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TRAINING MATERIAL ON RISK ASSESSMENT AT WORKPLACE INTRODUCTORY MODULE



Coordinator: Cyprus Workers' Confederation (SEK)
Participants: Department of Labor Inspection (CY)
Cyprus Safety and Health Association (CY)
Cyprus Employers & Industrialists Federation (CY)
Arbeit und Leben (D)
Odense Techniske Skole (DK)
Hellenic Institute for Occupational Health and Safety (EL)
Kauno Kolegija (LT)
Confederatia National A Sindicatelor Libere din Romania-FRATIA (RO)
Center for Advanced Technologies, Politechnic University of Bucharest (RO)

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MO-EN.1 Aim of the Module

This is an introductory module that aims to provide some background with respect to the risk assessment process. The information provided here could either be used as introduction to the sectoral training

The Module starts with basic definitions and provision of examples in order to make the different concepts clear. The Legal Framework that governs the Risk Assessment process at the European level is given in a tabulated format, while the Risk Assessment process is analyzed through the Five Step Approach. The Module discusses the priorities that should be in place when the need for prevention measures arises. In order to facilitate the whole process, a handy risk assessment tool has been developed and is being provided for direct use. The Tool is easy-to-use, self-explanatory and contains all necessary information not only for the performance of the risk assessment exercise as such, but for the follow up step, an integral part of the whole process.

As mentioned, this is the introductory part of the sectoral risk assessment training courses, where the hazards that are specific to the sector under consideration are identified and the safety measures are presented. Having in mind that some hazards exist in all sectors, the present module presents the risk assessment process for four of them, namely Fire, Noise, Manual handling and Stress at work. Aim of the corresponding chapters is at one hand to present to the trainee in a relatively analytical way the methodology that should follow in order to perform a risk assessment, and at the other hand to avoid unnecessary repetitions within the different sectoral modules.

M0-EN.2 The “WHAT”, “WHY”, and “WHO”

MO-EN.2.1 The “WHAT” Question: Basic definitions and Explanations

Hazard is anything with the potential to cause harm

Source of hazard: is anything (object, substance, tool, machine, activity, behavior, etc) that may give rise to one or more hazards causing harm

Risk is the likelihood of potential harm (injury, illness, death) occurring from exposure to a hazard

These terms are often being used interchangeable and incorrectly, therefore some examples are given below. In these examples a situation is described, just one source of hazard is identified and only one of the hazards associated with the identified source is given.

Example 1: Work is performed at the roof of a building in a construction site
Source of hazard: Work at height
Hazard: Falling objects from the roof of the building
Risks: A worker at the ground is hit by the falling object and is injured

Example 2: An operator is charged of the service of motor vehicles
Source of hazard: The engine’s oil
Hazard: Spilling of oil on the operator’s hands
Risk: Skin irritation

Example 3: An operator is asked to work with a cutting machine for 2 consecutive working shifts
Source of hazard: Extensive working hours
Hazard: The operator being too tired forgets to close the safety screen in front of the cutting machine
Risk: The cutting machine cuts a finger of the operator

Example 4: An operator is asked to lift and carry large sacks filled with sugar
Source of hazard: Heavy load
Hazard: Manual handling of the heavy load
Risk: Back injury

As evident from the above definitions:

- The source of hazard has a physical substance and is always present.
- The hazards appear during an activity at the presence of the related to the activity sources of hazards, meaning that they are always there.
- The risk related to the hazards that appear during an operation depend on the undertaken safety (preventive) measures, meaning that the risks decrease as the preventive measures increase.

There are several ways or the **Categorization of Hazards**. In a specific workplace, hazards can be categorized based on the activities and tasks of each job position, or

based on their sources. In most cases a combination of these two approaches is applied. The following table aims to relate the different categories of hazards that are widely used with their respective sources and the related potential harms.

Source of Hazards	Category of Hazards	Potential Harms
Electrical installations, electrical equipment	Electrical hazards	Burns, fire, electrifications
Machinery, lifting equipment, vehicles, transport	Mechanical hazards	Injury, death
Chemical substances, emissions (gases, vapors, mists, fumes, dusts), leaks, flammable materials	Chemical hazards	Health problems, irritations, headache, cancer, death, explosions, fires
Micro-organisms (viruses, bacteria, parasites, mold, etc), Lab cultures, Animals, Plants	Biological hazards	Health problems, allergies, Legionnaire's disease
Noisy operations and machinery	Noise, communication problems	Loss of hearing, psychological, accidents
Vibrating hands machines	Vibration	White fingers
Work at height, Confined spaces	Working conditions	Injuries, health problems, death, explosions, fire
Office equipment, Manual handling, Physical strain, Awkward postures	Ergonomic hazards, psychosocial hazards	Musculoskeletal disorders, stress
Temperature and relative humidity	Work micro-climate, psychosocial hazards	Health problems, stress
Ionizing radiation, UV radiation, Infrared radiation, Electromagnetic fields, microwave	Radiation	Burns, eyes injuries, health problems, cancer, fires
Slippery floors, uneven surfaces, lighting, ladders, exits, signs, ventilation, space	Working environment	Injuries from fall, slips, trips; health problems; fire
Tightness of a workplace	Housekeeping	Injuries
Hygiene and resting facilities, First Aid	Welfare	Infections, contaminations, illnesses
Work organization, Work load, Repetitive work, Working schedules, Isolation, Inter-	Psychosocial hazards; ergonomic hazards	Headaches, non-concentration, nervous disorders, stress,

relations among the employers, Relations with the management, Poor consultation, Poor support, Poor participation, Harassment, Violence, Mobbing, Person's temperament		musculoskeletal disorders
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OSH principles require elimination of risks during each activity

Given that hazards are always present during an activity, the related risks can be eliminated or at least minimized only through the establishment of the appropriate safety measures. The later measures can be established through the process of Risk Assessment (R/A).

Risk Assessment is the process of identifying what hazards exist in a workplace and how likely these hazards are to cause harm to employees and others, in order to decide what prevention or control measures are needed. It is a systematic and dynamic process for the creation of a healthier and safer working environment.

The Risk Assessment is the foundation of a company's occupational safety and health (OSH) system, of which the aim is that no one becomes ill or gets injured due to work activities. A Risk Assessment is nothing more than a careful examination of what, in a workplace, could cause harm to people, so that to become possible to weigh up whether enough precautions are taken or more should be done in order to prevent harm.

A Risk Assessment involves the identification of the hazards present and the evaluation of the risks involved, taking into account existing precautions and their effectiveness. According to the later evaluation new precautions may be suggested. Apparently, the complexity of a risk assessment is directly proportional to the complexity of the operations in the workplace under consideration. In small businesses with few or simple hazards, the R/A is a more or less straightforward process and no special skills are required, while in large and hazardous sites a sophisticated approach is required, especially for the novel or complex processes, or more strict regulations are applied.

M0-EN.2.2 The "WHY" question: Benefits for All

The aim of a risk assessment is to make sure that no one gets hurt or becomes ill. The performance of a thorough risk assessment is to the benefit of both employees and employers. If a workplace has been properly assessed and each worker that is assigned to do a job has been informed on how to do the job safely then the main benefits are the following:

For the employee:

- Reduction of accidents' rate and provision of better working conditions

- Elimination of the worry or his/her personal safety and the safety of his/her coworkers
- Increased job satisfaction
- Establishment of a fruitful communication with the management

For the employer:

- No lost output due to accidents
- No damaged machine from the non-establishment of the appropriate preventive measures
- No increase of insurance costs
- No costs for compensation for workers whose health is damaged in a workplace accident or by an occupational disease
- Compliance with legislation – No costs due to fines
- Increase of productivity due to the increase of the employees' job satisfaction
- Establishment of a human oriented image for the public

It is important not to treat the Risk Assessment as just more paperwork. Risk Assessments must be carried out with the intention of putting prevention systems in place. R/A should be viewed as a tool for improving prevention policies. It should not be just the drawing of checklists of risks and the determination whether what were considered as appropriate levels of control were applied. The R/A must go a step further and integrate the outlined prevention measures into the work organization.

M0-EN.2.3 The “WHO” question: Involvement and Responsibilities

The individual or the team that is to perform the risk assessment must have sufficient training, experience or knowledge in order to be able to identify the hazards and to evaluate the effectiveness of the precautions to control those risks. In small businesses the employer or a senior manager may have the competence for this task, while in larger businesses the safety officer or a risk assessment team carries out the assessment. In several cases the task is contracted out to consultants

A Risk Assessment can be performed by:

- The safety officer of the enterprise, if there is one, or the person appointed by the employer and has sufficient training, experience and knowledge
- The employer himself, in case that he has undergone an appropriate training and has an adequate certificate, and employs less than 5 persons
- External consultants. A possible disadvantage of this approach is the fact that consultants several times have a macroscopic view of the specific enterprise. In most cases the external agency has no real influence on integrating prevention management into the work organization, resulting in just some more paperwork.

In any case the performance of **a risk assessment of a workplace requires the active participation of employees or their safety representatives (consultation)**. This means talking to the people who do the jobs and have practical understanding of the hazards and risks involved; in other words observing what is going on at first hand and not just sitting at a desk reading manuals. It is important the risk assessment to take into account all the information coming from the employers' subjective experiences, since it represents real-life work situations. No one knows the problems

of a job better than the employer who has to do it. However, while safety representatives can be involved in the risk assessment of a workplace and should be asked to comment on it, the responsibility of performing the risk assessment lies with the management.

M0-EN.3 The Legal Framework

The main OSH issues are introduced by the Framework Directive **89/391/EEC** of 12 June 1989 on the **“Introduction of measures to encourage improvements in the safety and health of workers at work”**. The Directive contains general principles concerning the prevention of occupational risks, the protection of safety and health, the elimination of risk and accident factors, the informing, consultation, balanced participation in accordance with national laws and/or practices and training of workers and their representatives. It is worth mentioning that, according to the European Court of Justice (ECJ), in a judgement of the Framework Directive, the enumeration of health and safety risks in this Directive is not exhaustive and thus goes beyond those explicitly mentioned. According to the ECJ, the concepts “working environment”, “health” and “safety” embrace all physical and other factors, and are covered directly or indirectly by the Framework Directive and other Directives, such as the Working Time Directive (93/104/EC). The Council has adopted individual directives, in different areas, within the meaning of Article 16 (1) of the Framework Directive 89/391/EEC. These directives set the minimum safety requirements and it is up to the National Laws to introduce more strict ones. The EU legal framework is given below in a tabulated format:

Code (Date of the Council approve)	Title
89/391/EEC (12/06/1989)	Introduction of measures to encourage improvements in the safety and health of workers at work (<u>Framework Directive</u> , <i>Official Journal L 183, 29/06/1989 P. 0001 – 0008</i>)
89/654/EEC (30/11/1989)	The minimum safety and health requirements for the workplace (1 st individual directive, <i>Official Journal L 393, 30/12/1989 P. 0001 – 0012</i>)
2001/45/EC (27/06/2001)	The minimum safety and health requirements for the use of work equipment by workers at work (2 nd individual Directive, <i>Official Journal L 195, 19/07/2001 P. 0046 – 0049</i>)
89/656/EEC (30/11/1989)	The minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (3 rd individual directive, <i>Official Journal L 393, 30/12/1989 P. 0018 – 0028</i>)
90/269/EEC (29/05/1990)	The minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers (4 th individual Directive, <i>Official Journal L 156, 21/06/1990 P. 0009 – 0013</i>)
90/270/EEC (29/05/1990)	The minimum safety and health requirements for work with display screen equipment (5 th individual Directive, so called VDU Directive, <i>Official Journal L 156, 21/06/1990 P. 0014 - 0018</i>)
90/394/EEC (28/06/1990)	The protection of workers from the risks related to exposure to carcinogens at work (6 th individual Directive, <i>Official Journal L 196, 26/07/1990 P. 0001 – 0007</i>)
2000/54/EC	The protection of workers from risks related to exposure to

(18/09/2000)	biological agents at work (7 th individual directive, <i>Official Journal L 262, 17/10/2000 P. 0021 – 0045</i>)
92/57/EEC (24/06/1992)	The implementation of minimum safety and health requirements at temporary or mobile construction sites (8 th individual Directive, <i>Official Journal L 245, 26/08/1992 P. 0006 – 0022</i>)
92/58/EEC (24/06/1992)	The minimum requirements for the provision of safety and/or health signs at work (9 th individual Directive, <i>Official Journal L 245, 26/08/1992 P. 0023 – 0042</i>)
92/85/EEC (19/10/1992)	The introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding (10 th individual Directive, so called Maternity Directive, <i>Official Journal L 348, 28/11/1992 P. 0001 – 0008</i>)
92/91/EEC (03/11/1992)	The minimum requirements for improving the safety and health protection of workers in the mineral- extracting industries through drilling (11 th individual Directive, <i>Official Journal L 348, 28/11/1992 P. 0009 – 0024</i>)
92/104/EEC (03/12/1992)	The minimum requirements for improving the safety and health protection of workers in surface and underground mineral-extracting industries (12 th individual Directive, <i>Official Journal L 404, 31/12/1992 P. 0010 – 0025</i>)
93/103/EC (23/11/ 1993)	The minimum safety and health requirements for work on board fishing vessels (13 th individual Directive, <i>Official Journal L 307 , 13/12/1993 P. 0001 – 0017</i>)
98/24/EC (07/04/1998)	The protection of the health and safety of workers from the risks related to chemical agents at work (14 th individual Directive, <i>Official Journal L 131 , 05/05/1998 P. 0011 – 0023</i>)
1999/92/EC (16/12/ 1999)	The minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres (15 th individual Directive, <i>Official Journal L 023, 28/01/2000 P. 0057 – 0064</i>)
2002/44/EC (25/06/2002)	The minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration) (16 th individual Directive, <i>Official Journal L 177, 06/07/2002 P. 0013 – 0020</i>)
2003/10/EC (06/02/2003)	The minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise) (17 th individual Directive, <i>Official Journal L 042, 15/02/2003 P. 0038 – 0044</i>)
2004/40/EC (29/04/2004)	The minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (18 th individual Directive, <i>Official Journal L 159, 30/04/2004 P. 0001 – 0026</i>)

2003/88/EC 4/12/2003	The Working Time Directive (<i>Official Journal L 299, 18/11/2003 P. 0009</i>)
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The Framework Directive as well as the Individual ones require that the employer prepares a written risk assessment. It has to be pointed out that the occupational risks, which are to be evaluated by the employers, are not fixed once and for all, but are continually changing in relation to the progressive development of working conditions and scientific research concerning such risks.

M0-EN.4 Carrying out a Risk Assessment

In small workplaces it is possible to carry out the risk assessment as a single, straightforward exercise, while in larger organizations it will be necessary to split the assessment up into manageable units. This division into units may be done based on:

- Processes or activities
- Departments or sections
- Services provided

If this approach is followed then aspects that are common to all units (e.g. electrical hazards, fire precautions) should be assessed for all the units together.

The information provided in the following sections aim to provide the trainees with some basic tools for assessing the risks at their work environment, to decide whether a hazard is significant or not, and whether there is a need for additional safety precautions. The “Five Steps Approach” presented here is a structured methodology on how employers, self-employed people, employees’ representatives can assess risks in their workplace. Although the presented principles are applied to all cases, the methodology is mostly aimed at small and medium enterprises.

M0-EN.4.1 The five steps approach

M0-EN.4.1.1 Step 1: Identification of the hazards

During this step it is necessary to identify what could reasonably be expected to cause harm. In order to do so it is necessary to do an “office assignment” and to spend time on site. Here are some basic steps:

During the office assignment collect information and documents such as:

- Previous risk assessments, if any
- The operating procedures, which should incorporate health and safety considerations, the risks involved and the precautions required
- The tasks performed (e.g. procedures, duration, location)
- The work equipment, materials and substances being used – Collect the manuals of the machinery / equipment being used - Collect the Safety Data Sheets for the chemical substances (they include the required safety precautions). If no documents are available ask the manufacturers and suppliers to provide you with the necessary information so that their products can be used in a safe manner
- The existing (if any) safety handbooks or lists of safety rules that are communicated to the employees
- The frequency and adequacy of the employees training in health and safety
- The legal and other requirements related to the workplace
- The accidents/incidents records and the records of the occupational diseases

During the on site visit:

- Walk through the workplace and look for potential sources of hazards. It is important to spend time in the work locations seeing how work is actually carried out (as opposed to how it should be carried out)
- Observe the work practices, but keep in mind that several times they might change once workers realize that they are under observation

- Interview the employees or their representatives, since they are familiar with the operations and may have identified things that are not directly obvious
- Check the work environment
- Observe external factors that may have an impact on the workplace (e.g. jobs performed by sub-contractors, weather conditions)
- Take samples or make measurements if possible

Although the occupational hazards are directly related to the sector of activity and not all of them exist in each workplace, the information in the table provided in section 2.1 could be used to form an initial/general checklist that will be modified according to the conditions of the specific workplace under consideration.

M0-EN.4.1.2 Step 2: Identification of the persons that might be harmed and how

During this step all those that may be at risk from the work activities, both employees and others, must be identified. The different categories of employees to be considered are: production workers, maintenance workers, administrative staff, security officers, cleaners, delivery drivers, sales representatives, sub-contractors, temporary employees, customers, and any third person.

Special consideration should be given to:

- Young workers and inexperienced staff
- Expectant or breastfeeding mothers
- Employees with disabilities
- Those working at night shifts and during weekends
- People working alone, at isolated working posts

M0-EN.4.1.3 Step 3: Evaluation of the Risks, and decision on whether existing precautions are adequate or more should be done

All identified hazards cannot be removed immediately. This is why the magnitude of the related risks should be evaluated before deciding on the measures to be taken for their management and before prioritizing the required actions.

The magnitude of a risk depends on a combination of two factors:

- *Probability (likelihood)*: The more often or more likely it is that a harmful event occurs, the greater the risk. When the likelihood of an event is evaluated the following questions should be asked:
 - o How often do situations occur where an accident is possible?
 - o What are the factors that contribute to the situation?
- *Consequences (severity of harm)*: The greater the loss when a harmful event occurs, the greater the risk. When the severity of a harm is evaluated the following questions should be asked:
 - o What could an accident typically lead to? What is the worse case that is reasonably foreseeable?

- o On how many employees, customers, third parties, machinery, equipment and products could the accident and its consequences have an impact?
- o Which are the indirect consequences of an accident?

There are different ways of assessing the risk once a hazard has been identified. One of the simplest methods is the ranking of likelihood and severity of harm by creating a matrix and giving the risk a score, according to the formula:

$$\text{Risk} = \text{Likelihood} \times \text{Severity of Consequences}$$

The matrix may have as many steps as desired, but most use three, five or seven steps (meaning 3, 5 or 7 ranks for each of the two factors). For the purpose of the present training module a 3-level matrix is adopted, where the rating of likelihood and severity of consequences is as follows:

Likelihood of Adverse Effects		
Rating	Category	Explanation
1	Unlikely	The harmful event is not expected to occur during the entire professional carrier of an employee (the event occurs every 100-1000 years)
2	Possible	The harmful event may occur at some point during the entire professional carrier of an employee (the event occurs every 10-100 years)
3	Frequent	The harmful event may occur repeatedly during the professional carrier of an employee (the event occurs every 1-10 years)

Severity of Consequences		
Rating	Category	Explanation
1	Minor harm	Accidents and illness related to the harmful event are not causing prolonged distress and only First Aids might be required (e.g. small scratches, eye irritations, temporal headaches, temporal pains, etc)
2	Moderate harm	Accidents and illness related to the harmful event are causing prolonged or periodically re-occurring distress, such as wounds, 2 nd degree burns on a limited body surface, allergies, limited injuries, and more than 1 day absence from work is required.
3	Severe harm	Accidents and illness related to the harmful event are causing serious or permanent distress, such as 2 nd degree burns on a large body surface, 3 rd degree burns, disabilities, injuries that lead to several days of absence from work, or death

Then, the risk assessment matrix looks like this:

Risk Assessment Matrix			
Likelihood of Adverse Effects	Severity of Consequences		
	Minor Harm (1)	Moderate Harm (2)	Severe Harm (3)
Unlikely (1)	Low (1)	Low (2)	Medium (3)
Possible (2)	Low (2)	Medium (4)	High (6)
Frequent (3)	Medium (3)	High (6)	Very High (9)

Where the risk rating is as follows:

Risk Rating		
Rating	Category	Explanation
1, 2	Low	There is no need for action, the risk is acceptable but it is necessary to ensure that it will remain at the same level
3, 4	Medium	Actions to reduce the level of risk are required and need to be planned. After the realization of the actions a re-evaluation of the risk is required
6, 9	High / Very High	The risk is unacceptable and actions to reduce it need to be taken at once. The work related activity should not restart before the implementation of the required preventive measures

For the case of “Medium Risk”, the need for *prioritization of actions* may arise. Then, the number of people affected need to be taken into account, and the following rate can be used:

Number of people affected	Rating
1	1
2 – 5	2
6 – 10	3
More than 10	4
More than 20	5

The higher the score of the multiplication *Rate of Risk x Rate of people affected* the higher the urge for immediate actions.

The main **advantages** of the risk rating with the use of the above type of matrices are the following:

- It takes into account both severity and likelihood
- It is straightforward, easy to apply and relatively objective
- It helps in determining priorities for improvements

While, some of the **disadvantages** are underlined below:

- Its application for each hazard associated with each individual activity can be time consuming
- Maybe more time is spent in deciding upon the assigned rates, rather than evaluating the effectiveness of controls
- Some quick and simple measures to improve the control of the so called “low risks” may be overlooked, since attention is focused on the higher-scored risks

There are several much more sophisticated approaches for assessing the risk, such as the HAZOP, the Failure mode and effect analysis, the Event tree analysis and the Fault tree analysis. However the implementation of these approaches requires specialized knowledge, can be used only by experts, and is beyond the scope of the present training course.

In case that a hazard cannot be eliminated it is important to take all those measures so that the associated **risk is as small as possible**. Consequently, the above evaluation method needs to take into account the preventive measures, which are already in place and their effectiveness. For example, electricity is a significant hazard since it can kill people (rate of severity of consequences = 3), but the likelihood of doing so in an office environment where (existing preventive measures) live components are insulated and metal castings are properly earthed is extremely small (rate of likelihood < 1). On the other hand, if there are worn cables or plugs, if an ‘octopus’ has been created by inserting several plugs into a multi-plug outlet connected to a single wall outlet, or in order to disconnect a cord the cord itself is pulled instead of the plug then the likelihood of an accident could be rated as high as 3 and the related risk is “Very High”.

The use of a **checklist** that includes all the necessary safety precautions that must be in place is a useful tool, especially for people that aim to assess the risks at their workplace but do not have a long experience on doing this. The more complete such a checklist is the more detailed the risk assessment is.

For each activity / process, there are both *generic and dynamic risks*. **Generic** are those risks that are related to the hazards that are normally associated with the specific activity / process in every workplace, and there are safety precautions that are normally applied (e.g. electrical safety, fire safety) in order to minimize them. These precautions could be found in general safety manuals or safety plans. The evaluation of the adequacy of the preventive measures that are in place for these cases is more or less a straightforward process, and a generic checklist can be proved a useful tool. On the other hand, there are always **dynamic** risks that rise from the particularities of

each workplace, the employees' mentality, the management's attitude towards OSH issues, etc. The evaluation of the effectiveness of the existing precautions in these cases is more difficult and requires an excellent knowledge of the workplace that is being assessed.

It is worth pointing out that although the evaluation of the effectiveness of the precautions is an integral part of the risk assessment process, this is overlooked in some organizations that concentrate on the identification of risks without checking whether the intended precautions are actually being taken in the workplace and whether these precautions are proving efficient. In order just to illustrate this principle, let's refer to one of the examples that was given in Section 2.1:

Hazard: Falling objects from the roof of a building.

During the risk assessment process the above hazard has been identified and in Step 3 the effectiveness of the precautions has to be evaluated in order to estimate the related risks. This process must take then into account issues such as:

- If barriers and/or warning signs at ground level are in place and being respected
- If the tool belts that are provided to the workers that are working at the roof of the building are actually being used by them
- If the workers at the ground level are wearing head protection, as they have been instructed

Apparently if safety precautions are in place but are not being respected their effectiveness is minimum and the related to the hazards risks are great (dynamic risks).

M0-EN.4.1.4 Step 4: Recording of findings and Preventive measures

All the findings of the risk assessment have to be recorded in a systematic, easy-to-follow and easy-to-review way. A standard format has to be created to be used for all the risk assessments in the specific workplace. This way the different findings are directly comparable and can be used for future reference. Such a format can also be used as a reminder to keep an eye on particular hazards and precautions. Such a standard format, called "Risk Assessment Tool" is being provided in Section 4.3 of the present training manual.

As soon as the identified hazards and the existing precautions have been recorded, and the effectiveness of these precautions has been evaluated and recorded, then the additional preventive measures have to be decided, taking into account the preventive priorities lay down by the Framework Directive 89/391/EEC and being mentioned in section 4.2. These additional preventive measures have to be recorded and an expected implementation deadline has to be decided. The identification of the need for specific additional safety precautions but the non-implementation of the need is of absolutely no use. Therefore, a person responsible for the realization of the new preventive measures has to be selected and a reasonable deadline has to be set. The evaluation of the effectiveness of the additional safety precautions is expected to take place during the reviewing process (Step 5).

All the recorded information is advised to be filed. In case that that more than 5 people are employed then the employer is responsible for keeping a full record of the identified hazards, the people that performed the risk assessment, the results of the process, the safety measures that was decided to be implemented and the people that are in risk. Such a record has to be demonstrated in cases of inspections from the related competent authorities.

M0-EN.4.1.5 Step 5: Reviewing and revising of the performed risk assessment

Risk assessment should not be a static process, a snapshot of a situation. It must lead to an action plan of preventive measures. Both, the assessment and the prevention plan then, must be reviewed regularly to make sure that the established precautions are still working effectively; otherwise the impact of the assessment on the quality of the working conditions is minimal. The reviewing of the performed risk assessment, in order to take into account the new hazards, is also required when:

- New machinery is being used
- New employees are being charged of specific activities
- New processes / activities are introduced in the workplace
- New substances are being used
- The working environment (e.g. space, ventilation, floors) has altered significantly
- The operating conditions (e.g. working shifts, duties) have changed significantly
- There is any other significant change

M0-EN.4.2 Prevention Priorities

The Framework Directive 89/391/EEC lay down the general principles of prevention that must be followed when deciding what to do with an identified hazard. The following steps are given in a prioritized order:

1. Avoid the risk
2. Evaluate the risk that cannot be avoided
3. Combat (control) the risks at source
4. Adapt the work to the individual, especially on issues related to the design of the workplace, the choice of work equipment and the working and production methods, aiming to eliminate monotonous work, and work at a predetermined work rate
5. Adapt to technical progress
6. Replace the dangerous by the non-dangerous, or the least dangerous
7. Develop a coherent, overall prevention policy which covers technology, organization of work, working conditions, social relationships and the influence of factors being related to the working environment
8. Give collective protective measures priority over personal protective measures. Personal protective equipment (PPE) should be considered as the last line of defense
9. Give appropriate instructions to employees
10. Consultation

As evident from the above list of priorities the main OSH rule is that **risks must be eliminated** whether it is technically possible to do so. Consequently, the aim of a risk assessment should not be to determine whether or not risks are acceptable, but to impose elimination where possible, and to assess only those risks that cannot be eliminated at a given point. Furthermore, existing regulations should be treated as the lowest standards that must be met, and must check that appropriate solutions have been found for all ascertained risks, even where the rules do not expressly provide for that particular solution.

M0-EN.4.3 A Risk Evaluation Tool

The following table provides a standard format that could be used for the recording of all findings of the risk assessment performed in a workplace. This tool could be used in combination with a detailed checklist in order to make sure that no significant hazard has been overlooked and all necessary safety precautions are being introduced.

The Risk Evaluation Tool has to be filled in by the person that will perform the risk assessment. In the general information part is necessary to record the date of the assessment and the sections or activities that have been assessed. The main part of the Tool is to be filled in during the assessment exercise. As soon as a hazard is identified, its source, the employees that might be affected by the specific hazard, the harm that might cause, and the safety measures currently implemented have to be mentioned in the form. This information provides the ground for the evaluation that will follow. Then, using the Risk Assessment Matrix provided in Section 4.1.3 the need or not for action will be identified. If there is a need for action, then the necessary actions have to be declared and a person responsible for ensuring that the declared actions have been implemented has to be appointed. As expected, the risk assessment process is a useful and an OSH preventive exercise only if the further safety measures that will be identified are to be implemented within a reasonable time interval according to their complexity and the related to the hazard risk. Therefore, a provisional date for the realization of the necessary actions has to be given and be considered binding.

As already mentioned, a detailed checklist provides a useful tool for the identification of the hazards. Therefore, each of the sectoral modules that are being developed here, includes either an overall checklist, or a checklist per activity in the considered sector and a “Hazard Table” with all the main hazards and the respective safety precautions is included for a direct use from the persons that wish to evaluate the risks at their workplace.

M0-EN.5 Noise Assessment

The World Health Organization (WHO) defines noise as “any unwanted sound”. Noise can be generated by road, rail or air traffic, industry, music and any other activity, and can be a serious nuisance and a health hazard.

Noise is described in terms of intensity or amplitude (perceived as loudness) and frequency (perceived as pitch). The potential of damage to the hair cells of the inner ear is determined by the intensity and the duration of the noise exposure. The loudness of a noise is measured in units called decibels (dB). The potential damage of a noise cannot be assessed by simply measuring its intensity since the human ear does not respond equally to all frequencies. Therefore, most sound level meters are equipped with a filter that is designed to de-emphasize the physical contribution from frequencies to which the human ear is less sensitive. This filter is referred as the “A filter”, and measurements taken using this filter are reported as dB(A). A 3 dB(A) increase doubles the noise and the damage it can cause. The noise is loud enough to damage employees’ hearing (more than 85 dB(A)) if two persons that are 1 m away from each other are forced to shout when they speak.

Excessive noise is a serious health hazard. Exposure to noise accelerates the normal hearing loss that occurs with age. Hearing loss can be temporary or permanent. Temporary deafness is often experienced after leaving a noisy place. Even though hearing recovers within a few hours, this should not be ignored. It is a sign that if exposure to the noise continues, permanent damage will occur. The latter, can be caused immediately by sudden, extremely loud, explosive noises. In most cases, hearing loss is usually gradual due to prolonged exposure to noise. Another problem occurring from noise exposure is tinnitus (ringing, whistling, buzzing or humming in the ears). This distressing condition can also lead to disturbed sleep. Less obvious side effects such as increased pulse rate, blood pressure and breathing rate indicate that noise causes stress. This can be a safety hazard at work, interfering with communication and making warnings harder to hear.

M0-EN.5.1 Legal Framework

The 1st directive adopted by the Council on the protection of workers from the risks related to exposure to noise at work was in 1986 (Directive 86/188/EEC). The new **Directive 2003/10/EC** of the European Parliament and of the Council of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise) (17th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) establishes a clear and coherent prevention strategy. This new directive covers all sectors of the economy, including the maritime and air transport sectors (being excluded in the Directive 86/188/EEC). Recognizing the specificity of the music and entrainment sectors, the new Directive provides a two-years transitional period during which codes of practice will be established.

According to the Article 5(1) of the Directive, the risks arising from exposure to noise must be eliminated at their source or reduced to a minimum, taking into account technical progress and the available control measures.

The Directive foresees the following Daily Equivalent Exposure Limits (this is the mean daily exposure for an 8-hours working day):

- **87 dB(A)** (and 200 Pa): no worker may be exposed to this noise level or higher , a noise assessment should be carried out and an action plan has to be introduced
- **> 85 dB(A)**: further action for reducing noise must be taken, ear protection zones must be marked, and all exposed employees must wear ear protectors
- **80 – 85 dB(A)**: ear protection equipment has to be provided to the workers

All operators exposed to noise levels above 85 dB, must participate in a preventive medical surveillance program.

M0-EN.5.2 Organization of the Noise Risk Assessment

The risk assessment must be carried out by a competent person or team. This assessment requires greater degree of technical expertise than other types of risk assessments. For the assessment of noise the realization of measurements is required. The noise measurement instruments must be in good working condition and be accompanied by an update calibration certificates.

The workplace can be divided into different sections according to the activities that take place and the equipment that is being used. Information that needs to be gathered prior to the initiation of the risk assessment include information on:

- The processes / activities that result in excessive noise levels
- The latest available and reliable measurements of the noise level that took place, provided that no change of processes, and/or equipment has been taken place since then
- The duration of the noise emission at the different levels
- The exposure of the employees at the different noise levels
- The position of the employees related to the noise sources
- The available medical record related to the hearing surveillance of the employees

M0-EN.5.3 Factors to be Considered During the Noise Risk Assessment

Factor	Main issues to be considered
Source of noise	<ul style="list-style-type: none"> • Noise from office equipment • Noise from machines • Noise from people communication • Noise from near-by traffic • Noise from movement (including fall) of products • Noise from near by industrial establishments

Noise exposure reduction measures	<ul style="list-style-type: none"> • Selection of non noisy machinery, if available • Reduction in noise generation • Acoustic enclosures for noisy machinery • Use of noise absorption materials • Reduction in noise transmission • Type of hearing protection provided • Supply and maintenance of hearing protection • Designated hearing protection zones
Work organization	<ul style="list-style-type: none"> • Job rotation to reduce the duration of exposure to noise • Position of employee in relation to the noise source • Enforcement of the use of hearing protection • Quality, wording and positioning of signs
Training	<ul style="list-style-type: none"> • Emphasis on the training of employees about noise health effects • Presentation of results of performed noise survey • Frequency of training on how to use correctly the provided hearing protection equipment • Emphasis on the compulsory hearing protection activities

M0-EN.5.4 Key Elements for Avoiding or Reducing the Noise Risks

Measures	Means
Reduction of noise generation	<ul style="list-style-type: none"> • Redesign of noisy processes or activities • Choose quiet machines and equipment, by requiring from the suppliers to provide information on noise levels at operators' positions • Introduction of less noisy work methods or equipment • Maintenance of machines (e.g. replace badly fitting parts, secure loose parts, balance rotating parts, provide good lubrication) • Reduction of vibrating sources (surfaces of fluids) • Place vibrating machines on absorbing pads • Replace metal gears by plastic gears or belts • Use isolating, anti-vibration mountings • Separate vibrating surfaces from moving parts

	<ul style="list-style-type: none"> • Place absorbing gaskets around doors and lids • Choose centrifugal rather than propeller fans • Use large diameter, low speed fans • Use large diameter, low pressure ductwork • Streamlining ductwork to avoid turbulence • Use low-noise air nozzles or pneumatic ejectors
Reduction of noise transmission	<ul style="list-style-type: none"> • Place noisy machines in acoustic enclosures • Cover acoustic enclosures' surfaces with sound absorbent materials • Minimize the openings of the enclosures • Install absorbent gaskets around doors, windows, service inlets, etc • Avoid the contact of enclosure with vibrating parts • Use acoustic enclosures for the employees, such as control booth or noise refuge, when the noisy machines are large or there are several noise sources • Apply noise absorbent materials near to the sources, to avoid noise reflection from walls and ceilings of rooms • Position noisy exhaust of extraction systems away from the operators, if possible
Provision of hearing protection means	<ul style="list-style-type: none"> • Ear muffs, which completely cover the ear • Ear plugs, which completely cover the ear • Semi-inserts (called 'canal caps'), which cover the entrance to the ear canal

A good quality hearing protection mean reduces the level of noise by 20-25 dB.

When wearing **ear muffs** the operator need to be aware of some precautions such as:

- Earmuffs must cover the operator's ears totally
- Earmuffs must fit tightly with no gaps between the seal and operator's head.
- The headband must not be stretched
- The trap of hair, jewellery, glasses, hats etc under the seal must be avoided
- The seals and foam inside the earmuffs must be kept clean.
- If splits or cracks are found in the seals of the earmuffs another pair must be given

When using **ear plugs** precautions can be taken, such as:

- Earplugs must be inserted properly
- If the operator has ear trouble should ask for advice and instructions
- Disposable earplugs must only be used once

M0-EN.6 Fire Assessment

M0-EN.6.1 Organization of the risk assessment

If risk assessment has to be performed for large workplaces with multiplicity of activities and processes then the workplace could be separated into sections and an assessment to be performed for each section separately. This procedure could be also followed for the case of fire assessment, however it might be easier to assess fire protection for the premises as a whole, since the fire protection systems (fire detection, fire alarms, sprinklers, evacuation procedures) are usually designed for the entire workplace.

Working areas that should not be overlooked while performing a fire risk assessment include:

- Buildings outside the main building (e.g storage rooms, boiler houses)
- Basements, pits below equipment and confined spaces
- Upper walkways and platforms
- Roof areas where provision is made for maintenance access

For the best organization of the fire risk assessment is extremely helpful the assessor to have an updated layout plan of the premises, where the fire evacuation routes, the positions of detection alarms, the positions of the fire fighting equipment, etc. are marked. The documents prepared for the application for the acquisition of a Fire Certificate could also provide useful background information to be considered before the on-site inspection of the workplace.

M0-EN.6.2 Factors to be considered during the fire risk assessment

M0-EN.6.2.1 Means of Escape

Every fire escape route in the workplace must be assessed so that all the workers or visitors, who may be in the premises, have a safe access to Fire Exits once the alarm has been raised, before their means of escape are made unsafe by the fire. Among others, assess the width of the exit routes, and the availability of arrangements for people with disabilities. Emergency Doors must open in the direction of escape, not be locked or fastened; revolving or sliding doors must not be used for emergency exits. Emergency routes that require lighting must have emergency lighting.

M0-EN.6.2.2 Signalling

Proper signs must be placed to indicate the Fire Exits, the positions of the Fire Fighting Means, the Fire prevention requirements (e.g. no smoking, no hot work), the Alarm Warning System, and the Fire protection or Safety Doors.

Signs must have the appropriate size according to the optical view and distance, for example:



1. Move straight (showing exit direction)
2. Move straight and through Exit door (showing exit direction)
3. Move straight and upstairs (showing exit direction).

Lighting of the escaping and safety exit must be located:

- In the basements
- In large united office rooms
- When the level or the passage changes
- Outside of the final escaping exit- meeting points

Lighting devices of escaping exits and routes must have lighting all the time and in case of power cut off, to be able to light by a standby source (10 lux for 90 minutes).

M0-EN.6.2.3 Fire Detection and Warnings

Appropriate types of fire detectors must be used, in each workplace, to safeguard the safety of the employees and the premises in case of fire. In general, smoke alarms are the first choice, although heat detectors can be often used. The installation of fire detectors in less occupied areas is necessary (e.g. storage rooms, thinly populated work areas), since in those areas fires could develop undetected and spread through the premises. Alarms must be able to be heard above any noise likely to be present and in areas where people will be able to respond (e.g. heard in a central operating area to cover warehouses, stores etc). In large workplaces the conventional type of electrical fire alarm system should either incorporate a number of manually operated sounders, or a bell and battery (always kept charged). The manual alarms should be positioned so to be easily accessible by anyone in the premises. In cases that a dual alarm system is used (an alarm for the detection of fire, and a different alarm for the evacuation of the site) then the evacuation alarm is better to be accompanied by oral directions, especially for people not familiar with the premises.

M0-EN.6.2.4 Fire-fighting equipment

All workplaces should be equipped with means of fire fighting to be used by people in the premises. These means include:

- Portable fire extinguishers (see below)
- Fire blankets
- Hose reels (inside fire hose cabinets)
- Sprinkler system
- Other fixed fire fighting systems

The non-automatic equipment (e.g. manual extinguishers, hose reels) must be placed near exits, be easily accessible, simple to use and indicated by signs. The equipment must be regularly maintained and tested. Basic training should be provided for employees on the suitability of different portable extinguishers for different types of fire (see later in the section), and for some practical fire fighting techniques. However, fires should mainly be tackled, by trained fire fighters.

When deciding on the types of extinguisher to be provided, consider the nature of the materials likely to be found in the working area under consideration. The following table is indicative:

Type of Fire Extinguisher	Color Code	Suitability
 <p>Water</p>	<p>Red</p>	<p>Wood, Paper, Textiles, Fabric (ordinary combustibles) (Class A fires) Not for electrical or flammable liquid fires</p>
 <p>Foam</p>	<p>Cream</p>	<p>Flammable liquids, such as grease, gasoline, oil, Petrol, Diesel, etc (Class B fires) Also suitable for Wood, Paper, Textiles, Fabrics (Class A fires) Not for electrical fires</p>
 <p>Dry Powder</p>	<p>Blue</p>	<p>Flammable liquids (Class B fires) and electrically energized fires (Class C fires) Also suitable for Wood, Paper, Textiles, Fabrics (Class A fires)</p>
 <p>Carbon Dioxide (CO₂)</p>	<p>Black</p>	<p>Flammable liquids (Class B fires) and best for electrically energized fires (Class C fires) Not for paper fires</p>
<p>Class D Extinguishers</p>		<p>Designed for use on flammable metals (such as aluminium, magnesium, sodium potassium) and are often specific for the type of metal in question.</p>

Vaporizing Liquid	Green	Flammable liquids and electrically energized fires
Fire Blankets	-----	Flammable liquids in containers, such as deep fat fryers, cooking oils, chip pan (Class F Fire)

An extinguisher or a hose reel should be provided for approximately each 200 square metres of floor space, with a minimum of one per floor. If each floor has a hose reel, which is known to be in working order and of sufficient length for the floor it serves, there may be no need for water-type extinguishers to be provided. Fire extinguishers, if properly maintained and serviced, may be in service for at least 20 years.

Fire extinguishers should normally be located in noticeable positions on escape routes, preferably near exit doors or outside a specific hazard area. Wherever possible, fire-fighting equipment should be grouped to form fire points. These should be clearly visible or their location be clearly indicated so that fire points can be readily identified. Where workplaces are uniform in layout, extinguishers should normally be located at similar positions on each floor. If for any reason extinguishers are placed in positions hidden from direct view their location should be indicated by signs and, where appropriate, directional arrows.

Where practicable, fire extinguishers should be securely hung on wall brackets. Where this is impracticable, extinguishers should be placed on a suitable base plate (not on the floor). To assist in lifting, the carrying handle of larger, heavier extinguishers should be about 1 metre from the floor but smaller, lighter extinguishers may be mounted at a higher level.

Other fire fighting means include the automatic extinguishing materials used mainly for the property protection (HALON being forbidden since 1/1/2004 in all EU Member States), Chemical Gases, Inert gases, Aerosol, Sprinklers of water mist, CO₂, etc.

Periodic **inspection and testing** is required for any kind of fire safety system (detectors, sprinklers, alarms, etc). Reports of inspection, testing and maintenance must be kept at the workplace for review. The frequency of Inspection and Maintenance of passive and active fire protection and safety systems is given in the table below:

Systems	Frequency of inspections	Maintenance
Fire Detection and Warning System	Weekly	Three months
Safety lighting	Monthly	Six months
Autonomous lighting apparatus with batteries	Weekly	Do not apply

Fire extinguishers	Weekly	Yearly
Water hose	Weekly	Yearly
Sprinklers	Weekly	Six months
Fire safety doors	Weekly	Do not apply
Escaping exits, signalling and labels of action plans	Weekly	Do not apply
Fire safety and fire protection training	Six months	Do not apply

In every working place a Fire Protection and Fire Safety Team must be formed. The team is composed of a Leader/Head of Fire Safety, a Deputy Leader/Assistant Officer of Fire Safety and of Fire Safety Officers (according to the fire risk assessment and the size of workplace – minimum 2 persons). The training that the Fire Safety Team must undertake should include issues such as:

- The Theory of fire
- Fire prevention
- Actions in emergency situations
- Actions in case of a fire (how to contact the Fire Brigade)
- Actions in case the alarm activates
- How to activate the alarm system
- Evacuation of the building from visitors and people with special capabilities
- Location and type of fire fighting means
- How to use the appropriate fire extinguisher
- Escaping exits and assembly area
- Actions followed according to the fire risk assessment of the workplace

M0-EN.6.2.5 Evacuation Procedures

A fire evacuation procedure should be established and communicated effectively to employees. This procedure should include at least the following issues:

- Action on finding a fire
- Reaction to the fire alarm
- Description of the designated assembly points

Regular fire evacuation drills are an essential part of ensuring that the evacuation procedure will be effective when is really needed. Drill frequencies are usually specified in the Fire Certificates, otherwise they should be held at intervals of from 3 to 12 months, depending on the level of fire risk. Records should be maintained of the dates of the drills, the time taken to account for the safe evacuation of the premises and any other relevant details.

M0-EN.6.3 Key Elements for Fire Prevention

Fire prevention can be achieved through several ways, such as:

- Reduction of ignition sources (e.g. replacement of naked flame and radiant heaters with central heating systems, having strict no smoking areas, electrostatic dischargers)
- Reduction of quantity of dangerous, flammable substances to a minimum
- Storage of flammable substances and materials at low temperatures
- Prevention in the formation of explosive atmospheres (including appropriate ventilation)
- Decrease of the quantity of easily accessible potential fuel
- Reduction of sources of oxygen
- Segregation of incompatible dangerous, easily ignited substances

M0-EN.7 Manual Handling Assessment

Manual handling includes a broad variety of tasks such as lifting, lowering, pushing, pulling and carrying. If any of these tasks are not carried out safely then there is a risk of injury. More than a third of all reported injuries, which result in someone being off work for more than 3 days are caused by manual handling. Through the early reporting of symptoms, proper treatment and suitable return to work plans, most people recover from their injuries and return to their employment. However, for a number of persons, an injury may cause them to take long periods off work and perhaps even leave work permanently.

M0-EN.7.1 Legal Framework

According to the **Council Directive 90/269/EEC** of 29 May 1990 on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers (fourth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC), 'manual handling of loads' means any transporting or supporting of a load, by one or more workers, including lifting, putting down, pushing, pulling, carrying or moving of a load, which, by reason of its characteristics or of unfavourable ergonomic conditions, involves a risk particularly of back injury to workers.

According to the Article 3 of the Directive:

- The employer shall take appropriate organizational measures, or shall use the appropriate means, in particular mechanical equipment, in order to avoid the need for the manual handling of loads by workers.
- Where the need for the manual handling of loads by workers cannot be avoided, the employer shall take the appropriate organizational measures, use the appropriate means or provide workers with such means in order to reduce the risk involved in the manual handling of such loads, having regard to different factors (see section M0-EN.7.3).

Article 4 of the Directive refers to the organization of workstations. Wherever the need for manual handling of loads by workers cannot be avoided, the employer shall organize workstations in such a way as to make such handling as safe and healthy as possible and:

- assess, in advance if possible, the health and safety conditions of the type of work involved, and in particular examine the characteristics of loads, taking into account the different factors (see section M0-EN.7.3);
- take care to avoid or reduce the risk particularly of back injury to workers, by taking appropriate measures, considering in particular the characteristics of the working environment and the requirements of the activity, taking account the different factors (see section M0-EN.7.3).

M0-EN.7.2 Organization and Realization of the Risk Assessment

The assessment can be carried out either by one individual or by teams in more complicated cases, especially when the assessment of the design of equipment or of

the layout has to be included. In all cases, the assessor/s need to have at least a good knowledge of:

- The nature of the handling operations
- A basic understanding of human capabilities
- The high risk activities in the workplace under assessment
- Practical means of reducing risk

For large workplaces with a variety of activities the assessment needs to be carried out on the basis of sections, job titles, processes, services provided or work stations. The information that the assessor/s need to collect prior to the on-site visit include:

- Past accident investigation reports (for accidents related to manual handling)
- Ill health records
- Operating procedures, safety handbooks that make a reference to manual handling activities and precautions

As in all cases of risk assessment sufficient time has to be spent on site, to look at the manual handling activities that take place. Issues that need to be noticed include:

- The handling techniques adopted by the employees
- The level and manner of use of handling aids and their effectiveness
- The physical conditions of the workplace (e.g. flooring, housekeeping, lighting, width of corridors)

During the discussions with the workforce itself, the assessor would need to acquire information concerning:

- The level of training of the employees on handling techniques
- The availability of assistance when needed
- The procedures being followed when the handling equipment or handling aids break down or are unavailable
- The extend of manual handling in the employees' working tasks

Furthermore, the assessor needs to get information on any possible working variations between the different working shifts, on seasonal variations or day-to-day variations

M0-EN.7.3 Factors to be considered during the manual handling risk assessment

It is impractical to say if one particular load is safe to lift or to set general weight limits for manual handling. Risk of an injury might be affected by several factors such as indicated in the following table.

Factors	The main issues to be taken into account
Nature of the Load	<ul style="list-style-type: none"> • Weight, size, shape, rigidity of the load • Bulk of the load (including the effects of wind on large loads, the possibility of loads hitting obstructions, or loads with offset centers of gravity) • Grip positions (inefficient grip positions could lead to loss of control of the load)

	<ul style="list-style-type: none"> • Instability of the load • Sharp edges, rough surfaces, hot or cold surfaces
Working Environment	<ul style="list-style-type: none"> • Space constraints (e.g. restricted headroom, low work surfaces) may result in unsatisfactory postures • Uneven, slippery or unstable floors • Moving workplaces (e.g. boats, trains, elevating work platforms) introduce unpredictability in footing • Flooring (e.g. steep slopes, steps, ladders), slipperiness of the flooring, Change of level of work surfaces • Temperature and/or humidity extremes • Inadequate ventilation or gusts of winds • Poor lighting
Individual Capability	<ul style="list-style-type: none"> • Gender • Age • Experience • Pregnancy • Disability • Previous injury or ill-health • Clothing, footwear
Task Related Factors	<ul style="list-style-type: none"> • Holding or manipulating loads at a distance from the trunk • Incorrect body movement or posture • Excessive lifting of loads • Excessive pushing or pulling
Work Organization	<ul style="list-style-type: none"> • Frequent or prolonged physical effort • Rate of work imposed by a process • Opportunities for rest and recovery
Training	<ul style="list-style-type: none"> • Type and frequency of training on good handling techniques (see below)

M0-EN.7.4 Good Handling Techniques for Safe Manual Handling

M0-EN.7.4.1 Safe Lifting

A good handling technique with a lifting operation as an example is given below. The advices are practical and suitable for use in training the employees on safe manual handling.



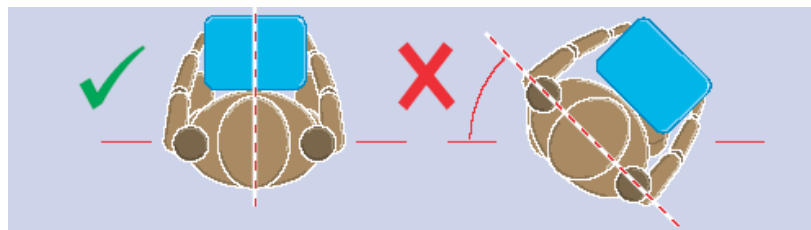
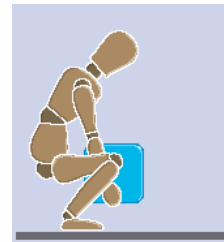
- **Workers must think before the lifting/handling.** It is good to plan the lift. Can they use handling aids? Where is the load going to be placed? Will they need help with the load? Any kind of obstructions such as discarded wrapping materials must be moved. For a long lift, they must consider resting the load midway on a table or bench to change grip.

- **The load must be kept close to their waist.** The load must be close to the body for as long as possible while lifting. The heaviest side of the load must be kept next to the body. If a close approach to the load is not possible, they should try to slide it towards the body before attempting to lift it.

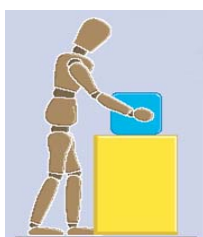
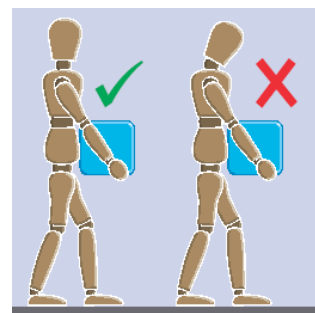


- **A stable position should be adopted.** Their feet should be apart with one leg slightly forward to maintain balance (alongside the load, if it is on the ground). The worker should be prepared to move their feet during the lift to maintain their stability. Tight clothing or unsuitable footwear is good to be avoided, because they might make this task difficult.

- **The worker must get a good hold.** Where possible the load should be hugged as close as possible to the body. This may be better than gripping it tightly with hands only.
- **A good start is made with a good posture.** At the start of the lift, slight bending of the back, hips and knees is preferable to fully flexing the back (stooping) or fully flexing the hips and knees (squatting).
- **They must never flex the back any further while lifting.** This can happen if the legs begin to straighten before starting to raise the load.
- **It is better to avoid twisting their back or leaning sideways,** especially while the back is bent. Shoulders should be kept level and facing in the same direction as the hips. Turning by moving the feet is better than twisting and lifting at the same time.



- **The head must be kept up when handling.** The worker must look ahead, not down at the load, once it has been held securely.
- **Worker must move smoothly.** The load should not be jerked or snatched as this can make it harder to keep control and can increase the risk of injury.



- **Put down, and then adjust.** If precise positioning of the load is necessary, put it down first, and then slide it into the desired position.

- **It is important for workers to remember that they don't have to lift or handle more than they can easily manage.** There is a difference between what people can lift and what they can safely lift. If in doubt, they must always seek advice or get help.

M0-EN.7.4.2 Safe Pushing and Pulling

In general, pushing is safer over pulling, provided that the operator can see over the load and control steering and stopping. The workers should always use handling devices

- **Handling devices.** Aids such as barrows and trolleys should have handle heights that are between the shoulder and waist. Devices should be well-maintained with wheels that run smoothly. When purchasing new trolleys etc, they must be of good quality with large diameter wheels, made of suitable material and with castors, bearings etc which will last with minimum maintenance. The force that needs to be applied to move a load over a flat, level surface using a well maintained handling aid is at least 2% of the load weight. For example, if the load mass is 400 kg, then the force needed to move the load is 80 N. The force required is much larger if, for example, the wheels of the handling aid are not in the right position or the device is poorly maintained.
- **Slopes.** Employees should ask for help from another worker whenever necessary if they have to move a load over a slope or ramp, as pushing and pulling forces can be very high.
- **Uneven surfaces.** Moving an object over soft or uneven surfaces requires higher forces. On an uneven surface, the force needed to start the load moving could increase to 10% of the load weight, although this might be offset to some extent by using larger wheels. Soft ground may be even worse.
- **Stance and pace.** To make it easier to push or pull, employees should keep their feet well away from the load and go no faster than walking speed. This will stop them becoming too tired too quickly.

M0-EN.7.5 Key Elements for Avoiding or Reducing the Risks

Measures	Means
Elimination of manual handling	<ul style="list-style-type: none"> • Redesign of processes or activities • Use of transport where possible
Automation or mechanization	<ul style="list-style-type: none"> • Use of mechanical handling solutions such as: mechanical lifting devices, manually operated lifting devices, powered conveyors, trolleys and trucks, lifting tools
Load-related measures	<ul style="list-style-type: none"> • Reduction of the load's size or weight • Making the load easier to grasp • Increase of the load's stability

Task-related measures	<ul style="list-style-type: none">• Reduction of lifting and carrying by pushing, pulling, sliding or rolling techniques• Avoid the need for handling in seated positions• Allow loads to be held close to the body• Use leg muscles rather than arms or shoulders• Limit the frequency of lifting• Provide rest breaks• Introduce job rotation within work teams
Work environment related measures	<ul style="list-style-type: none">• Provision of clear handling space• Provision of even and firm floors• Reduction of sharp changes on work levels• Provision of appropriate lighting• Provision of adequate thermal environment and ventilation

M0-EN.8 Assessment of Stress at Work

Job stress can be defined as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the employee and/or from the interaction of the employee and the conditions of work. Job stress can lead to poor health and even injury. Sustained work-related stress is an important determinant of depressive disorders, the fourth biggest cause of the global disease burden. Stress can potentially affect any workplace and any employee, independently of the company's size, field of activity, or form of employment. Tackling stress can lead to greater efficiency and improved occupational health and safety, with consequent economic and social benefits for all stakeholders.

M0-EN.8.1 Legal Framework

Although the Framework Directive (FWD) 89/391/EEC and its individual Directives do not mention explicitly the word “stress at work”, the content of several directives clearly reveals the intention of the EU legislator to cover all aspects of the health and safety of workers, such as their physical, mental and/or social well-being. More specifically:

The “VDU Directive” (Fifth individual Directive of the FWD), in Article 3(1) on the “analysis of workstations states that: *“Employers shall be obliged to perform an analysis of workstations in order to evaluate the safety and health conditions to which they give rise for their workers, particularly as regards possible risks to eyesight, physical problems and problems of mental stress”*.

The “Maternity Directive” (Tenth individual Directive of the FWD), in Article 3(2) the Commission should establish guidelines on the assessment of certain agents and processes considered hazardous for the safety or health of workers. These guidelines should *“also cover movements and postures, mental and physical fatigue and other types of physical and mental stress connected with the work done”*.

The “Working Time Directive” (93/104/EC) touches upon many aspects of the organization of working time which might trigger stress if not properly implemented and applied, however, an explicit reference to stress is to be found in the article 8 on “length of night work”, which states that: *“Member States shall take the measures necessary to ensure that ...night workers whose work involves special hazards of heavy physical or mental strain do not work more than 8 hours in any period of 24 hours during which they perform night work.”*

Furthermore, in recognition of the broad economic and social added value of tackling work-related stress, the European social partners (ETUC, UNICE/UEAPME and CEEP) have signed a framework agreement (on 8/10/2004) aiming to the provision to employers and workers with an agreed framework to identify and prevent or manage problems of work-related stress.

M0-EN.8.2 Organization of the risk assessment

Work related stress (WRS) is preventable and actions towards its reduction can be very cost-effective. Risk assessment for WRS involves the same basic principles, steps and process as for all other workplace hazards (see Chapter M0-EN.4). Participation of the workers and/or their representatives is crucial to the success of the

process. The assessor should identify the causes of stress, the groups of workers mostly affected, and to provide concrete suggestions for the elimination of the hazard.

Symptoms that should be considered as indicators that WRS might be a problem in an organization are the following, according to the European Agency for Safety and Health at Work (Fact Sheet No. 22):

Organization	Individual
Participation: Absenteeism, high staff turnover, poor time-keeping, disciplinary problems, bullying, aggressive communication, isolation	Behavior: Tobacco, alcohol or drug abuse, violence, bullying or harassment
Performance: Reduced output or quality of product or service, accidents, poor-decision making, errors	Psychological: Sleep problems, anxiety disorders, depression, inability to concentrate, irritability, family relationship problems, burnout
Costs: Increased costs from compensation or increased health care costs, referrals to health services	Health: Back problems, heart problems, peptic ulcers, hypertension, depressed immune system

Prior to the initiation of the risk assessment the assessor should take into account the above mentioned indicators and review the appropriate company's records. Additional information that needs to be gathered, include:

- Existing policies with respect to hierarchy, promotions, contracts, assignment of roles and responsibilities within the company
- Existing policies related to resolution of conflicts
- Work schedules
- How organizational changes are managed and communicated to employees
- Cases related to violence, harassment and bullying
- Recorded absences (causes and frequency)
- Training being provided to employees to acquire adequate skills and knowledge for the performance of their tasks
- Available means for the employees to report work related problems

Information should also be gathered from the employees through the distribution of appropriate questionnaires, in order to identify problems at an early stage keeping in mind the need for confidentiality.

M0-EN.8.3 Factors to be considered during assessment of the work-related stress

Factor	Main issues to be considered
Work content and work	• Clarity of employee's role and responsibilities

organization	<ul style="list-style-type: none"> • Existence of role conflict • Diversification and interest of work • Development of knowledge, skills, and capabilities • Degree of initiatives • Technical and intellectual abilities required • Opportunities provided for adaptation of working methods, rate and product's improvement • Distribution of work (pauses, rotations, vacations, absent workers, temporary workers) • Repetition of tasks and actions
Evaluation system of the work and the worker	<ul style="list-style-type: none"> • Level of control and planning of individual work by the staff • Existence of a systematic self-evaluation system • Participation of the staff into the evaluation process
Relationships	<ul style="list-style-type: none"> • Culture and social climate (cooperation, understanding, mutual respect) • Management of conflicts - Support in solving problems (hierarchy, colleagues) • Level of communication with colleagues, management, peripheral departments • Quality of communication (freedom to communicate on any subject during work, available communication systems (telephone, e-mail, etc.)) • Availability of social premises and facilities (e.g. cafeteria, lunch lodge)
Time Management	<ul style="list-style-type: none"> • Overload and sub-activity • Schedules (extra time, holidays, rest) • Illness and absences (existing policy) • Night work • Atypical working hours
Professional incertitude	<ul style="list-style-type: none"> • Professional development and perspectives for the future • Promotion opportunities • Contract and salary

Respect of personal integrity	<ul style="list-style-type: none"> • Harassment (sexual and moral) • Violence (physical and psychological) • Intolerance (racism, religious) • Mobbing, isolation, differentiated treatment
General working environment	<ul style="list-style-type: none"> • Tools, equipment, working stations and working surfaces • Lighting and ventilation • Noise and vibrations • Manual handling of loads • Exposure to chemicals and biological hazards • High or low temperature and humidity
Relations between professional and private life	
Training and support	<ul style="list-style-type: none"> • Provision of training to new comers and sub contractors • Provision of training to staff whose jobs have changed • Provision of social support, feedback and encouragement

M0-EN.8.4 Key Elements for Avoiding or Reducing the Work-related Stress Risks

Measures	Means
Management and communication measures	<ul style="list-style-type: none"> • Clarity of company's objectives • Clarity of individual roles and tasks • Clarity of staff related processes • Provision of adequate management support for individual and teams • Matching responsibility and control over work • Improvement of work organization, processes, working conditions and environment • Performance of risk assessment
Work organization	<ul style="list-style-type: none"> • Adaptation of work to the individual • Avoidance of repetitive and monotonous work • Adoption working schedule to individual needs, when possible

Training and support	<ul style="list-style-type: none">• Training of managers and workers to raise awareness and understanding of stress, its possible causes and how to deal with it• Provision of valuable information and consultation to workers and their representatives in accordance with EU and national legislation, collective agreements and practices, in due time
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