupational Safety and Health Inspectorate of Uusimaa participated in the developing work.

The first version of the TYTA model has mainly been tried out in connection with inspection activity at the inspectorate of Uusimaa. As a result of experiences and development work done, the model has undergone some corrections and improvements to better adjust to the needs of the workplaces of the Occupational Safety and Health Inspectorates. The conclusion of this work has been done as a part of the nation-wide TALVA project. The name comes from the Finnish terms economics and inspection. The project's objective is development of the supervision of occupational safety by increasing knowledge of working environment economics. Responsible for the final draft of the model is Keijo Päivärinta, inspector at the Occupational Safety and Health Inspectorate of Uusimaa and Arto Teronen, researcher at the Department for Occupational Safety and Health of the Ministry of Social Affairs and Health.

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ANNEXES

1. INTRODUCTION

The estimation of the relation input - output of the occupational safety activity on company level, is not an easy task. It is especially difficult - if not impossible - to show the advantages of a separate measure. It is easier to estimate costs. Lately in Sweden, in particular, but also in Finlandⁱ methods have been developed by means of which it is possible to estimate the total level of costs, on the one hand of input on the working environment, on the other hand of problems in the working environment. Hence it is possible by means of a calculation model to estimate which direction the development has taken and whether the input has given expected results.

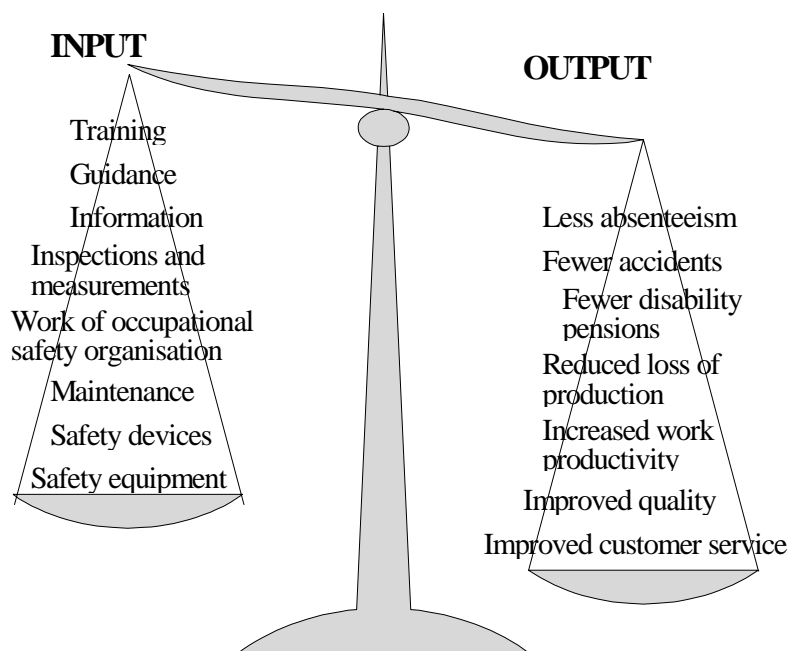


Figure 1.1 Input and output of the working environment

The development of occupational safety and health and the working conditions includes, besides acquisition of safety equipment and devices, often considerable input in initiation into work, training, development and maintenance. This is the case, at least in those organisations which have succeeded in their occupational safety and health operations. The investments in occupational safety and health are often well known in the company. Development work and training are not always considered as costs.

However, the output of occupational health and safety is hardly ever measured or evaluated. In many cases it is possible to evaluate the costs of accidents, absenteeism, labour turnover and disability pensions. According to the organisation's size and field of activity, these costs can vary a lot. For example the cost of a day of absence usually vary between FIM 500 and 2 000, but there are cases when absence does not cause any additional costs and in fact leads to savings of indirect employee costs.

More significant than the reduction of costs of absenteeism and accidents are often the profits which the development of working conditions and improvement of production control result in. These impacts are

ⁱ The Institute of Occupational Health, Helsinki (1995): Työsuojelukustannukset hallintaan (Control over occupational safety costs)

seen as reduced interferences of the production, smaller losses, improved work productivity or quality and service. However, the problem of how to measure and evaluate these effects remains.

1.1 Monitoring costs of the working environment

The problem of the occupational safety and health activities is that it operates separately from the other operations of the company, such as personnel administration and production. Occupational safety and health concentrates mainly on preventing accidents by trying to influence on separate technical solutions. The conditions that affect the working environment are, however, significantly more complex.

Accidents and work-induced illnesses can be considered as adverse effects of the production. Because of the working environment's integrated character it is, however, often difficult to point out separate circumstances that cause accidents and illnesses. In fact it is possible to suppose that the same problems of production control which entail quality defects or interruption of the production, occasionally cause health problems.

If absenteeism or other production-related problems become too extensive at some work point or department, measures can be taken to reduce them. To ensure that management receives accurate information for decision-making, the occupational safety and health organisation or the quality organisation must be able to inform management on the absenteeism and accident situation and other consequences. Internally in the organisation, various information is accumulated, but remains often unused. From the management's point of view the problem might as well be lack of information as a huge flow of information.

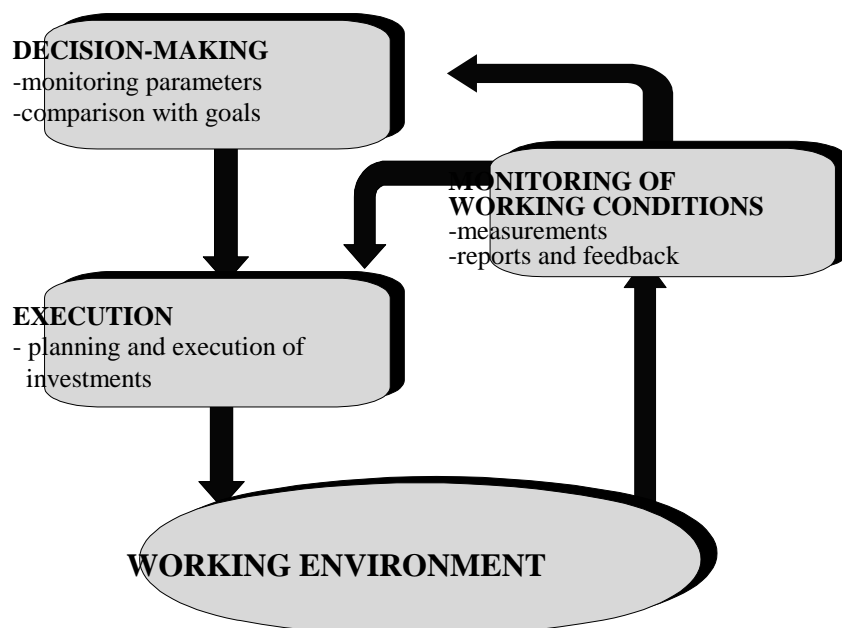


Figure 1.2 Monitoring system of working environment costsⁱⁱ

ⁱⁱ Ministry of Labour (1993) Työolot, henkilöstö ja menestyvä organisaatio (Work environment, Personnel and successful organisation)

Problems might also occur if the division of work is not working properly. The management may delegate the decision-making to the line management, but it might be that the indicators of results might favour short-term measures instead of long-term development. Delegating the decision-making and realization of occupational safety is not successful, unless the occupational safety organisation is not able to decide about the use of necessary resources at the same time.

1.2. The TYTA model

The TYTA model is an Excel 4.0-based tool, produced to evaluate accidents, absence, labour turnover and input costs of the working environment in a company. By means of the calculation model it is possible, on the basis of limited basic information, to relatively easily calculate costs and benefits of the development of a company's working environment. The model can be used provided that the user is familiar with the basics of spreadsheet computation. By using the push buttons it is possible to move from one page to another when using Excel. Each item to be filled in, is connected with a button which displays a short instruction on how to fill in the item. Diskette which contains these worksheets are available separately.

The calculation model is in the first place aimed at monitoring costs on a company level. On the other hand the principle of planning has been to support the activity of the occupational safety and health inspectorates. Starting points of the development of the model have been as follows:

A) PRODUCTION OF INFORMATION TO SUPPORT MANAGEMENT'S DECISION-MAKING

Accidents, absenteeism and labour turnover might cause a company high costs. With the help of the calculation model it is possible to analyse the impacts of the working environment. At the same time the model helps the company's management to plan means to be taken concerning the working environment.

B) MONITORING WORKING CONDITIONS ON COMPANY LEVEL

The model is suitable for companies as means to monitor the situation and development of working conditions.

C) A MEAN TO ESTIMATE THE LEVEL OF THE WORKING ENVIRONMENT AT WORK PLACES

Shortcomings in working conditions might show as a high number of accidents and much absenteeism or high labour turnover. Results produced by the calculation model can be used as a help to find out on which level the work place's working conditions are in comparison with other companies in the field. The occupational safety inspectorates can use the calculation model as a support for the inspection work, a kind of "mean for argumentation" for a occupational safety inspection.

D) COMPILING INFORMATION FOR COMPARISON FROM THE INSPECTORATES' SUPERVISION OBJECTS

Along with the use of the calculation model the occupational safety and health inspectorate receive useful information about the economic impacts of the working environment. After some time it is possible to produce e.g. information and mean figures according to field of activity. This information is useful for allocating and intensifying supervision in the inspectorate.

The general structure of the calculation model is as follows:

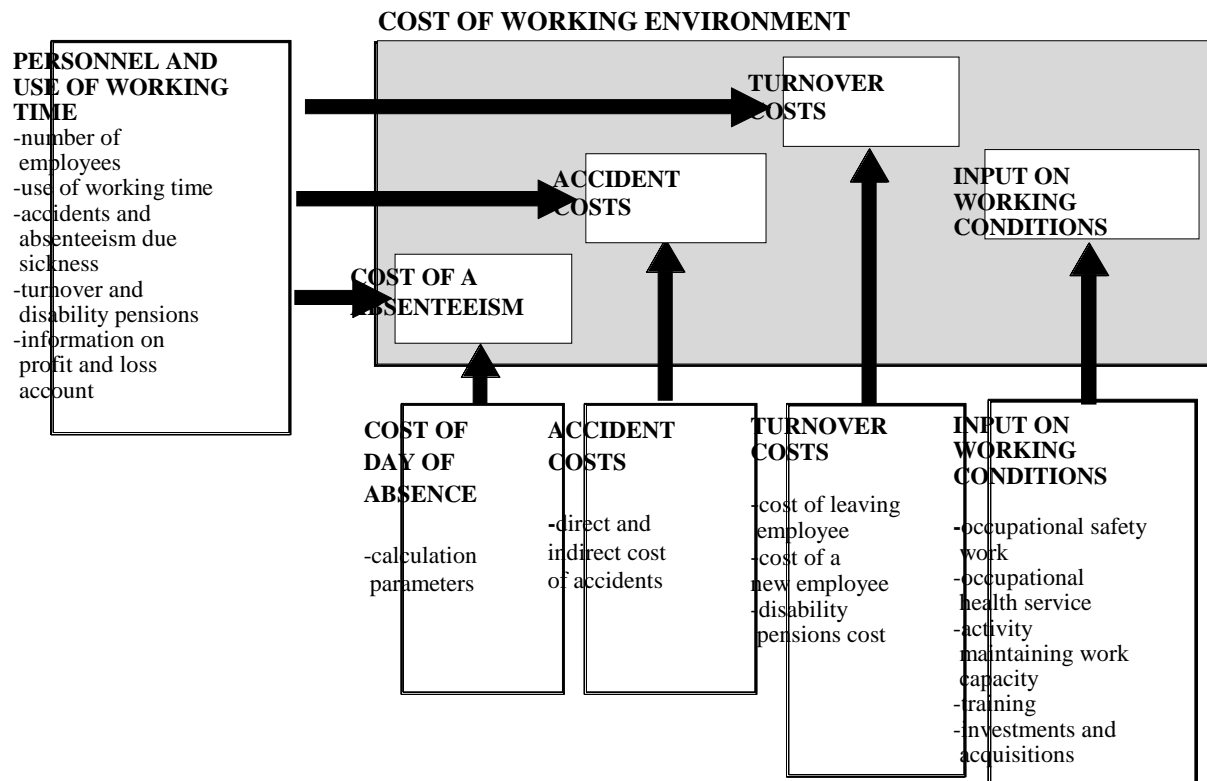


Figure 1.3 The TYTA calculation model

The calculation model consists of six pages which are presented as an appendix to the report. In reality the basic information according to company is entered on page 1 (personnel and use of working hours) and 4 (input on working conditions). In the basic information of the calculation model it is also possible to define objectives concerning the company's sick days, accidents, turnover and input.

Pages 2 - 4 (cost of absence day, accident and turnover costs) consist of calculation parameters which also can be modified according to company. The parameters are also that information and skill which develop during the use of the model. The objective is that the parameters in the future could better and better describe the conditions of the field of activity.

A report on working environment costs and a summary of the results of the calculation has been compiled on page 6. Working environment costs comprise in this context the sum of accidents, sick days, turnover costs and input costs of development of the working environment. The calculation principles of the model are presented in the following chapters.

2. COSTS OF ABSENTEEISM DUE TO SICKNESS

Analysing impacts of sick days on costs is a difficult problem. Usually the most obviously measurable costs i.e. wages during absence are monitored in companies. However, these costs do not give the right picture of the level of costs during absence. A lot of indirect costs are related to absenteeism. It is difficult to develop a monitoring system to explain them.

If only the company's cash expenses are investigated, easily seen additional costs are not incurred by absenteeism. Wages during absence are not additional cost as such, as the same wages have to be paid also during the time the employee is present. The true costs of absent time are related to the consequences absenteeism has on the company's activity.

Available work input is reduced by absence. The value of this lost work input can be measured by means of wages during absence. What determines the formation of costs, however, is the impact of the reduction of work input on the organisation's operations. Usually the input of the absent employee has to be compensated some how: recruitment of replacements, overtime or maintenance of over-capacity. In some cases the lacking input can be seen in the result i.e. sales and production losses. Absence can also be seen as disturbances in the company's operations. The problem is to measure these costs and allocate them on absence because e.g. overtime time work and disturbances in production also occur for other reasons than absence due to sickness.

How serious the impact of absenteeism is, depends largely on the production capacity's degree of use. If only a part of the capacity is in use, absenteeism can be compensated by making use of more capacity i.e. by reassigning work to other employees. The employees' stress situation varies from time to time and hence the impact of absenteeism. During a time of intensive strain it is most likely necessary to compensate absenteeism by over time work or replacements, whereas during a silent time absenteeism does not have a considerable impact on the operation.

The starting points mentioned above have to be considered when calculating costs of absenteeism due to sickness. It is not always possible or practical to develop exact systems for cost estimates, because the impact absenteeism has on costs varies from case to case. It is more reasonable to estimate figures which describe the average situation of the organisation (e.g. the price of a sick day) and use these as calculation parameters for measuring costs.

2.1. Models for calculating costs due to absenteeism

Cost effects due to absenteeism have been studied especially in Sweden, where different kinds of models for calculating costs due to absenteeism have been developedⁱⁱⁱ. The calculation philosophies differ a little from each other, but in general outline the types of costs and classifications are alike.

Högström and Nilsen (1992) starts the calculation of costs due to absenteeism by estimating first payroll savings in the company due to absenteeism. Payroll costs paid by the company during the time of sick leave are concerning one person a little bit smaller than for the corresponding time of the employee being present^{iv}. The true costs of absenteeism are those when this little saving of payroll costs is deducted from indirect additional costs due to absenteeism. Högström and Nilsen do not consider payroll costs during sick leave as true costs due to absenteeism. In their model the indirect impact of absenteeism on the organisation's operation and results are emphasised.

It is important to accentuate that Högström and Nilsen calculate the **net costs** of absenteeism i.e. additional costs due to absenteeism. They try to find an answer to the question of how much more absenteeism from work costs than presence at work. According to Liukkonen (1989) costs of absenteeism are calculated as a sum of payroll costs during sick leave and additional costs of production i.e. about the sum of the first two terms in figure 2.1. Liukkonen's model measures the gross **costs of absenteeism** i.e. all costs which can be allocated on absenteeism. In this case it is to be observed that payroll costs have to be paid also for normal wages and salaries^v.

The problem of calculating gross costs is that these cannot be used directly in estimating e.g. the benefits of a reduction in absenteeism. Along with a change in figures of absenteeism, the company's costs change as much as the net costs. The gross costs, however, include the value of the lost work input i.e. wages paid during sick leave. In practice this is the only quantity which can be measured relatively reliably.

The calculation model which will be presented in the following aims to combine the approaches mentioned above. The basis for estimating costs are calculation of payroll costs during absenteeism (not calculation of payroll savings due to absenteeism). Additional costs due to absenteeism are formed as follows:

ⁱⁱⁱ Liukkonen (1989), Högström and Nilsen (1992) and Johanson and Johrèn (1993). In Finland the Central Federation of Finnish Employers (1990) has published a guide, mainly according to Liukkonen. In this guide a model for calculation of costs due to absenteeism is presented. The Helsinki Research Institute for Business Administration has also made studies on cost of absenteeism.

^{iv} This is the case especially according to the Swedish insurance system.

^v The terms net and gross are used by the authors.

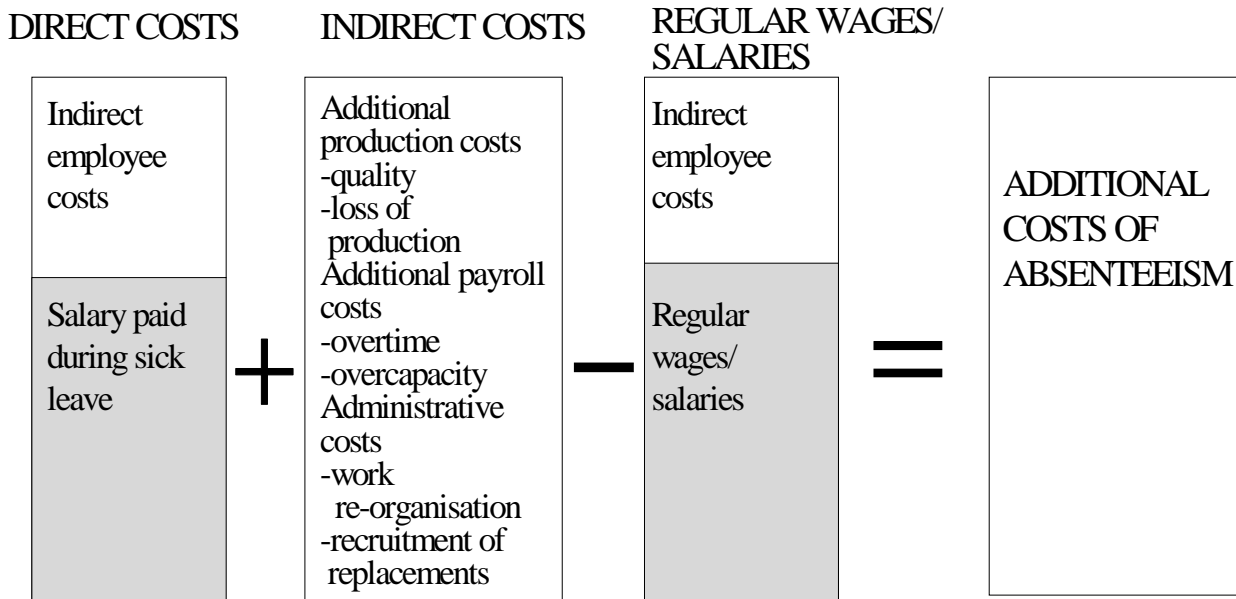


Figure 2.1. Additional costs of absenteeism due to sickness (Ministry of Social Affairs and Health 1996)

Salaries and wages during absenteeism are the basis of the calculation of costs due to absenteeism. When indirect costs due to absenteeism are added, the result is gross costs of absenteeism. Finally the cost of regular work is deducted which results in additional costs due to absenteeism i.e. net costs.

2.2. Direct costs of absenteeism due to sickness

Direct costs are formed by wages during sick leave and indirect employee costs. The employer is totally responsible for payroll costs concerning short-term (1-9 days) sick leaves. Concerning long-term sick leaves (100-300 days) the Social Insurance Institution pays the employee on sick leave an earnings-related benefit. During long-term sick leaves the employer pays the difference of wages during sick leave and the daily allowance according to the collective agreement of the branch (normally ca 60 days). The employer is entitled to draw the employee's sickness allowance if the employer has paid salary during sick leave or some other similar compensation.

Indirect employee costs are in general determined according to the payroll costs paid by the employer. Exceptions are holiday pay and holiday compensations which are also paid during the time a daily allowance is paid. In this case also indirect employee costs are paid according to the difference between salary and compensation. Regarding indirect employee costs there is no difference whether salary is paid for the time an employee is present at work or absent from it. Indirect employee costs are e.g. social security premium, pension premium, accident and unemployment and disability insurance premium and group insurance premiums.

If disability due to sickness continues for more than 300 days, the absent employee will receive disability pension or rehabilitation benefit.

COMPANY LTD	At work (FIM /day)	Sick leave 1 - 9 days (FIM)	Sick leave 9 - 60 days (FIM)
Gross salary	480	448	142
Holiday pay provision	94	94	94
Social insurance premiums	174	166	72
Other indirect employee costs	32	32	32
TOTALLY	780 FIM /day	740 FIM /day	340 FIM /day

Table 2.1 Payroll costs during sick days (Ministry of Labour, 1996)

The employer's direct costs of absenteeism i.e. payroll costs during sick leave are usually lower than those of regular salaries and wages. This is the case, in particular, of long-term absenteeism when sickness insurance covers a part of the payroll costs. Also payroll costs of short-term absenteeism might be lower since no bonuses for piece-work, shifts etc. are paid.

In some cases payroll costs during sick leave can be received straight from the company's accounting system. A satisfying accuracy is, however, reached when estimating an average payroll cost during sick leave by means of average earnings per hour and the coefficient of indirect employee costs:

PAYROLL COSTS OF A DAYS ABSENCE	=	LENGTH OF WORKING DAY [h]	×	AVERAGE EARNING- PER HOUR	×	COEFFICIENT OF INDIRECT EMPLOYEE COST
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2.3 Indirect costs of sick leaves

Indirect costs of absenteeism depend on the impact that absenteeism has on the company's operations. Presented in the table below are possible consequences of absenteeism and costs which a company might incur due to different consequences.

MEANS TO COMPENSATE ABSENTEEISM	CONSEQUENCES TO THE ORGANISATION	COST EFFECTS
No effect, work is postponed	Part of the work left undone, lost output	Value of lost input, no additional costs
Work is left undone	Lost production Lost sales	Value of lost input Lost margin Value of lost production
Production interruption	Work of others is interrupted Lost sales Lost production	Value of lost work input Lost margin Value of lost production
Work is transferred to others (reasonable additional load)	Overmanning in company Postponement of others jobs	Cost of over-capacity No additional costs
Work is transferred to others (unreasonable additional load)	Reduction of productivity Quality effects Increased absenteeism	Losses of production Wastage Quality costs
Outside services	Work is done by an outside service	Price of a service Arrangement, planning
Overtime work	Paid wages for overtime work Reduced work efficiency and quality	Basic wages for overtime work Compensation for overtime work Quality costs
Replacements	Introduction time, recruitment Reduced work efficiency and quality	Payroll cost Loss of production Quality costs

Table 2.2 Compensation of absenteeism and cost effects

The table above does certainly not cover all cases or all possible consequences. In different organisations and cases there are certainly situations when it is also necessary to take notice of other consequences. In general the effects of absenteeism can be as in the following:

- reassigning of work within the company (over-capacity, overload, postponement of other work)
- increased work input in an other way (overtime work, replacements, outside services)
- no ability or desire to compensate a work input (work is postponed or is left undone, possibly even the work of others is disturbed or interrupted).

At least the following factors has to be considered as indirect costs effects of absenteeism due to sickness:

- increased payroll expenses
- value of lost production and sales
- falling-off concerning internal and external quality and costs incurred hereby.

How indirect costs can be estimated is presented in the following example.

INDIRECT COSTS	Cost FIM/time	Short- term FIM/day	Long-term FIM/day
Costs of management and administration	150	50	7.5
Costs of company health care	200	67	10
IMPACTS OF ABSENTEEISM Short-term absenteeism	% - dispersal	Add. costs FIM/day	Average additional costs
Work is postponed or left undone	30 %	800	240
Work is carried by others (notable workload)	50 %	500	250
Overtime work	20 %	1500	300
Replacements	0 %	1000	0
TOTALLY	100 %	---	790
IMPACTS OF ABSENTEEISM Long-term absenteeism	% - dispersal	Add. costs FIM/day	Average additional costs
Work is postponed or left undone	10 %	800	80
Work is carried by others (notable workload)	30 %	500	150
Overtime work	10 %	1500	150
Replacements	50 %	1000	500
TOTALLY	100 %	---	880

Table 2.3. Calculation of indirect costs of absenteeism due to sickness

Calculation of indirect costs begins with estimation of indirect impacts of absenteeism on administration, management and occupational health service. Usually these costs are more dependent on the number of times an employee is absent than on the number of days of absence. The cost are actually estimated per time of absence. Hereafter costs can also be allocated on days of absence.

Costs of management and administration. Working time is spent in recruiting and orientating replacements, re-organising work and supervision of overtime work, dealing with sick leave certificates and applications for compensation.

Costs of company health care. The costs are depending on the way the company has arranged health service, the contents of the agreement on occupational health service and in what extent the employees are using the company's health service. Costs incur by visits at the occupational health station, health examinations, treatments and certificates.

Impacts of absenteeism. The impacts on production have been estimated by means of a calculation model developed by Johanson and Johrén (1993). Each absence has at least some kind of impact on the operations and results of the organisation. If this is not the case the company is overmanned. In the example it has been estimated that absenteeism causes at least four consequences:

- 1) **Work is postponed or left undone.** All tasks are not urgent, thus some can be postponed owing to absenteeism. In practise this means that less work will be done during the calculation period. Some of the job descriptions (e.g. developing work) are of the nature that the amount of work cannot be performed within the limits of normal working hours. Consequently, the tasks have to

be prioritised and parts of these will be left undone. In a case like this absenteeism results in a situation in which an ever larger number of tasks are left unattended. In the column Additional cost (FIM/day) the cost effect of such an alternative is estimated. In this case it is calculated that the value of work which is left undone is the same as the average sum paid for having it done, i.e. approximately 800 FIM per day.

- 2) **Work is carried out by others.** The most common solution is that other employees are requested to do the job. Doing the job of the employee being absent leads to additional stress. It is even possible that the tasks of the person being absent are not mastered sufficiently. This results in lower productivity and increased quality defects. Assigning work to others, is at least on a short-term basis an economical way of compensating the work input of an absent employee. Even if the input can be put off, it is probable that the total production remains smaller than without absenteeism. The load on other employees can not be increased unlimitedly. Postponement of work is the most usual solution, at least concerning short-term absenteeism. In this case it was estimated that loss of production and quality defects cause total costs of approximately FIM 500 per day of absence which is compensated like mentioned above.
- 3) **Overtime.** It is not possible to postpone or reassign work to others in all situations, compensation of a day of absence causes overtime work. Overtime is an easy, but expensive way to increase available work input for a short period. As an average cost per hour, additional expenses included, is approximately FIM 100, the compensation of a day of absence with overtime work costs approximately 1500 FIM ($2 \times 1,5 \times \text{FIM } 100 + 6 \times 2 \times \text{FIM } 100$).
- 4) **Replacements.** In some cases replacements need to be hired from outside the company. This applies in particular to long-term absence. Hiring replacements creates extra payroll costs. Extra costs are caused e.g. by time spent on orientation of a replacement. Also, productivity is lower than with regular staff. In the above example it was estimated that payroll costs for a replacement would be FIM 800 per day. However, the new employee's productivity will be approximately 25 % lower than that of a regular employee. Thus, the cost effect is FIM 1000 per day (wages FIM 800 + reduced productivity 25 % x FIM 800).

The extent of above mentioned consequences occurring in connection to short- and long-term absenteeism has been estimated in the column *dispersal in percentage* of the calculation model. Concerning short-term absenteeism approximately half (50 %) of the days of absence are compensated by reassigning work to others. In less than one third of the cases (30 %) work can be put off or left undone and in the rest of the cases overtime work is necessary. Replacements are not recruited for short-term absenteeism.

Long-term absenteeism often leads to recruitment of replacements. In this case a half of the days of absence (not cases of absence) are compensated by replacements. Work can be left undone or postponed in ca 10 % of the days of absence, overtime work is caused by approximately 10 % of the days of absence and the rest of the work is reassigned within the company.

The last column *Average additional cost* in table 2.3 is calculated on the basis of the two adjacent columns (e.g. 30 % x FIM 800 per day = FIM 240 per day). By the help of the mathematical operation the cost effects are allocated on one short- or long-term day of absence.^{vi}

2.4. Parameters of absenteeism due to sickness

By means of calculations presented in chapters 2.2 and 2.3, costs of a sick day can be presented as follows:

COSTS OF A DAY OF ABSENCE	Short-term	Long-term
Parameters to be used	FIM /day	FIM /day
Wages of a day of absence	800	264
Share of compensation of the sickness insurance	0	320
Indirect costs	907	898
Gross cost of a day of absence	1707	1162
Net cost of a day of absence	907	362

Table 2.4. Costs of a day of absence

The price of a day of absence used in literature is either the gross cost (Liukkonen, 1989) or the net cost (Johanson-Johrén, 1993). The net cost is considered a better figure, as if the company succeeds according to the above example, to reduce e.g. 500 short-term sick days, the company incurs savings of FIM 500 x 907 i.e. approximately FIM 450 000.⁷ On company level it is important to acknowledge which costs of absenteeism are calculated and how they are used.

^{vi} In other words, the indirect cost of a day of absence is calculated as a weighted mean of different cost effects.

⁷ Gross costs of absenteeism decrease FIM 500 x 1707 i.e. ca 850 000, but it has to be taken into account that 500 work days cost FIM 500 x 800 i.e. approximately FIM 400 000. The true savings in costs are the difference i.e. FIM 450 000.

Acknowledging the price of a day of absence is useful when investments for improvement of employees' health are motivated. Even the calculation of the total costs of absenteeism is easier when the average cost of a day of absence is estimated. In the table below costs of absenteeism of approximately 300 employees organisation are calculated by the help of cost data in table 2.4. In this case the percentage of absence was 4,6. Gross costs of absenteeism were ca 8,5 % and net costs 4,6 %. The table also contains some important parameters of absenteeism.

COSTS OF ABSENTEEISM DUE TO SICKNESS	SITUATION 1996
Absenteeism due to sickness -%	4.6 %
Sick days per employee	11.7
Sick periods per employee	1.5
Direct costs of absenteeism due to sickness	FIM 1 996 000
Indirect costs of absenteeism due to sickness	FIM 3 314 000
Gross costs of absenteeism due to sickness	FIM 5 310 000
Net costs of absenteeism due to sickness	FIM 2 510 000

Table 2.5 An example of costs of absenteeism due to sickness in an organisation of 300 employees

Parameters related to costs of absenteeism due to sickness are for example:

- cost of a sick day (short- and long-term absenteeism)
- proportion of costs of absenteeism due to sickness of the personnel expenses
- proportion of costs of absenteeism due to sickness of the turnover

To be able to affect absenteeism it is also important to know other parameters. Considerable parameters related to absenteeism are for example:

- percentage of absenteeism due to sickness (absenteeism due to sickness/theoretical regular working hours)
- sick days per employee
- frequency of absenteeism due to sickness (sick periods per employee)
- duration of sick period

3. ACCIDENT COSTS

Estimation of cost effects of accidents is not a new phenomenon. A pioneer in the area of studies of accident costs was **H.W Heinrich** who was studying cost effects of accidents on company level in the USA as early as in the 1920's. Heinrich developed a so called **iceberg theory** of accident costs. According to this theory he divided a company's accident costs into direct and indirect costs. Only the direct costs are received from the company's monitoring systems, indirect costs beneath the surface, remain invisible. He came to the conclusion that indirect costs are four times as big as direct costs. Heinrich's pattern of thought is still very popular and current. However, it is regrettable that due to lack of newer studies, Heinrich's division between direct and indirect cost is still used for estimating accident costs.

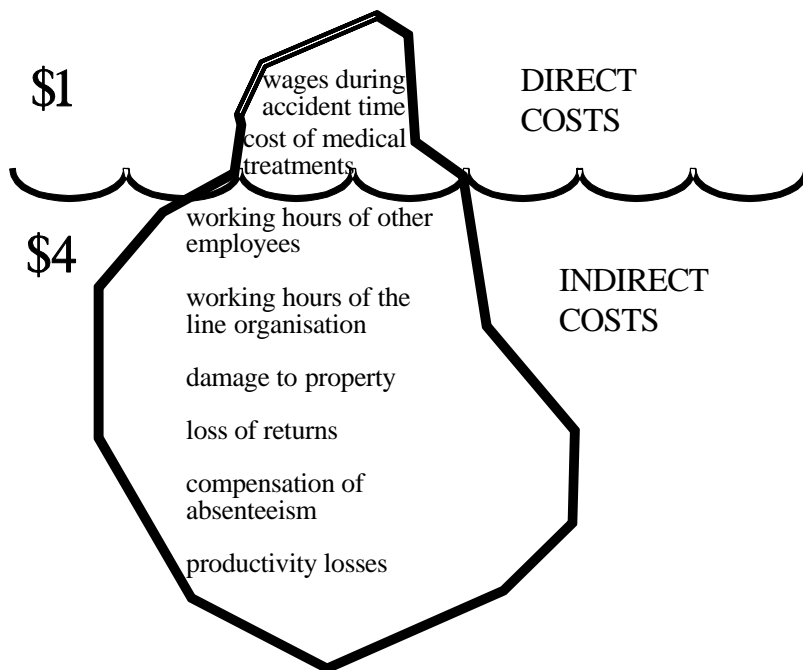


Figure 3.1 "The iceberg" of accident costs

Simonds and Grimaldi changed to some extent the classification of costs in the 1950's. They divided company level accident costs into insured and uninsured costs. Even if they criticised Heinrich their method is in principle very much the same as Heinrich's. Differences are found in the names and classification of cost groups.

Heinrich paid attention to the fact that a lot of accidents in companies do not cause losses of health. He invented the so called pyramid theory according to which a lot of minor accidents happen per one accident causing disability to work. His calculation model, however, did not take into account sheer material damages. F. Bird widened the calculation of accident costs to also include material damages in the 1960's. According to Bird the ratio between direct and indirect accident costs is approximately 1:6 when material damages are included in indirect costs. The pyramid theory of accidents is still in common use.

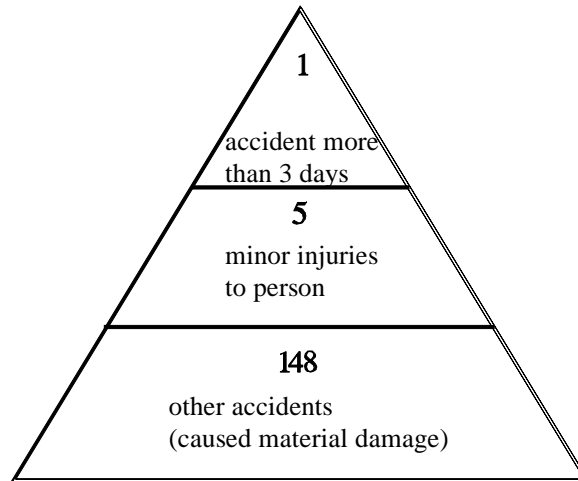


Figure 3.2 Accident pyramid of the food branch (dairy) according to an English study (HSE, 1993)

As an implement for estimating accident costs, Uusi-Rauva, Aaltonen and Saari developed in the late 1980's a so called **the accident consequence tree- method**. With the model the division of direct and indirect costs were abandoned. As the model was developed the objectives were coverage and clarity, due to which its use requires exact and thorough work, a thing which is not always possible in a company.

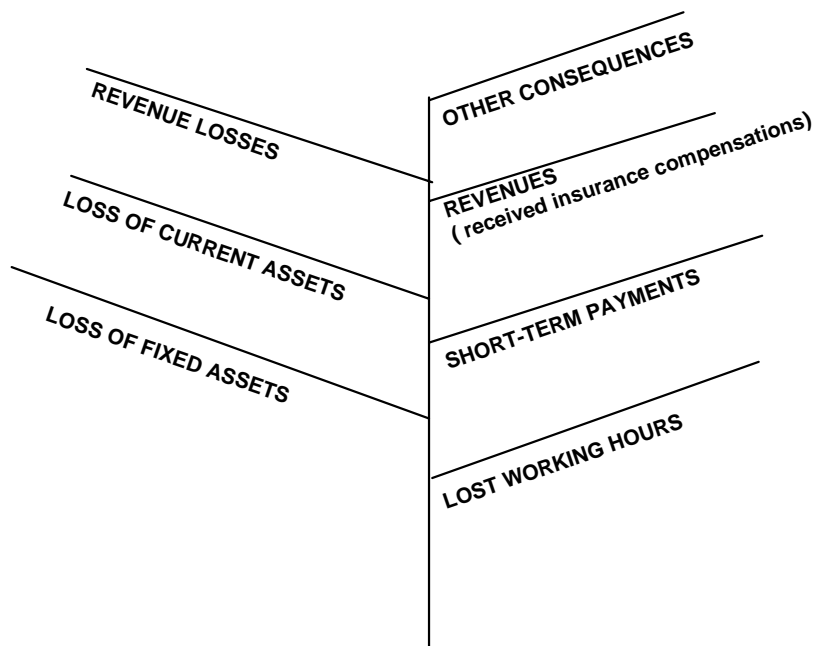


Figure 3.3 The company's tree for accident consequences (Uusi-Rauva, Aaltonen, Saari, 1998)

There are national economical analyses of accident costs available. Their purpose has been to also estimate those accident costs which the companies themselves are not obliged to pay, but which through taxation and the insurance system concern the whole enterprise sector and society. From the company's

point of view, interesting are only those costs which the company is able to affect by company measures. Subsequently only the proportion of the accident insurance premium which changes according to the company's accident situation can be considered as the company's accident cost.

3.1 How accident costs incur

There are a lot of theoretical models for calculating accident costs, but only a few which can be put into practice. The models of accident cost usually contain long check lists in which all possible consequences of an accident are taken into account. However, from the companies' point of view it is more important to concentrate on consequences which are more significant and easier to assess, than trying to achieve an accident cost as exact as possible (as high as possible).

The costs of accidents incurred by companies are, to a great extent, determined by accident insurance and its coverage and the company's share of liability. Especially in small companies the accident insurance premium covers the main part of the accident's direct costs and taking insurance compensations into account, accidents do not necessarily lead to other direct costs.

In the following accident costs are calculated by means of a method according to which direct and indirect costs are first estimated and from this sum compensations received from the accident insurance and regular wages are deducted, in the same way as calculating net costs of absenteeism due to sickness. In practice accident costs are in this case indirect accident costs deducted with insurance compensations. This calculation might give a somewhat exaggerated picture of the accident costs in cases when employees have directly received compensation in form of daily allowance.

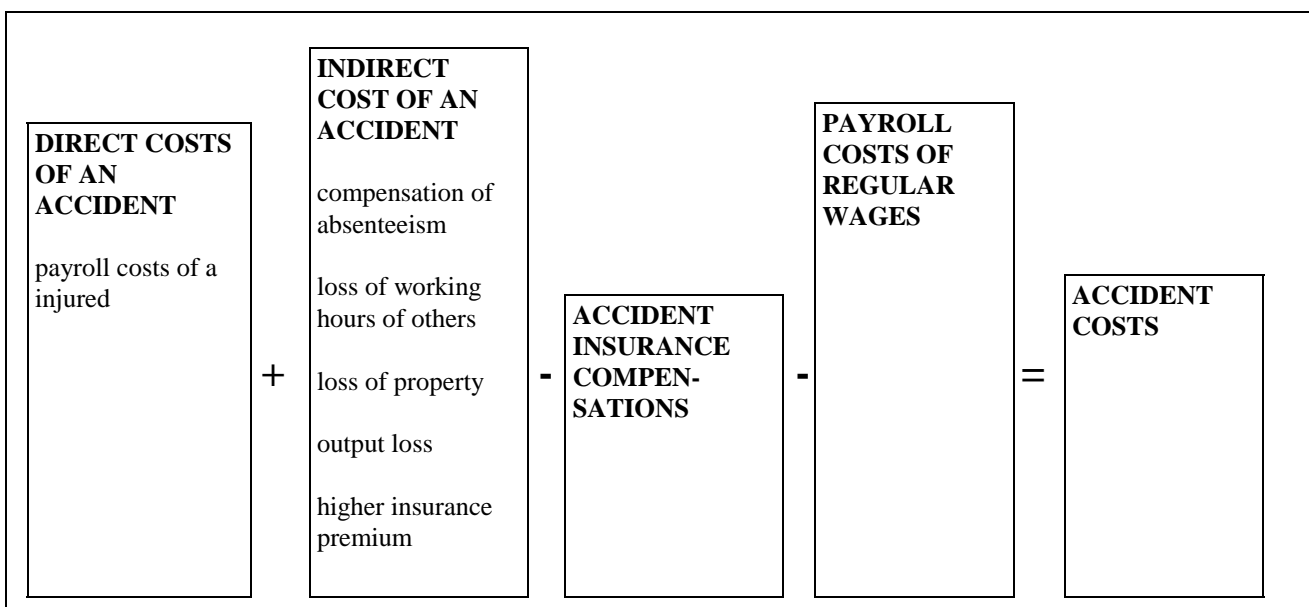


Figure 3.4 How accident costs incur

3.1.1 Direct costs of accidents

There are not any unambiguous definitions on which costs in connection to accidents are direct and which are indirect. In this interpretation loss of working hours caused by the injured are calculated as direct costs of an accident. In practice direct costs of accidents are costs belonging to the compensation responsibility of the accidents insurance company i.e. insured costs.

Payroll costs can be estimated if the number of days of absence due to accidents is known. There are no separate accounts for absenteeism due to accident or sickness in the accounting, at least not in smaller companies, hence exact payroll costs for the accident time can usually not be found. Wages during the accident time can be estimated by aid of the average income per hour and the coefficient of the indirect employee costs:⁸

PAYROLL COSTS OF TIME OF ABSENCE DUE TO ACCIDENT	=	LOST WORKING HOURS	×	AVERAGE INCOME PER HOUR	×	COEFFICIENT OF INDIRECT EMPLOYEE COSTS
---	---	-----------------------	---	----------------------------	---	---

According to the company's monitoring system, absence due to accidents is monitored either per hour or per day. If monitoring leads only to finding out about days, the above formula can be used, when estimating costs of 7,5 or 8 working hours. When monitoring lost working hours the problem is to estimate wages of the accident day. According to the time of the accident the loss is 1-8 hours of working time. If the monitoring does not give any information on lost working hours of the accident day, it is possible to use 4 hours/accident as a mean.

Another alternative for calculating direct costs of absence due to accidents is to estimate the average payroll cost per regular working day. In this case true working hours are calculated as regular working hours, excluded are accordingly absence days, holidays etc. Payroll costs of time of absence due to accidents can thus alternatively be calculated as follows:⁹

PAYROLL COSTS OF TIME OF ABSENCE DUE TO ACCIDENT	=	LOST WORKING DAYS	×	$\frac{\text{ALL PERSONNEL EXPENSES}}{\text{REGULAR WORKING DAYS}}$
---	---	----------------------	---	---

Direct costs of the time of absence due to accidents are in the TYTA model calculated in accordance to the latter formula. This is of no importance to the amount of accident costs as the costs are mainly formed by indirect costs.

⁸ The formula below gives in fact a too high an estimate of wages for the absence day due to an accident. The employer is not obliged to pay all additional employee costs during the accident time. The companies' internal calculations system, however, usually allocate the additional employee costs on the accident days. In this sense the calculation method serves its purpose.

⁹ This calculation method usually gives a considerably higher estimation than the figure mentioned above. This figure describes the cost which the employer on an average is obliged to pay when more working days are made. The figure mainly describes the value of lost work input, not so, payroll costs of time of absence.

The insurance company usually sends a list of daily allowances paid for accident days. Compensations during absence due to accident paid by the accident insurance are, however, not necessarily the same as payroll costs paid by the company. Other direct costs of accidents are usually possible to find out through the information sent by the insurance company. An exception is a situation when the company's occupational health service produces information on e.g. costs.

3.1.2 Indirect costs of accidents

To enable estimation of indirect costs of accidents a lot of lists are drawn up and by means of these, it is possible to describe consequences of an accident with varying exactness.

It is usually most difficult to measure and estimate indirect costs in a company. Monitoring and information systems do usually not give a picture of the amount of the costs. The relation between indirect and direct costs depend essentially on the nature of the accident and the circumstances. How costs incur, is actually very much a matter of chance; most types of costs are typical of only very rare or very severe accidents. Consequently it is difficult to work out reliable and general instructions for estimating indirect cost of accidents.

Indirect costs can be estimated e.g. according to the table presented below. The objective has been to present the most essential and probable indirect costs of accidents. Due to the fact that it is impossible to estimate all consequences of an accident, indirect costs also comprises the category *Other indirect costs* wherein lacking types of costs can be included if it is necessary to use them.

INDIRECT COSTS OF ACCIDENTS		
1.	COMPENSATION OF ABSENCE	Replacements and overtime Loss of production Reorganisation of work
2.	LOSS OF WORKING HOURS CONCERNING OTHERS THAN THE INJURED	Repairs and cleaning Helping the injured, first aid Interruption of work Accident investigation
3.	LOSSES OF PROPERTY	Lost products, semi-finished goods or raw materials Breaking of machines and devices
4.	LOSS OF OUTPUT	Price reduction, penalties Lost deals and clients
5.	OTHER INDIRECT COSTS	Other possible consequences as - lost image - legal expenses, fines and other types of costs
6.	ADDITION TO ACCIDENT INSURANCE PREMIUM	The impact of accidents on the insurance premium concerning special premium category

Table 3.1 Indirect cost effects of an accident

Cost effects of compensating absence

The impact of absence due to accidents differs in no way from other kind of absenteeism. When costs effects of compensating absence are estimated, the same factors are to be considered as those already discussed in connection with costs effects of absence due to sickness.

The cost effect of loss of working hours concerning others than the injured

The employees are to the company an expensive and meagre resource. There is hardly any such work input at disposal which could be taken into use without making other work performances suffer. Loss of working hours which an accident cause to other employees, is a reduction of normal operations in the work place and reduce the result to be reached. Losses of working hours can vary considerably depending on field of activity and the nature and severity of the accident.

Maybe the most common consequence is the loss of working hours due to repairs and cleaning. Repairs and cleaning refer to the time that is spent on resetting the circumstances and the production line into the state preceding the accident (or a state in which the factor causing the accident is omitted). If damages to machines or devices occur in connection to the accident, it might be better to include costs incurred by their repairing in damages to property.

Especially when accidents are severe, time might be spent on saving the victim and on first aid. In this case the consequences usually also include interruption of production. In some cases the victim needs someone to accompany him or her to the company's health care or hospital.

In connection to accidents, especially the line management and occupational safety organisation incur working hours by investigating the accident and evaluating and planning corrective means.

In practice accurate loss of working hours are not possible to find out. Losses can be estimated according to accident or type of accident e.g. in hours. The estimated numbers of hours can easily be transformed to costs. As loss of working hours vary considerably, it is necessary to estimate mean figures.

Losses of property

Losses of property can be divided into losses of fixed assets and current assets. Current assets comprise finished, semi-finished goods, raw materials, components, energy and equipment. Fixed assets include production equipment of long-standing effects such as machines, devices and production premises.

Losses of current assets include the value of products and raw materials damaged in connection to the accident. Usually companies are well aware of the value or the degree of working up of the products during different stages of the production.

Losses of fixed assets are mostly replacements of machines and devices or costs due to reduction of the capacity. The estimation of costs follows the custom of the company.

Loss of output

As a result of an accident, production might be disturbed to the extent that deliveries to the customers are delayed and orders are not taken due to lack of capacity.

Investigating causality of accidents and delays and losses of proceeds of the sale can be difficult. There is reason to include penalties and discounts and especially sales losses in accident costs only when the relation can be explicitly shown.

Concerning lost deals and clients the amount of lost sales proceeds can first be estimated. The true cost, however, is the loss of sales margin which can be estimated according to the proceeds of sales.

Addition to accident insurance premium

The accident insurance premiums in smaller companies are determined on the basis of nation-wide statistics on accidents per branch. As the risk of accidents vary from field to field, premiums on different branches vary in amount. Concerning accident insurance according to general tables of premiums, the accident situation at the work place has no impact on the insurance premiums. If a company belongs to a special premium category, the company's statistics on accidents affect the price of the premium.^{vii} According to the company's size it is possible to stage the premium system by moving step by step to full liability. If accidents occur more than usual the company's premiums are raised. Concerning the special premium category the company's accident insurance premium can in practice be divided into two parts: a fixed premium and changeable premium.^{viii} A fixed premium proportion is determined according to general statistics on accidents and a changeable premium according to the company's own statistics.

In theory it is possible to analyse the impact of an accident on the company's insurance premium. It is not practical to allocate the proportion of the fixed premium on accidents. However, the proportion the company can have an effect on could totally be regarded as the company's indirect accident cost.

Special cases are so called reduced deductible insurances (limited and fully deductible). In this case the insurance company attends to paying the compensations, but charges the insured the compensation expenses per accident up to the agreed maximum amount of the deductible at the end of the year. Management expenses are charged as the actual insurance premium added with the premium for large accidents to cover the accident risk exceeding the deductible. In a case like this almost the whole insurance premium is included in the proportion which the company can affect.^{ix}

^{vii} The company belongs to a special premium category in 1997 if its accident insurance premium has exceeded at least FIM 82 566 during the last two years.

^{viii} The insurance companies use different terms of the premium systems. In use are among others, premium proportion of permanent and transient compensations.

^{ix} In a case like this there is a risk of double calculation. In fact costs paid like this are the company's direct accident costs and there is reason to include them in the calculation. In this case the accident cost is the sum of direct and indirect costs deducted with regular wages and salaries, just as when calculating cost of absence due to sickness.

3.2 Investigating accident costs on company level

It is usually very easy to estimate direct costs of accidents. Statistics give the numbers of accidents and absence days due to accidents and other compensations to be paid. The problem is the estimation of indirect costs.

A solution to the problem is to separately estimate the indirect consequences in connection to each accident. For this purpose a follow-up form suitable to the company's needs, can be developed. This form is filled in each time an accident occurs.

A more feasible alternative is that the relation between direct and indirect costs of accident costs is estimated as a once-for-all analysis and the received coefficient is in the following used as a default value for estimating indirect cost. The method gives a rough picture of the indirect impacts of accidents. If necessary an estimate of the relation between direct and indirect costs can be revised after some years. The problem with this method is that the relation between direct and indirect costs varies very much depending on different kinds of accidents. In the following methods according to which the proportion of indirect cost of accidents are estimated separately to different kinds of accidents are presented. Consequently, instead of one ratio a type of accident-related ratio is received.

The company's accident statistics are the basis for analysing accident costs. The objective is to choose a representative sample of the accidents, the accident costs of which are tried to be analysed as accurately as possible. The figures calculated are generalized to cover all accidents in the company. As a process the analysis of accident costs proceeds as follows:

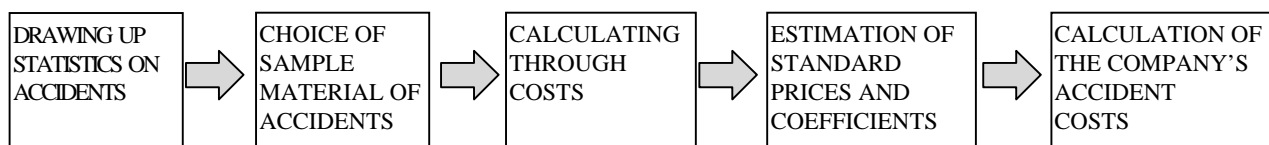


Figure 3.5 Analysing accident costs as a process

On the basis of accident statistics, accidents can for example be put into groups as follows:

TYPE OF ACCIDENT Year 1996	Accidents less than 3 days	Accidents 3 to 30 days	Accidents over 30 days	Days of absence in total
a Work travel accidents	0	3	1	60
b Heavy liftings	4	4	0	75
c Accidents involving a machine	0	2	1	56
d Accidents involving eyes	5	1	0	15
e Slipping accident etc.	3	7	1	200
f Other accidents	2	4	0	30
TOTAL	14	21	3	436

Table 3.2 Example of a company's accident statistics

Accidents that are used for analysing accidents costs are divided into a small number of groups so that accidents with the same kind of consequences are put into one group. Different kinds of accidents are chosen for calculation of costs so that standard prices and coefficients can be formed according to type of accident. For the analysis, already occurred accidents can be chosen, but in this case it is necessary to afterwards evaluate the consequences of the accidents. Another alternative is to use new accidents as the material and in connection to these compile costs effects of the accidents. The problem of the former alternative is that estimating consequences of an accident afterward can prove to be impossible. On the other hand the calculation can be done relatively quickly. The latter alternative entails waiting for compiling material, but the material is more reliable, because in connection with the accident, all impacts are systematically taken into account.

Counting through accident costs

When the sample has been chosen, the information on costs can be compiled by means of a separate form. A summary of the result can look like this.

INFORMATION ON COST	TYPE OF ACCIDENT					
	a	b	c	d	e	f
Includes counted accidents						
Counted accidents	1	2	3	1	1	2
-days of absence total	8	21	56	2	10	16
Direct costs	a	b	c	d	e	f
Wages during absence	7300	19200	51300	1800	9200	14700
Other direct costs						
Direct costs total (FIM)	7300	19200	51300	1800	9200	14700
Indirect costs	a	b	c	d	e	f
Indirect costs of absence	8300	21800	58200	2100	10400	16640
Other losses of working hours	0	400	6800	200	1000	200
Losses to property	0	2500	2000	0	0	
Output loss	0	0	5000	0	0	
Other indirect costs	0	0	0	0	0	
Indirect costs total (FIM)	8300	24700	72000	2300	11400	16840
Coefficient of indirect costs	1,14	1,29	1,40	1,28	1,24	1,15

Table 3.3 Example of a company's estimation of accident costs

In the table the indirect costs are proportioned to direct costs before compensations to be received from the accident insurance. This gives a coefficient by means of which indirect costs can be calculated concerning accidents in the future. On the following page the direct and indirect costs of accidents in a company have been calculated by means of using coefficients calculated above. To reach the final accident costs, accident insurance compensations still have to be taken into account.

TYPE OF ACCIDENT Year 1996		Accidents total	Direct costs	Indirect costs
a	Work travel accidents	4	55 000	63 000
b	Heavy liftings	8	69 000	89 000
c	Accidents involving a machine	3	51 000	72 000
d	Accidents involving eyes	6	14 000	18 000
e	Slipping accident etc.	11	183 000	227 000
f	Other accidents	6	27 000	31 000
TOTAL (FIM)		38	399 000	500 000

Table 3.4 Example of direct and indirect costs of accidents

The gross costs of accidents are in this case FIM 899 000, but to reach final accident costs the impact of the accident on the insurance premium has to be taken into account and the compensations from the insurance company and regular wages have to be deducted.^x The final calculation is as follows:

ACCIDENT COSTS	1996
Days of absence due to accidents	436
Direct costs of accidents	399 000
Indirect costs of accidents	500 000
Insurance compensations	210 000
Normal wages	- 399 000
Proportion of insurance premium	60 000
ACCIDENT COSTS, TOTAL (FIM)	350 000

Table 3.5 Parameters of accident costs

3.3 Accidents and disturbances

The problem with the occupational safety and health operations is most probably the fact that these operations are usually kept separate from other kind of activity, such as personnel management and production. Occupational safety and health has also concentrated on preventing accidents by influencing on separate technical solutions of the production. The relations between different factors in the company, however, are considerably more complex.

^x A good way to estimate the accidents' impact on the insurance premium is to calculate the difference.

PAID INSURANCE PREMIUMS - SMALLEST POSSIBLE INSURANCE PREMIUM

In this case the smallest insurance premium possible is the premium that the company would pay with the current labour force in a case of no accidents. It is possible that the experts of the insurance company is needed to enable an estimation.

Accidents and work-related illnesses can be considered as adverse effects of the production. Due to the integrated working conditions it is, however, difficult to point out a particular factor of the circumstances which causes an accident or an illness. In fact it is possible to think that the same problems of production management which cause quality defects or interruptions of the production, occasionally also cause losses of health. Instead of paying attention to technical circumstances, attention should be paid to the company's processes and the organisation's lines of action.

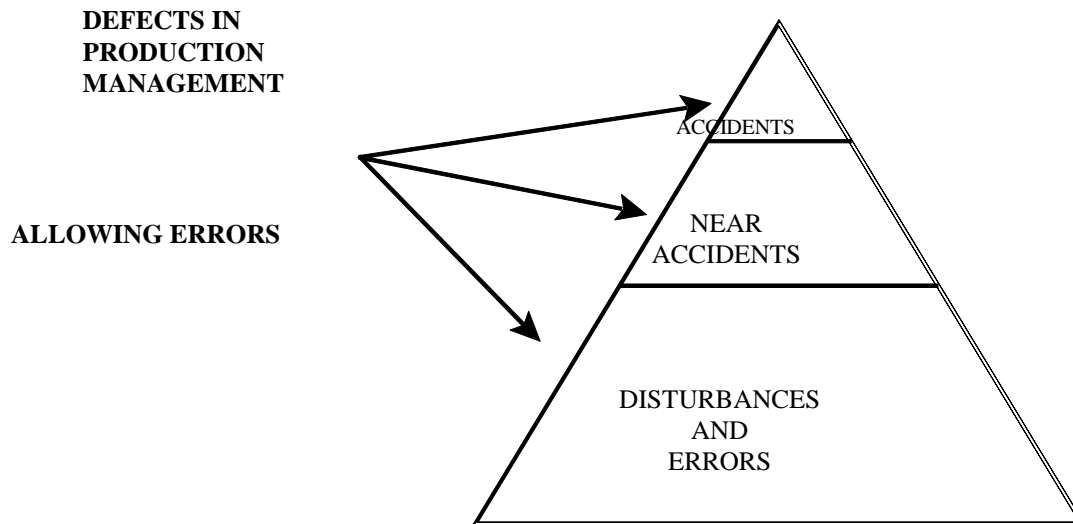


Figure 3.6 Preventing accidents by developing production management

If actual work accidents are prevented by developing the organisation's lines of action and production processes, the number of other accidents and disturbances are at the same time affected. These occur considerably more often than actual work accidents and their impact on the company's profitability can be manifold in comparison to the actual accident costs.

Companies do usually not have a follow-up system by means of which the economic impact of varying disturbances could be evaluated. According to a British survey (HSE 1993) costs caused by other accidents were as much as many tenfold higher than those of work accidents.

4. STAFF TURNOVER AND DISABILITY COSTS

Staff turnover is an indicator of working conditions and job satisfaction. Turnover refers to the number of employees who during the period of calculation commence an employment and end an employment. Often a distinction is made between departure turnover and arrival turnover (Gröjer-Liukkonen 1990).

A high turnover can be seen as a sign of low job satisfaction. The turnover might in some situations be as high as 70 %. In a case like this the work experience and knowledge of work and lines of action drop too low and accordingly there is no chance for maintaining a high quality and productivity.

Turnover, however, can by no means be seen as something negative in all situations. Changing jobs is part of natural career development of employees. By recruiting new employees it is guaranteed that the best knowledge and skills are in use. Also a too low a turnover can be a problem to the company. A low turnover might prevent a regeneration from taking place. During a time of low turnover the company might lose important skills. For good and skilled employees it is usually easier to change jobs than for the unskilled.

The employer incurs costs when a contract of employment is made and when an old one is terminated. The expenses vary by occupation, case and work place, consequently standard figures are difficult to present. It is also difficult to present some target figures. Both a too low and too high a turnover can be a problem, but during a short period of time in particular, an organisation can manage even very exceptional turnover figures. In theory there might be "optimum figures" for each organisation entailing that costs due to turnover and profits due to new personnel would be in balance. Determination of this optimum is, however, impossible.

Investigating turnover figures and costs is practical for making right decisions, especially as a basis for long-term plans of personnel. The idea behind the calculation model is to make the company acknowledge the turnover costs to enable better decisions concerning recruitment of personnel.

The turnover is often given in percentage of the average number of personnel. In small organisations and units (less than 100 employees), the use of proportional figures might, however, give a wrong picture of the development of the staff turnover. The turnover percentage is calculated according to the form below: ^{xi}

$$\frac{\text{Number of employees resigned} + \text{Number of new employees}}{2 \times \text{average number of personnel}} \times 100 \%$$

From the point of view of calculating the turnover percentage, taking into account temporary employees is problematic. Turnover calculation usually only applies to employees in a regular employment relationship and the turnover figures of employees employed for a given period of time can be recorded separately. During an economic depression turnover is low and the need of employees is filled with internal flexibility. Even internal turnover can be measured separately.

^{xi} The turnover percentage can also be calculated separately of employees leaving and new employees. This is done in the example of chapter 4.1.1

Due to the fact that there is no uniform definition of staff turnover and practices vary significantly, it is important that procedures for compiling statistics are analysed and determined when comparing figures and planning measurements.

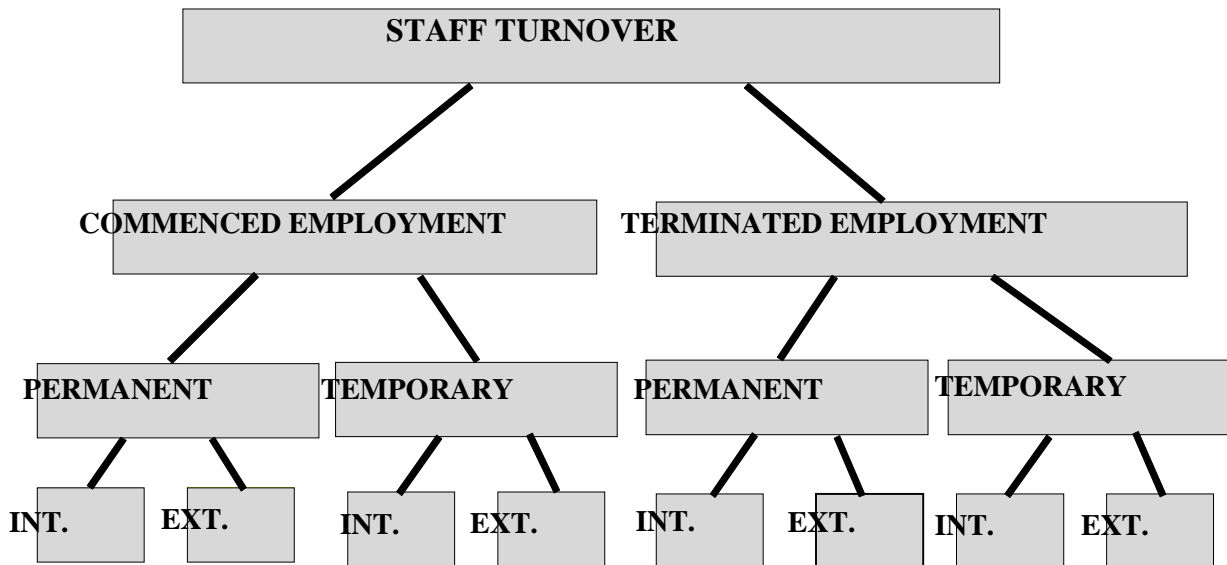


Figure 4.1 Turnover and disposition of staff (Centre for Occupational Safety 1994)

Disability pensions make one part of the turnover. Disability pensions are consequences of an employee's loss of health and ability to work. A part of disability pensions are no doubt beyond the employer's possibilities to influence on, but a considerable part of the pensions are consequences of physical and mental working conditions.

4.1 The costs of turnover

Despite the size of a company's organisation, the management and personnel management have to be aware of the most important parameters and costs. Visible costs of turnover are advertising and consultant costs, but usually these constitute only a small part of the total costs. Turnover costs can be divided into three categories (Högström-Nilsen, 1992).

- costs of a resigned employee
- costs of recruiting a new employee
- costs of orientation and training of a new employee

A special case are the costs incurred by disability pensions. These are analysed in chapter 4.2.

4.1.1 The parameters of turnover

Turnover costs can be analysed by estimating costs in a typical turnover situation. These costs can be generalised to standard costs of turnover. Standard costs related to turnover can be as in the following example (in chapter 4.1.2 - 4.2 a more detailed presentation of how to arrive at standard costs):

COSTS OF TURNOVER	FIM
Cost of resigned employee	5 750
Cost of resigned clerical employee	5 750
Cost of disability pension/case	577 000
Cost off new employee	37 750
Cost of new clerical employee	71 875

Table 4.1 Example of standard costs of turnover

It is preferable to separately estimate turnover costs of commencing and resigning employees. Usually turnover costs vary considerably according to task and occupational group. In the table above, turnover costs of clerical staff and employees are estimated separately. A more detailed classification might be necessary for some organisation.

As such, the standard cost is already an important information. They can be used for estimating total turnover costs and changes of them e.g. when employing new staff. The total costs can be calculated as follows:

STAFF AND TURNOVER		Situation 1997	Estimate 1998
Employees	no.	200	220
Clerical employees	no.	150	180
Total of personnel	no.	350	400
New employees	no.	5	25
New clerical employees	no.	10	35
Resigned employees	no.	2	2
Resigned clerical employees	no.	3	5
New disability pensions	no.	3	3
Turnover percentage, resigned employees	%	1.4 %	1.8 %
Turnover percentage, new employees	%	4.3 %	15.0 %
COSTS OF TURNOVER AND DISABILITY		Situation 1997	Estimate 1998
Costs, resigned employees	FIM	28 750	40 250
Costs, new employees	FIM	907 500	3 459 375
Costs, disability pensions	FIM	1 731 000	1 731 000
Total of costs	FIM	2 667 250	5 230 625

Table 4.2 Example of parameters of turnover

4.1.2 Costs of a leaving employee

Termination of an employment always entails some costs which as a rule are caused by loss of working hours.

Working hours of management. Working time is e.g. spent on interviews in connection with termination of an employment, payroll computation and other routines related to termination of employment. An employee leaving a job, is usually a routine and does not take much time, but in some cases it might be a very complex process comprising discussion on reasons for quitting, pension benefits and time of notice, destiny of working implements and car provided by the employer, and maintenance of customers or keeping business secrets.

Working hours of supervision and line management. Working time is spent mainly on the same issues as that of the management. Time might also be spent on discussions where the employer tries to persuade the employee to stay on in the company. Time is also spent on writing work certificates, working arrangements related to termination of the employment and evaluating the need of a new employee.

Loss of an employee's productivity. An employee terminating employment also incurs time by routines in connection to leaving. The effectiveness of the employee has decreased during the time of notice and perhaps even earlier. It is even possible that the employee neglects his or her tasks.

Other costs. Costs might be incurred by farewell presents and occasions. In this item costs due to losses of customers and losses of special skills can be included.

Loss of skill is a factor which is related to almost every termination of employment. The employee has during his or her time at work attained work-related experience and special skills. In some cases the loss of such a skill might directly cause loss of customers. Estimating a cost due to loss of skill is very difficult. One way, however, to estimate the amount of the costs is to calculate the working hours incurred until the new employee hired to replace the old employee will be about as skilled in the duties as the previous employee. In this calculation model the previously mentioned cost is taken into account in the costs due to orientation and training of a new employee (chapter 4.1.4) hence it is not necessary to include it in the cost of an employee terminating employment. If it is considered that a part of the loss of skill is irretrievable, this part can be considered in the item other costs.

COST/RESIGNED EMPLOYEE	Employee		Clerical employee	
	hours	FIM	hours	FIM
Working hours of management	2	250	2	250
Working hours of line management	4	500	4	500
Loss of productivity	40	5000	40	5000
Other costs	---	0	---	0
Total /resigned employee	5750		5750	

Table 4.3. Calculation of an employee terminating employment

4.1.3 Recruitment costs of a new employee

Hiring a new employee does not only incur the company costs. The need to recruit staff is often due to expansion and new duties. Hiring a new employee can turn out to be a problem if the departure turnover of termination of employment is high and the company is obliged to replace the experienced employees with new ones. From the turnover's point of view it could be of importance to find out the fundamental reason for resignations and recruitment. In this case one proportion of turnover costs would be positive, investments due to expansion and development of operations, and a another proportion negative, e.g. costs due to a poor working environment and a low work satisfaction. Turnover is not differentiated like this in the following thus.

NEW EMPLOYEE Recruitment costs	Employee		Clerical employee	
	hours	FIM	hours	FIM
Needs analysis	4	500	10	1 250
Advertising	---	5 500	--	20 000
Interviews, choices, tests etc.	10	1 250	20	2 500
Other costs		1 000		5 000
Recruitment costs in total		7 750		28 750

Table 4.3. Calculation of recruitment costs of a new employee

Needs analysis. Hiring a new employee is preceded at least with some kind of needs analysis. In the above example the use of working hours might be a little underestimated. In connection to recruitment several questions have to be deliberated on, e.g. whether a new employee is needed or not, the post is filled from the inside or the outside of the company and whether there is a need for one or more employees to attend to the duties and which the qualifications required are etc. In some cases it is necessary to hire a consultant to find out the actual need to hire new employees.

Advertising. In most cases a new post is advertised in newspapers. In a large organisation the post is advertised even internally. An exception is recruitment directly from colleges or through an employment exchange. In the example it is assumed that concerning workers, recruitment from schools is more common and advertising more economical than with clerical employees as with advertising many employees are looked for at the same time. Advertising costs comprise the designing and writing of the advertisement and the space in a paper.

Interviews, selections, test etc. Usually tens of applicants are applying for a job. Partly due to this the selection of a new employee can be an expensive process. Before a new employee is selected from a large group of applicants, possibly the following work stages have to be done:

- reading through the applications and a preliminary elimination
- first round of interviews (2-10 applicants)
- going through the interviews and further elimination
- tests of the second round (2-5 applicants)
- decision-making
- agreements on conditions of employment
- answering the other applicants.

Other costs. Other costs can comprise compensations for travelling expenses of the interviewed and applicants and consultant fees for persons from outside the company who carry out tests.

4.1.4 Orientation and training of a new employee

The productivity of a new employee is at first lower than that of a more experienced worker. The effect can last from some months to years. The contents of the duty has a considerable effect on this time of learning. The process of learning a skill is long, and it might take years to reach the same level of skill and work productivity as that of an experienced employee.

NEW EMPLOYEE Attaining a skill	Employee		Clerical employee	
	hrs	FIM	hrs	FIM
Orientation	20	2 500	20	2 500
Productivity and time of orientation	0 %	---	0 %	---
Training time	40	5 000	80	10 000
Productivity during time of training	0 %	---	0 %	---
Attaining experience	500	12 500	500	15 625
Productivity during experience time	80 %	-	75 %	---
Working hours of the orientator and trainer	40	5 000	40	5 000
Training and course fees	---	5 000	---	10 000
Attaining a skill	30 000		43 125	

Table 4.5 Costs due to a new worker's attainment of skills and experience

In table 4.5 the time incurred by an new employee attaining skills is divided into three stages:

- time of orientation
- time of training and
- time of attaining experience

For each period the costs are calculated by means of form

$$\text{Time spent} \times \text{Cost per hour} \times (1 - \text{productivity percentage}).$$

The cost per hour can be estimated by means of average wages per hour and the coefficient of indirect employee cost. The last term describes the training time which reduces productivity. In this case it is assumed that the employee does not produce anything during the time of orientation and training i.e. the total working time spent on training and orientation is calculated as a cost. During the time of attaining experience, productivity is 80 % (when the last term of multiplication is 20 %) and the productivity of a clerical employee is 75 % (decline 25 %).

Orientation. Orientation is time spent on getting to know the work place and fellow employees and learning general lines of action and duties. Usually during the time of orientation the new employee hardly produces anything. In the example it is assumed that ca 20 hours is spent on orientation on general level.

Time of training. During the time of training time is spent on learning special knowledge and skills necessary for carrying out work duties. Training can be carried out by in-house or out-house courses. Training as such is not only limited to the commencing of employment. In practice working life continuously changes and also experienced employees participate in training. An employee who has been in working life for long has participated in training to a value of tens or even hundreds of thousands of Finnish marks at the expense of the employer. In the example it is assumed that it is necessary to use ca 40 hours for employees on and 80 hours for clerical employees to train skills essential for carrying out work duties.

Gaining experience. Usually knowledge and skills are attained by working. The kind which is not learnt at school or at courses. Depending on tasks, it takes some weeks or some years to master the most important things. During this time the employee is often less productive than an experienced employee. The most difficult tasks or exceptional situations might require help of an experienced employee. In the example it is assumed that it takes approximately 500 working hours for an employee and a clerical employee before he or she masters his or her work completely. Work productivity is during the time in question a little lower than that of an experienced employee. In the calculation it is assumed that the average productivity of an employee is ca 20 % and that of a clerical employee 25 % lower than that of an experienced employee.

In practice it can be difficult or even impossible to measure productivity disparity between employees and thus, the decline of productivity of the new employee. In theory productivity can be depicted by means of a **learning curve**.

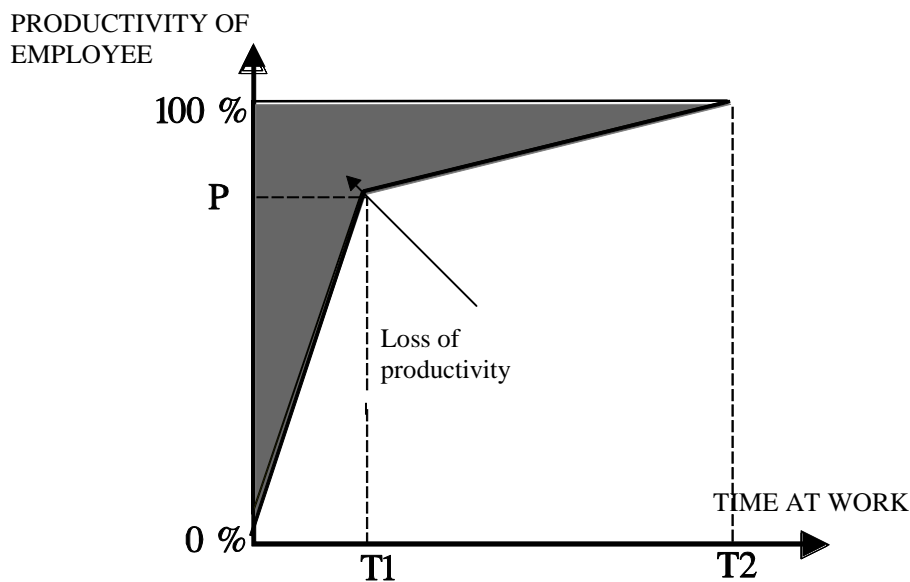


Figure 4.2 Learning curve of a new employee

In the beginning the employee's productivity is growing quickly (pace 0 .. T1). Gradually the pace of learning slows down and the final stage (T1 ..T2) can be very long. Depending on case the learning curve might be very different. The loss of productivity that related to the time of learning is in the figure presented as the shaded area.^{xii} It has been necessary to estimate some kind of mean value of the loss of productivity for the calculation model.

4.2 Costs of disability pensions

A company's costs due to employees' retirement on disability pensions vary depending on the company's size as follows:

- employees 1-50, the company has no excess
- employees 51-999, the company has a step by step growing excess proportion
- employees at least 1 000, the company has complete excess

In companies with less than 50 employees disability pensions are covered with a disability proportion included in the pension insurance premium. The number of persons in the company retiring with disability pension does not affect the size of the insurance premiums.

If the number of employees vary between 51-999 the excess of the company increases and correspondingly the share of the tariff fee decrease as the number of employees increase. The tariff fee is a fee calculated according to the average risk of disability by age.

Companies with at least 1 000 employees pay in full the costs incurred by disability pensions. In practice this means that the company pays the pension expenses due to disability as a single payment to the insurance company.^{xiii} So the size of the disability pension premium depends only on the number of cases of disability pensions in the company and the age of the receiver of pension, salary and length of working history.

Costs of disability pensions can be calculated by means of the form:^{xiv}

$$\frac{(1+i)^{65-A} - 1}{i \times (1+i)^{65-A}} \times (12 \times \text{Gross. salary}) \times 0,58$$

The first term in the form is a so called recurring discounting factor of the premiums, for the calculation of which there are ready tables. It is also a ready function in most spreadsheet computation programmes. By means of the term it is possible to determine the present value of future payments of premiums (in this case that of pensions). By means of the latter part of the form the employee's annual pension is calculated. Gross salary refers to the monthly salary and A to the age of the employee at the time when he or she retires.

^{xii} In reality learning hardly proceeds linearly. The form of a more accurate curve might be exponential.

^{xiii} To be more exact the discounted present value of futur pension premiums.

^{xiv} The form is not absolutaly accurate, but gives a reasonably approximate value. The discounting factor in the form, the interest rate is i (fund interest of 3 % can be used, situation in 1997) and A is the age of the person retiring.

It is assumed that the employee has started working life at the age of 23 when his or her pension percentage is estimated to be ca 58 %. The pension percentage varies in reality according to the age at the time of retiring with disability pension as the calculation rules for future time determine the size of the pension (up to the age of 50 it is calculated to increase 1,5 %/year, up to 60 1,2 %/year and to 65 0,8 %/year). Also the gross salary gives a little too big a size of the pension salary as the pension salary is determined by the average salaries during the last 10 year of employment. A company had better use the expertise of the pension insurance company if more accurate calculations of cost effects of disability pensions are desired. By means of the average pension percentage of the form, however, it is possible to receive sufficiently accuracy concerning the requirements of this calculation.

In the example below, costs incurred by disability pension are calculated by means of the average age of the of pension recipient and average monthly salary and the form presented above. For companies' in-house use it could be possible to draw up tables which make estimation easier in separate cases.

Management and occupational health service costs per case of disability pension can be rather high. The costs are comprised of different interviews, considerations related to decisions on pensions and statements, estimations of possibilities of rehabilitation and different medical examinations and tests.

COSTS OF DISABILITY PENSIONS	
New disability pensions, number	3
Average age of disability pension receivers	56 years
Average monthly wages	FIM 10 000/month
Disability pensions to be paid (estimate)	FIM 1 552 000
Expenses of management and occupational health service	FIM 15 000
Disability pension costs -excess %	100 %
Disability pension cost/case	FIM 532 000

Table 4.6 Example of calculation of disability pension costs

5. COSTS OF INVESTING IN THE DEVELOPMENT OF WORKING CONDITIONS

Investments in developing working conditions and occupational safety are surprisingly little monitored in Finnish companies. However, monitoring costs can be of use to make sure that the resources within the company have been allocated accurately. From here on the costs of investments in developing working conditions are divided into three groups:

- costs in connection to the activity of the occupational safety organisation
- costs in connection to operations aiming to maintain capacity to work and occupational health service
- costs in connection to development of work and skills
- investments concerning occupational safety and working environment techniques.

ORGANISATION OF OCCUPATIONAL SAFETY (FIM)	Situation 1997
Working hours of occupational safety staff	99 000
Occupational safety and health meetings	16 500
Occupational safety training	25 000
Working hours of company and line management	60 000
Working hours of employees	30 000
Other costs	45 000
Costs of the organisation of occupational safety	275 500

Table 5.1 Example of costs of occupational safety activities

Costs of the organisation refers in this context mainly to time spent on occupational safety work. The objective is to monitor the use of time which is spent on tasks related to development and planning of working conditions. However, there is no use to follow up working hours spent besides every day work, because making a distinction between duties of occupational safety, production and other duties is impossible.

Working hours of occupational safety employees. Working hours are times spent on occupational safety work by an employee of the occupational safety on full-time or part-time basis (head of occupational safety, engineers, technicians, delegates and representative etc.) If it is not possible to find out used working hours it can be estimated as in the following example:

$$3 \text{ persons} \times 11 \text{ months} \times 30 \text{ hours/month} \times \text{FIM } 100/\text{hour} = \text{FIM } 99\,000$$

Meetings related to occupational safety and health. This refers to time spent by others than the personnel of occupational safety and health, e.g. by the occupational safety committee. If meetings are held once a month, the calculation is as below :

$$11 \text{ meetings} \times 5 \text{ persons} \times 3 \text{ hours} \times \text{FIM } 100/\text{hour} = \text{FIM } 16\,500$$

Occupational safety training. Costs of the occupational safety personnel, safety training of the line management and personnel. For example course fees, travelling expenses and used working hours.

Working hours of company and line management. In this item the working hours spent by the line management on planning safety operations, drawing up operations programmes and other planning, management and development of occupational safety.

Working hours of employees. Working hours include for example time spent on planning and preparations of working conditions and other from normal operations to varying projects.

Other costs. For example consultant fees. Computer programmes etc. If desired in this item costs of investments in occupational safety or e.g. personal safety equipment can be estimated or additional running costs of occupational safety.

ACTIVITY MAINTAINING ABILITY TO WORK (FIM)	Situation 1997
Costs of occupational health service	270 000
Planning and supervision of operations	30 000
Investigations and measurements	15 000
Health and exercise campaigns	0
Rehabilitation	25 000
Working hours spent on activity for maintaining ability to work	40 000
Fees for external services	0
Reimbursement from the Social Insurance Institution	120 000
Costs of activity for maintaining ability to work	260 000

Table 5.2 Example of costs due to activities for maintaining capacity to work

There is no unambiguous definition of activity maintaining work ability. In this case it mainly refers to activities maintaining the employees' health and well-being. In some cases even maintaining skills and its development are seen as activities maintaining work capacity. However, it is taken into account in the costs of table 5.3.

Costs of occupational health service. In this case all costs of occupational health service are seen as a part of activities to maintain work ability (even if this does not concern of applications to be sent to the Social Insurance Institution).

Planning and managing operations. Mainly working time spent on drawing up operation programmes for maintaining work ability and planning and managing of various projects (line management, occupational safety organisations, personnel, personnel administration).

Investigations and measurements and health and exercise campaigns. Expenses due to outside services, equipment, materials etc. For example charting the atmosphere at a work place, fees for using gyms., etc.

Rehabilitation. Rehabilitation of an employee is often an alternative for e.g. a disability pension. Additional costs due to rehabilitation can be included here, for example new work and aid fees from care and rehabilitation institutions and working hours spent on rehabilitation.

Working hours spent on activities for maintaining work ability. Mainly working hours spent by employees on activities for maintaining work ability. For example:

$20 \text{ persons} \times 20 \text{ hours} \times \text{FIM } 100/\text{hour} = \text{FIM } 40\,000$

Fees for outside services. Consultant fees and other costs which have not been taken into account in the previous items.

Reimbursements from the Social Insurance Institution. The Social Insurance Institution reimburses a part of the costs used for occupational health service, rehabilitation and activity for maintaining work ability. The reimbursement percentage varies according to the object.

DEVELOPMENT AND TRAINING (FIM)	Situation 1997
Development of work, line management	45 000
Development of work, personnel	100 000
Development of skill, employees	280 000
Development of skill, clerical employees	370 000
Training and course fees	98 000
Fees for external service	80 000
Costs of development and training	973 000

Table 5.3 An example of costs due to development and training

Costs of development and training projects can, if need be, take into account and included as extensively as possible. Several projects and investments for development of quality and production have also their impact on the working conditions and on the way the work duties will be carried out. Delimitation is not always an easy task.

Working hours spent on developing work. Working hours spent on different kinds of development programmes (estimate).

Working hours spent on developing a skill. Working hours spent on training and other development of skills. However, not working hours spent on orientation and training of new employees.

Training and course fees and outside services. Course fees in connection to training and development of skills, travelling expenses, and consultant and other fees.

ACQUISITION OF EQUIPMENTS AND OTHER INVESTMENTS (FIM)	Situation 1997
Investments in working environment and occupational safety	0
Operating expences	5 000
Equipments	35 000
Working hours spent on occupational safety	45 000
Costs of acquisitions of equipments and investments	85 000

Table 5.4 Example of costs due to acquisitions of equipment and investments in occupational safety

To distinguish productive investments from occupational safety investments is usually not possible and not even practical. If some only occupational safety investments or acquisitions of equipment are made e.g. in connection to project for preventing accidents, these costs can be taken into account in costs in table 5.4 or costs of occupational safety organisation (other costs) in table 5.1.

Working environment and occupational safety investments and running costs. Included here can be increased investments and running costs, mainly due to corrective occupational safety activities, resulting from separate projects and corresponding factors. If the lifetime of investments is several years, it is necessary to take into account the proportion of the time of calculation. The running costs can for example be costs due to increased energy costs and lower productivity.

Equipments and material refers to e.g. personal safety devices and safety cloths etc.

Working hours spent on occupational safety. For example working hours spent by planning, repairs and transferring and checking and testing devices can be included.

1. PERSONNEL AND USE OF WORKING HOURS

COMPANY Ltd

1,1 PERSONNEL AND TURNOVER			Situation 1997	Estimate 1998	Objective
1.10	Employees	no.			
1,11	Clerical employees	no.			
1,12	Part-time employees	no.			
1.13	Temporary employees	no.			
1,14	Personnel totally	no.	0	0	0
1,15	Total work hours for part-time employees	%	50%	50%	50%
1,16	Total work hours for temporary employees	%	50%	50%	50%
1.17 a	New employees	no.			
1.17 b	New clerical employees	no.			
1.18 a	Resigned employees	no.			
1.18 b	Resigned clerical employees	no.			
1,19	New disability pensions	no.			
1,2 USE OF WORKING HOURS			Situation 1997	Estimate 1998	Objective
1.20	Theoretical total working hours	h		0	0
1,21	Holidays	d			
1,22	Sick days (short term)	d			
1,23	Sick days (long term)	d			
1,24	Sick days totally	d	0	0	0
1,25	Accident absence days	d			
1,26	Other absences	d			
1,27	Efficient working hours	h	0	0	0
1,3 ABSENCES AND ACCIDENTS					
1.30	Sick periods (short term)	no.			
1,31	Sick periods (long term)	no.			
1,32	Number of accidents (less than 3 days)	no.			
1,33	Number of accidents (more than 3 days)	no.			
1,4 TURNOVER AND EMPLOYMENT			Situation 1997	Estimate 1998	Objective
1.40	Turnover	M			
1,41	Personnel expenses	M			
1,42	Gross margin	M			
1,43	Gross margin %	%	0%	0%	0%
1,44	Value added	M	0	0	0
1,45	Value added / person	FIM	0	0	0
1,46	Sickness insurance compensation (SII)	FIM			
1,47	Accident insurance compensation	FIM			
1,48	Average personnel costs / day	FIM	800	800	800

2. COST OF ABSENCE DAY

COMPANY Ltd

The prices of absence days below are used in the calculation

2,1	COSTS OF ABSENCE DAY	Short-term FIM/day	Long-term FIM/day
2,10	Wages of absence day	800	264
2,11	Share of sickness insurance compensation	0	320
2,12	Indirect costs	790	880
2,13	Gross cost of absence day	1590	1144
2,14	Net cost of absence day	790	344

2,2	DIRECT COSTS	Short-term	Long-term
2,20	Average wages per hour		0
2,21	Reservation for holiday salary		
2,22	Social security fees		
2,23	Other personnel costs besides wages		
2,24	Cost per hour totally	100	0
2,25	Wages of absence day	800	264
2,26	Share of sickness insurance compensation	0	320

2,3	INDIRECT COSTS	Cost FIM/case	Short-term FIM/day	Long-term FIM/day
2,31	Costs of personnel administration and manag.		0	0
2,32	Company health service costs		0	0

2,4	IMPACTS OF ABSENTEEISM Short-term absenteeism	%- distribution	Add.costs FIM/day	Average Add.costs
2,41	Work is postponed or left undone	30,0%	800	240
2,42	Work is carried out by others (notable workload)	50,0%	500	250
2,43	Overtime work	20,0%	1500	300
2,44	Replacements	0,0%	1000	0
2,45				0
2,46	TOTAL	100,0%		790

2,5	IMPACTS OF ABSENTEEISM Long-term absenteeism	%- distribution	Add.costs FIM/day	Average Add.costs
2,51	Work is postponed or left undone	10,0%	800	80
2,52	Work is carried out by others (notable workload)	30,0%	500	150
2,53	Overtime work	10,0%	1500	150
2,54	Replacements	50,0%	1000	500
2,55				
2,56	TOTAL	100,0%		880

3. ACCIDENT COSTS

COMPANY Ltd

The following accident costs information is used in the calculation

3,1	ACCIDENT COSTS	
3,11	Wages of accident days	0
3,12	Other direct accident costs	0
3,13	Indirect accident costs	0
3,14	Insurance compensation	0
3,15	Accident costs totally	0
3,16	Direct costs / accident day	800
3,17	Indirect costs / accident day	790
3,18	Coefficient of indirect costs	0,99

3,2	COSTS INFORMATION- ALL ACCIDENTS	
3,21	Labour cost on absence day (FIM)	800
3,22	Other direct accident costs	
3,23	Received insurance compensation	0
3,24	Share of insurance cost that can be influenced	

3,3	ACCIDENT STATISTICS Divided into main types	Lenght of accident			Abs.	Costs	
		0-3	3-30	30-	days	Direct	Indirect
a	Work travel accidents					0	0
b	Heavy liftings					0	0
c	Machine accidents					0	0
d	Accidents to the eyes					0	0
e	Slipping					0	0
f	Other accidents					0	0
3,31	TOTAL	0	0	0	0	0	0

3,4	COST INFORMATION Including counted accidents	TYPE OF ACCIDENT					
		a	b	c	d	e	f
3,40	Counted accidents						
3,41	- days of absence total						
	Direct costs	a	b	c	d	e	f
3,42	Wages during absence	0	0	0	0	0	0
3,43	Other direct costs						
3,44	Direct costs total (FIM)	0	0	0	0	0	0
	Indirect costs	a	b	c	d	e	f
3,45	Indirect cost of absence	0	0	0	0	0	0
3,46	Other losses of working hours						
3,47	Losses to property						
3,48	Profit losses						
3,49	Other indirect costs						
3,50	Indirect costs total (FIM)	0	0	0	0	0	0
3,51	Coefficient of indirect costs	0,00	0,00	0,00	0,00	0,00	0,00

4. STAFF TURNOVER AND DISABILITY PENSIONS

COMPANY Ltd

4,1	STAFF TURNOVER	FIM
4,11	Cost of resigned employee	0
4,12	Cost of resigned clerical employee	0
4,13	Cost of disability pension / case	0
4,14	Cost of new employee	0
4,15	Cost of new clerical employee	0

4,2	COST / RESIGNED EMPLOYEE	Employee		Clerical employee	
		hours	FIM	hours	FIM
4,21	Working hours of management		0		0
4,22	Working hours of line management		0		0
4,23	Loss of productivity		0		0
4,24	Other costs		0		0
4,25	Total costs of resigned employee		0		0

4,3	COSTS OF DISABILITY PENSION	
4,31	New disability pensions, number	0
4,32	Average age of disability pension receivers	
4,33	Average montly wages	
4,34	Disability pensions to be paid (estimate)	
4,35	Expenses of management and occupational health service	
4,36	Disability pension costs - excess %	100%
4,37	Disability pension costs / case	0

4,4	NEW EMPLOYEE Recruiting costs	Employee		Clerical employee	
		hours	FIM	hours	FIM
4,41	Needs analysis		0		0
4,42	Advertising	----- -		----- -	
4,43	Interviews, decisions and tests etc.		0		0
4,44	Other costs		0		0
4,45	Total costs of recruitment		0		0
	Obtaining profesional skills	hours	FIM	hours	FIM
4,51	Orientation		0		0
4,52	Productivity and time of orientation	0%	-----	0%	-----
4,53	Training time		0		0
4,54	Productivity during time of training	0%	-----	0%	-----
4,55	Obtaining experience		0		0
4,56	Productivity during experience time	80%	-----	75%	-----
4,57	Working hours of orientator and trainer		0		0
4,58	Training and course fees	-----		-----	
4,59	Costs of obtaining profesional skills		0		0

5. INPUT COSTS OF WORKING CONDITIONS

COMPANY Ltd

5,1	ORGANISATION OF OCCUPATIONAL SAFETY (FIM)	Situation 1997	Estimate 1998	Objective
5,11	Working hours of occupational safety staff			
5,12	Occupational safety and health-meetings			
5,13	Occupational safety training			
5,14	Working hours of company and line managem.			
5,15	Working hours of employees			
5,16	Other costs			
5,17	Total costs of the OSH organisation	0	0	0
5,2	ACTIVITY OF MAINTAINING WORK ABILITY (FIM)	Situation 1997	Estimate 1998	Objective
5,21	Costs of the occupational health service			
5,22	Planning and supervision of operations			
5,23	Investigations and measurement			
5,24	Health and exercise campaingns			
5,25	Rehabilitation			
5,26	Working hours for maintaining work ability			
5,27	Fees to external services			
5,28	- Reimbursement from the SII			
5,29	Total costs of maintaining work ability	0	0	0
5,3	DEVELOPMENT AND TRAINING (FIM)	Situation 1997	Estimate 1998	Objective
5,31	Work development, line management			
5,32	Work development, personnel			
5,33	Development of professional skills, employees			
5,34	Devel. of professional skills, clerical employees			
5,35	Training and course fees			
5,36	Fees for external services			
5,37	Total costs of development and training	0	0	0
5,4	ACQUISITION OF EQUIPMENTS AND OTHER INVESTMENTS (FIM)	Situation 1997	Estimate 1998	Objective
5,41	Investments in working environment and OSH			
5,42	Operating expenses			
5,43	Equipments and materials			
5,44	Working hours spent on occupational safety			
5,45	Total costs of equipments and investments	0	0	0

6. WORKING ENVIROMENT COSTS

COMPANY Ltd

6.1	SICKNESS ABSENTEEISM	Situation 1997	Estimate 1998	Objective
6.11	Sick leave %	0,0%	0,0%	0,0%
6.12	Sick days / employee	0,0	0,0	0,0
6.13	Sick periods / employee	0,0	0,0	0,0
6.14	Direct costs of sick leaves	0	0	0
6.15	Indirect costs of sick leaves	0	0	0
6.16	Gross costs of sick leaves	0	0	0
6.17	Net costs of sick leaves	0	0	0

6.2	ACCIDENTS	Situation 1997	Estimate 1998	Objective
6.21	Absence % due to accident	0,0%	0,0%	0,0%
6.22	Accident days / employee	0,0	0,0	0,0
6.23	Direct costs of accidents	0	0	0
6.24	Indirect costs of accidents	0	0	0
6.25	Gross costs of accidents	0	0	0
6.26	Net costs of accidents	0	0	0

6.3	STAFF TURNOVER AND DISABILITY	Situation 1997	Estimate 1998	Objective
6.31	Turnover %, resigned employees	0,0%	0,0%	0,0%
6.32	Turnover %, new employees	0,0%	0,0%	0,0%
6.33	Costs, resigned employees	0	0	0
6.34	Costs, new employees	0	0	0
6.35	Costs, disability pensions	0	0	0
6.36	Total costs	0	0	0

6.4	INPUT IN WORKING CONDITIONS	Situation 1997	Estimate 1998	Objective
6.41	Occupational safety and health organisation	0	0	0
6.42	Activity for maintaining work ability	0	0	0
6.43	Development and training	0	0	0
6.44	Acquisition of equipments and other investments	0	0	0
6.45	Total costs	0	0	0

6.5	WORKING ENVIRONMENT COSTS	Situation 1997	Estimate 1998	Objective
6.51	Total costs of working environment	0	0	0
6.52	Working environment costs FIM / person	0	0	0
6.53	Working environment costs % of turnover	0,0%	0,0%	0,0%
6.54	Working environment costs % of personnel expences	0,0%	0,0%	0,0%