

We care

Occupational Safety and Health Management Manual

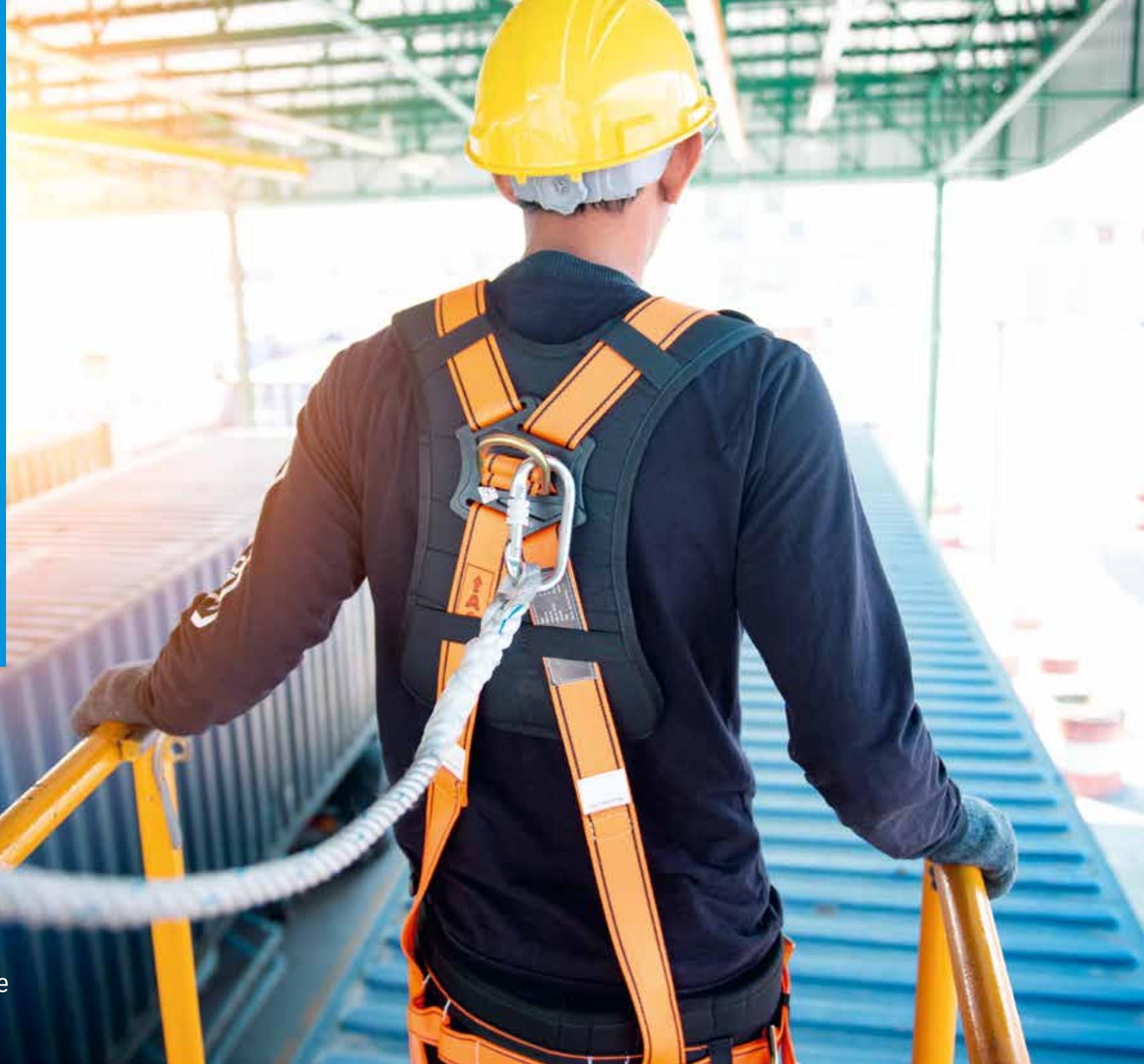
Issue 2020



thyssenkrupp



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because we care



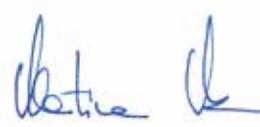
Zero compromise
on safety and health.
This is our value.
Because we care.



Foreword

Those working at thyssenkrupp should be safe and stay healthy. No matter where, no matter when; period. We do not intend to compromise when it comes to occupational safety and health. This is an outstanding value for us, an integral part of our corporate culture. That is why we strive to create working conditions that bring life to our aspirations. We work every single day to ensure that our activities are safe and that they do not affect our well-being, neither physically nor mentally. To this end, we shall identify weak points in occupational safety and health hazards; thus, consistently eliminating unsafe conditions and actions. We shall systematically discuss how we can improve the situation; moreover, we need to implement ideas quickly, and monitor their impact and effects.

This management manual "Occupational Safety and Health" is a guide to how occupational safety and health management is systematically implemented in our daily processes according to the "Plan – Do – Check – Act" approach. In doing so, we shall observe and strictly adhere to legal regulations and rules. The same applies to the Group-wide minimum requirements contained in this manual. They ensure an appropriate level of safety and health – worldwide. Please use this assistance.


Martina Merz
Chairwoman of the Executive Board
and Chief Executive Officer (CEO)


Oliver Burkhard
Member of the Executive Board and
Chief Human Resources Officer (CHRO)

Yet beyond rules and processes, an attentive and progressive safety and health culture can only develop within thyssenkrupp if you as a manager uncompromisingly support our goals and make them tangible in the daily work of your teams. Be a responsible role model, communicate clearly and unambiguously, be mindful in the workplace. Only if you show that you care, will your teams do the same.

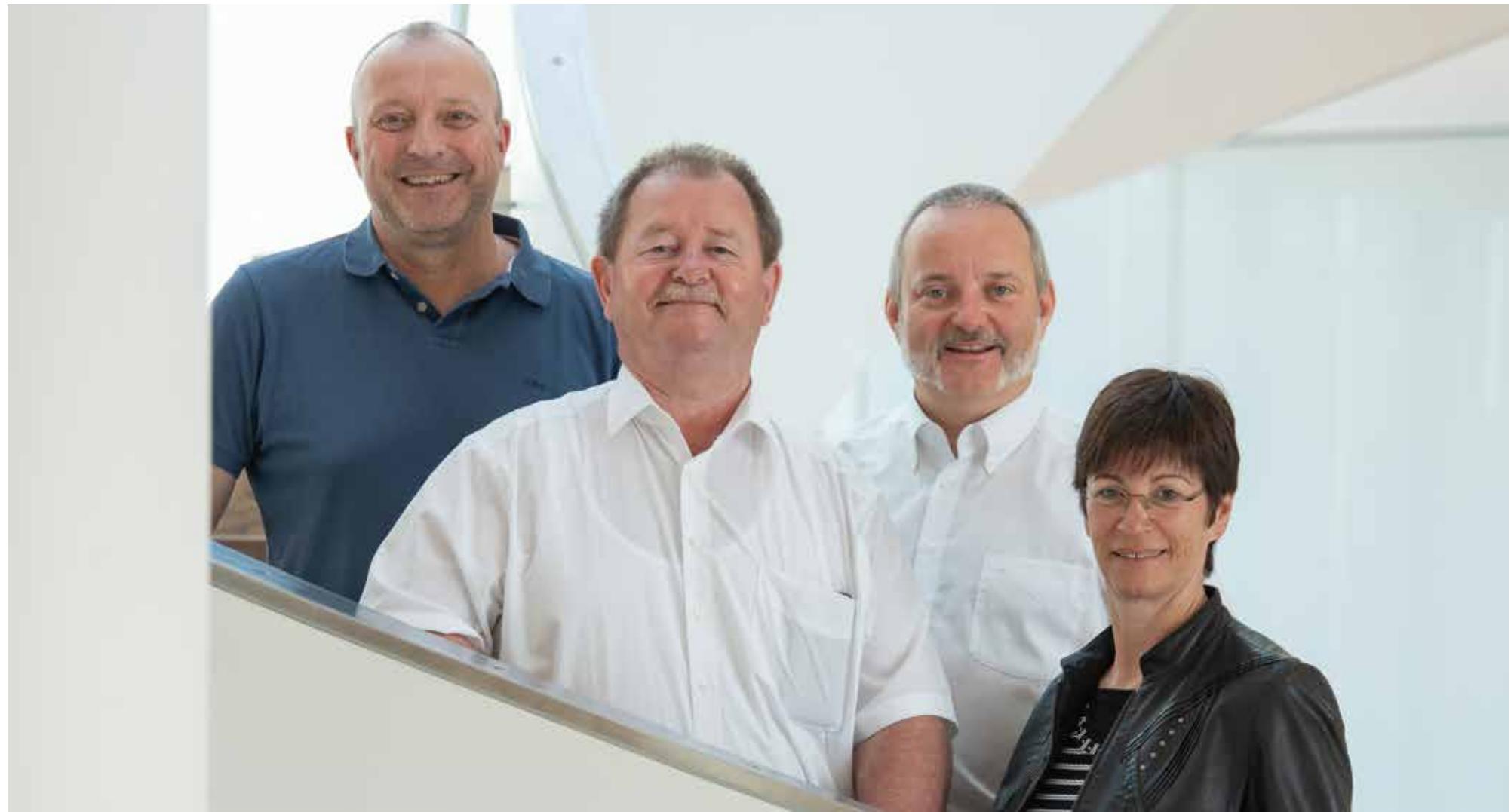
Safety and health are values in themselves. But it is good to know, from personal experience, that safety and health management go hand in hand with economic success. Consequently, we have a common commitment – and a recipe for success: There are to be no compromises in occupational safety and health. That is our value. Because we care.

Essen, November 2019

thyssenkrupp AG


Johannes Dietsch


Dr. Klaus Keysberg
Member of the Executive Board and
Chief Operating Officer Materials (COOM)



Statement

The health of each and every person is of paramount importance and shall be protected – in particular in daily working life. That is why we – as employee representatives – are delighted that the new corporate policy makes occupational safety and health a top priority at thyssenkrupp.

Only together with all employees, their representatives, supervisors, management, and boards will we succeed in developing our safety and health culture into an integrated management system.

Only together will we be able to ensure that all employees can return home from work safe and sound every day.

Only together will we be able to move closer to our goal of "Zero Accidents" at all our companies around the world.

This manual is a step in the right direction on the path to an accident-free and healthy Group. We understand the complexity of this task. That is why it is all the more important that we all pull together.

We – the Group Works Council and European Works Council – have actively supported the preparation of this manual. We encourage you to draw attention to occupational safety and health management issues. In the spirit of an open culture, please approach employee representatives and executives so we can work on improvements together.

Essen, November 2019

thyssenkrupp AG

On behalf of the
Group Works Council



Dirk Sievers



Susanne Herberger

On behalf of the
European Works Council



Fritz Weber



Wolfgang Krause

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General remarks



thyssenkrupp



We at thyssenkrupp give top priority to safety and health at work.

Everyone should be able to perform their work well and return home safe and sound, irrespective of whether they are a board member, manager, other executive or supervisor, specialist, or employed in another function. We therefore jointly pursue a forward-looking safety and health culture.

Health in this context is not merely the absence of disease – it is a state of physical, mental, and social well-being. Occupational safety and health management at thyssenkrupp therefore adopts a comprehensive approach that comprises three areas:

Leadership behavior and social interaction:

Measures and programs for executives and supervisors, specialists, and employees to strengthen our occupational safety and health culture and (role model) behavior in line with the values set out in the mission statement.

Safety and health at work:

Ensuring an appropriate occupational safety and health management system on the basis of internal minimum standards, statutory requirements, and requirements from the *context* of the company (see chapter 1 “*Context of the company*”).

Personal health:

Personal advice, work-related medical advice and support, screening programs to detect health risks at an early stage, and offers to promote good personal safety and health behavior.

Against this background, we consider thyssenkrupp's occupational safety and health management system a continual improvement process aimed at

- avoiding accidents by preventive measures,
- avoiding work-related illnesses due to physical and psychological stresses caused by work,
- ensuring safe workflows and trouble-free operations,
- establishing working and organizational conditions, leadership behavior, and social interaction that promote good health,
- building awareness, motivation, and abilities to promote individual health,
- enabling the inclusion of employees with restricted capabilities as much as possible at thyssenkrupp.

This improvement process can only be successful when it is supported by all functional levels within the company. Each company included within the scope of this manual shall therefore give its stakeholders the opportunity to participate actively. This applies in particular to employees without management functions and/or their representatives. A distinction is made between consultation (consultation before decisions are taken) and participation (involvement in decision-making). Appendix A 0 “Consultation and participation of employees” gives an overview of the issues requiring consultation or participation.

0.1 Scope of this manual

This manual supplements, as an Operating Instruction, the Group Regulation Occupational Safety and Health and contributes to:

- Creating a consistent Group-wide understanding of occupational safety and health management

- Defining responsibilities, duties, and minimum standards in occupational safety and health management (to supplement the existing *statutory regulations*)
- Creating an appropriate organizational body for occupational safety and health management

0.2 Addressees and scope

This Group Operating Instruction applies to all companies, employees, managers, and Executive Board members of the thyssenkrupp Group, the regulation-relevant shareholdings, and third parties included in section 2 of the Group Regulation “Document Architecture”.

0.3 Relationship to national law

Mandatory *statutory regulations* take precedence over this manual. If stricter statutory rules and regulations exist in individual cases, they shall be observed (see chapter 4 “Compliance with *statutory regulations* and other requirements”). As far as the thyssenkrupp locations in the USA are concerned, the manual explicitly serves the purpose of information and consulting only.

0.4 Period of validity

This manual shall apply indefinitely from January 1, 2020.

Context of the company

“A prerequisite for any successful design of the occupational safety and health management is to know, and take into account, the relevant influencing factors, requirements, and expectations.”

- Relevant external and internal topics identified?
- Requirements and expectations of relevant interested parties determined?
- Scope of occupational safety and health management defined?

No company can act completely independently. Cultural, political, economic, social, and other conditions provide a basic framework for all activities.

The requirements and expectations of employees, investors, customers, and many other parties further limit this framework for any activities. Internal topics such as corporate values, goals, and strategies, organizational structures, decision-making and information processes, tc., also have an important role to play. The occupational safety and health management of a company shall take these factors into account and adapt to them. A prerequisite for any successful design of the occupational safety and health management is to know, and take into account, the relevant influencing factors, requirements, and expectations.

Definition of terms

The *context of the company* refers to the totality of all key issues that have a positive or negative impact on how a company develops, implements its safety and health management, and achieves its desired outcomes. The needs and expectations of interested parties shall also be taken into account.

Measures

Each company included within the scope of this manual shall identify the relevant external and internal factors, as well as the needs and expectations of employees, and any other interested parties. This can be done in the form of a table (see Appendix 1 "Context analysis"). Relevant are the factors, needs, and expectations that relate to safety and health in the company. The scope and extent of the safety and health management system shall be defined and documented by taking into account the *context* and the activities carried out or planned. The scope of application shall be described in both factual and spatial/local terms. In principle, the safety and health management system is to be applied throughout the complete company and not only limited to individual operating units.

The *context analysis* shall be reviewed at regular intervals to ensure that it is up to date and revised whenever necessary. The results are to be incorporated into the definition of objectives and measures (see chapter 5 "Objectives and measures") and into the management review (see chapter 16 "Management review").

2

Occupational Safety and Health Policy

- Group policy and explanatory statement (where available) made known in the company?
- Accessible to interested third parties?

In the Occupational Safety and Health Policy the management of a company states its principles with regard to safety and health at work.

The Executive Board of thyssenkrupp AG, together with the Group Works Council, first published its Occupational Safety and Health Policy in 2002, which have been further developed into today's Occupational Safety and Health Policy. The policy puts the focus on the people to and for whom it applies and calls on all employees to take on responsibility for each other in the spirit of a forward-looking safety and health culture. It thus clearly sets the Group's occupational safety and health vision: "Zero compromise on safety and health. This is our value. Because we care."

"Politics puts people at the center and calls on all employees to take responsibility for each other in the sense of a progressive safety and health culture."

The thyssenkrupp Occupational Safety and Health Policy is the framework for occupational safety and health management in the Group, and thus provides the orientation for its operational implementation in the Group units.

Measures

The thyssenkrupp Occupational Safety and Health Policy shall be communicated to employees and interested third parties. Where deemed necessary, it can be supplemented with an explanatory statement on the part of the respective Group unit. This explanation shall make reference to the Group's Occupational Safety and Health Policy and be undersigned by the respective legal entity board or manager as appropriate. It shall be reviewed at regular intervals to ensure that it is up to date and revised whenever necessary.

References

Appendix 2 "thyssenkrupp Occupational Safety and Health Policy" (available at: www.thyssenkrupp.com)

Plan



Workplace risk assessment



Risk assessment is the central element of operative implementation of occupational safety and health management.

It is the basis of effective planning and hence an indispensable prerequisite for continual improvement. This applies for the reduction of accident and health-related risks just as it does for *health promotion*. It is only possible for effective preventative measures to be defined and implemented on the basis of a thorough assessment of the risks and the resources available for countering them.

Put another way: Without a risk assessment, accident and health risks can be overlooked or miscalculated. This may lead to lost *opportunities*, which could have led to improved working conditions – and also safety and health management in general. A systematic approach therefore contributes decisively to preventing occupational injuries and illnesses and promoting the personal health, abilities, and motivation of everyone involved.

For each company included within the scope of this manual, risk assessments shall therefore be conducted as set out in the following sections.

Definition of terms

Opportunities are chances to improve safety and health at work.

A *procedure* is a defined way of carrying out an activity or process. This includes determining: Who – does what – with whom – how/with?

- Risk assessment procedure defined?
- Risk assessment conducted and documented?
- All workplaces included?
- Regular check and update ensured?

3.1 Implementation

Depending on the type of operational situation and the activities performed, risk assessments may relate to:

- The work area
- A specific machine or system
- A specific activity
- A certain person or specific groups of people (e.g., adolescents, pregnant and breastfeeding women, individuals with disabilities)

Potential risks are determined and assessed taking into account so-called hazard and stress factors. Appendix 3.1 a contains an overview of all conceivable hazard and stress factors relevant for safety and health at work.

The risks of an accident shall be assessed on the basis of a risk matrix, for example, as depicted in Appendix 3.1 b. Opportunities should be assessed in terms of their potential to improve safety and health at work (e.g., high/medium/low).

Risk assessments shall be performed for all jobs as a matter of principle. The risk assessment shall take into account all individuals who could gain access to the areas with risks. It is also necessary to consider hazards arising from third parties (e.g., neighboring companies) over which the organization has no control. The risk assessment shall be checked at regular intervals to see if they are up to date and, if necessary, adapted.

A check shall be made primarily:

- In the course of procuring new tools, devices, machines, or equipment, raw or auxiliary materials
- When new work processes are introduced or existing ones are substantially modified
- When significant changes are made to the operational organization or the relevant processes
- In the course of the introduction of new products and services
- When changes are made to the personnel structure or deployment of personnel with other individual prerequisites than originally provided for
- In the event of outage or decommissioning of relevant operational facilities
- On certain grounds that suggest a check, for example in the case of *incidents*

The relevant company parties shall review the consequences of the changes and any need to adjust the risk assessment.

3.2 Process steps

Practical implementation of a safety and health risk assessment normally encompasses the following process steps:

- Definition of the organizational structure, work areas, and activities

- Identification of hazards
- Assessment of risks and *opportunities*
- Definition of measures
- Execution/implementation of the measures
- Check of the effectiveness of the measures
- Regular check and update of the risk assessment

When defining measures, attention shall be paid to the hierarchy of controls. The primary objective is the complete elimination of hazards, or by minimizing, at source, the use of dangerous processes, working equipment, and/or working materials. When this is not possible, technical and organizational safety measures have priority over administrative safety measures (e.g., trainings) or *personal protective equipment*.

The system used for identifying and assessing risks, defining measures, performing effectiveness checks and regular *inspections* is also to be used for *health promotion* measures. With this, the characteristic fields are differentiated, which include nutrition, exercise, stress management, and addiction prevention.

The definition of measures always includes information on the respective deadlines, resources, and responsibilities (see chapter 5 "Objectives and measures").

"When defining measures, attention shall be paid to the hierarchy of controls."

3.3 Documentation

The results of the safety and health risk assessment shall be documented. The documentation encompasses at least the identified hazards, the assessment of the risks and *opportunities*, and the measures derived from the assessment, and the control of their effectiveness.

The relevant supervisors are responsible for conducting and documenting the risk assessment. The employees participate. Safety and health specialists, company physicians, and other specialists will give support as part of their consultancy assignment.

3.4 Brief risk assessment before starting work

In addition to the above, each and every employee should be encouraged and obliged to briefly assess the possible risks involved in the work ahead. This brief assessment supplements the formal risk assessment and serves the purpose of preventing accidents and damage to health resulting from thoughtless action.

Employees shall consciously take the necessary protective measures and, where applicable, consult and coordinate with other personnel involved. At thyssenkrupp the we check card was developed for this purpose, with seven simple questions as guide to this end.



We check
together for more safety

Whatever you do – do this first.
Before each task answer these questions:

- What are you planning to do?
- What am I doing, what are the others doing?
- What is different today or unusual?
- What can go wrong?
- What can I do to prevent it going wrong?
- What can the others do?
- Who can I ask if there are difficulties?

Everything complete? Let's go!

 osh
because we care



Compliance with statutory regulations and other requirements

One important responsibility of the legal entity boards or managers is to manage the companies within the bounds of the law.

A company can only be managed within the bounds of the law if all the relevant *statutory regulations* are known. This applies just as much to occupational safety and health management as to all other specialist disciplines. However, there are many other requirements that can be important for the company. Those responsible shall be aware of these.

- Procedure defined to identify all relevant statutory regulations and other requirements?
- Relevant regulations and requirements made known in the company?



Definition of terms

Statutory regulations refer to the requirements that arise from laws and ordinances and from the subordinated legal norms. Official orders, permits, or court rulings also play a part.

Furthermore, requirements can also arise from the company's own principles, policies, and rules (e.g., from this manual) as well as from contracts and technical standards.

Measures

In the first step, the companies included within the scope of this manual shall identify the relevant *statutory regulations* and other requirements for each location. As regards the legal regulations, this can take place via the compilation of a legal register. The second step is to determine the need for action. The need for action shall be taken into account when defining the objectives and measures (see chapter 5 "Objectives and measures").

The *statutory regulations* and requirements thus identified shall then be appropriately documented and made known to all relevant persons.

In order to guarantee that these are up to date, it is essential that the company is informed about amendments. If changes are made in the operative organization or the processes, a check shall be made as to whether further requirements have arisen.

Compliance with the relevant *statutory regulations* and other requirements shall be assessed at regular intervals. This can take place by means of a so-called *compliance audit*.

The results of the assessment shall be documented.

"Regulations and requirements shall be made known to all relevant persons."

Objectives and measures

The regular setting of objectives and measures with the respective deadlines, resources, and responsibilities is imperative for continual improvement of occupational safety and health management.

Besides this, *indicators* (leading and lagging *indicators*; see chapter 12 “Effectiveness monitoring”) are named, on the basis of which the implementation of said measures can be tracked. Systematic planning contributes towards the purposeful use of resources and an ongoing increase in the effectiveness of occupational safety and health management.

As part of regular planning, each company included within the scope of this manual shall, in addition to the specific objectives of the company, also incorporate the superordinated objectives of the Group. Particular account shall be taken of the objectives for which Group-wide OSH Key Performance Indicators (OSH KPIs) have been formulated.



- Procedure defined for the regular planning and tracking of objectives and measures?
- Objectives defined and formulated in accordance with the SMART principle?
- Action plans, resources, and indicators defined?
- Responsibilities, timeframes and degree of implementation included?
- Objectives and programs measures made known in the company?
- Tracking indicators used?

Definition of terms

An *action plan* contains the combination of all individual measures planned for achieving a certain objective.

An *indicator* is a measurement parameter that enables a qualitative and/or quantitative evaluation of the implementation of a measure and the extent to which the objective thereof has been achieved.

Measures

As part of planning, the occupational safety and health objectives for the planning period are defined in increasing detail across the organizational levels of the Group (Corporate, Business Area, Business Unit, etc.) and *action plans* for their realization prepared. The recommended planning period is the fiscal year. The strategy shall comply with the principles named in the Occupational Safety and Health Policy and allow for it to be checked for continual improvement of occupational safety and health management. The companies included within the scope of this manual shall implement the

measures resulting from the planning and supplement them with company-specific measures where necessary and appropriate.

The following process steps are to be followed:

1. Identification of the need for action

Before objectives can be set, it is first necessary to determine the areas in which there is a need for action. Indications in this respect are provided by the analysis of the *context* of the company (see chapter 1 “*Context of the company*”, and Appendix 1 “*Context analysis*”), and the evaluation of the checking and monitoring activities as listed as examples in chapter 17 “*Corrective process and continual improvement*”. The aim of this step is to gain an overview of all fundamental improvement possibilities for safety and health within the company. These fundamental *opportunities* for improvement are also referred to as *opportunities* for safety and health management.

The need for action can be derived from the following questions:

- Do hazards, unsafe conditions, or unsafe actions arise repeatedly?
- Are these found to arise at particular workplaces, at particular times, or among particular groups of people?
- Are there any other conspicuous occurrences that indicate that previously implemented occupational safety and health management measures are inadequate in terms of ensuring that employees can perform their work safely and on a healthy basis?
- Are there any indications of current or future deficiencies in the organization or in the safety and health management processes?
- Does the *context analysis* provide indications of further improvement possibilities?

2. Derivation, agreement, and adjustment of objectives

In step 2, the objectives are identified and agreed to, on the basis of the *opportunities* found in step 1. To this end, the *opportunities* shall be assessed taking into account the potential for success. This weighing of the *opportunities* against the risks for a successful implementation provides indications as to which objectives and measures with the given resources promise the biggest benefits for workplace safety and health. Objectives and measures are within the joint responsibility of, and to be supported by, all parties concerned within the company. They are to be discussed within the responsible OSH body. Account is to be taken of what is known as the SMART principle when formulating the objectives.

SMART stands for the following principles:

S = Specific. The objective shall be specifically and unambiguously formulated so that there is no scope for alternative interpretation.

M = Measurable. It shall be possible to determine whether the objective has been achieved.

A = Approved. The objective shall be consulted upon and coordinated with all responsible persons and approved and supported by them.

R = Realistic. The objective shall be feasible.

T = Time-scheduled. Every objective shall have a clearly defined deadline by which it should be achieved.

The defined objectives must be made known to all employees in an appropriate form, for example by way of dialog, meetings, and notices. The objectives shall be documented in writing.

An adjustment of objectives shall be made if it is found that they no longer reflect the operational circumstances. An adjustment can lead to the dropping, modification, or addition of individual objectives.

3. Definition of measures and the formulation of indicators

An *action plan* shall be created for each objective, which describes the individual measures designed to achieve it. The responsibility and time or time frame for implementing it and the required investment (if applicable) shall be defined for each individual measure.

In addition, suitable *indicators* shall be stated with which the successful implementation of the individual measure can be checked. A differentiation is made between leading and lagging *indicators*. Leading *indicators* enable the tracking of a measure's implementation and the achievement of its objective(s) during the planning period, while lagging *indicators* only signal whether the objective has been achieved or not at the end of the planning period (see chapter 12 "Effectiveness monitoring"). The *action plans* should be checked regularly and, if necessary, updated.

4. Review of measures and achievement of objectives

The review serves, on the one hand, the purposes of establishing whether defined measures have actually been implemented and, on the other, whether the situation has in fact improved as a result of the measures' implementation. It is therefore useful at the beginning of a planning period to define periods on the basis of which the implementation of the measure and the degree to which its objective has been achieved are to be measured. This measurement is helpful towards determining at an early stage whether there is a necessity for corrections. If a measure is not running as planned, the process defined in the "Define measures and formulate *indicators*" step shall be started anew.

On conclusion of the planning period it is then possible to definitively assess whether the objective has been achieved, doing so on the basis of the occupational safety and health planning. The results of this assessment should in turn be integrated into the planning of the following planning period.

The objective of the measures shall be made available at the annual planning talks to enable the investment projects contained in it to be adopted for budget planning. The objectives and measures can serve as the basis for individual target agreements.



“The regular setting of objectives and measures is imperative for continual improvement of occupational safety and health management.”

Do



Organization

A functional organization is of crucial importance for the legal certainty and effectiveness of occupational safety and health management.

With regard to the tasks, duties, and responsibilities of the various parties, the distinction shall be made between:

- The respective boards (executive or management board) or the respective managers
- Executives who are not board members or managers and supervisors
- Employees
- Employee representatives including representatives of the severely disabled or youth representatives (where available)

The occupational safety and health organization also includes supporting functions (OSH experts), especially:

- Safety and health specialists
- Company physicians
- Health managers
- Safety coordinators (in Germany)

as well as coordinators who are needed in the case of certain hazard sources such as, for example, *radiation* or laser protection coordinators.

In general, the duties of OSH experts are to be performed by Group employees. The transfer of these tasks to a service provider from outside the Group when creating new contracts is only permitted in exceptional cases. Exceptions shall be approved by the BA Head of OSH in consultation with Corporate Occupational Safety and Health. Projects and construction site activities are exempted from this requirement.

When parts of the company's own functions or processes are contracted out to external service providers for the purpose of outsourcing, it must be ensured contractually that the legal regulations and other requirements relevant to the company continue to be met (see chapter 4 "Compliance with *statutory regulations* and other requirements") and that there are no negative effects on the company's own safety and health management.

Finally, where appropriate, the employees shall also be involved. They cooperate on occupational safety and health management through consultation and participation. The employee representatives participate within the scope of their statutory duties (see Appendix 0 "Consultation and participation of employees").

- Functional organizational and operational structures created for the company?
- Tasks, responsibilities, and authorizations of all parties clearly defined and communicated?
- Management tasks and obligations defined and delegated to executives and supervisors in writing?
- Sufficient resources provided?
- Advice from safety and health specialists and company physicians ensured?
- Specialists available to support the company health management system?
- Safety/radiation protection/laser protection coordinators appointed (where necessary)?

6.1 Functions

6.1.1 Legal entity boards/managers, other executives

All legal entity boards, managers, and other executives and supervisors of the Group as well as relevant investee companies bear responsibility for occupational safety and health



“As far as they possibly can, all employees are under obligation to take responsibility for their safety and health at work.”

management in their areas and for the development, management, and promotion of an advanced safety and health culture. They are supported in the realization of their duties by OSH experts.

The officers responsible for each individual unit shall create, maintain, and continuously improve suitable and appropriate organizational and operational structures for occupational safety and health management. Where appropriate, executives may, and should, define the management tasks and obligations and delegate the execution thereof to executives at lower levels. This should take place in writing and both respective parties shall sign it. However, the general organization, selection, and monitoring obligations of the delegating executives are not transferable. This entails primarily the selection of qualified personnel, correct assignment of duties, and checking of the implementation of the intended organizational structure and process organization.

Compliance with the requirements of this manual is monitored to an appropriate degree by the responsible officers at the next highest level in each case. They are supported by the occupational safety and health organizations and other relevant specialists.

Executives and supervisors shall give the necessary instructions and decide on the requisite action on their own authority. For this purpose, they shall in particular

- Conduct safety and health risk assessments or arrange for them to be conducted, and monitor the effectiveness of the selected measures

- Ensure that their employees receive regular instruction and monitor its effectiveness
- Arrange to provide their employees with the requisite occupational medical check-ups
- Provide *personal protective equipment* and check that it is used correctly

6.1.2 Employees

As far as they possibly can, all employees are under obligation to take responsibility for their safety and health at work. This includes personal commitment to measures for the prevention of occupational injuries and illnesses as well as first aid. They should not put themselves and other people at risk by their actions.

Tools, machines, equipment, vehicles, working materials, guards and protective devices, and the *personal protective equipment* made available shall be used for the intended purpose and regularly inspected for visible defects.

Employees shall immediately report identified safety and health risks as well as defective guards and protective devices to the supervisor responsible for them. Employees should not follow any instruction nor indulge in any activity that can result in an unsafe act violating safety and health regulations. Employees may, and should, address unsafe situations and activities with their own responsibility and, if necessary, stop them. The primary goal should be to find an on-the-spot amicable solution and thereby remedy the situ-

Stop unsafe work!

You have the responsibility and the authority to stop unsafe actions and conditions.

Stop unsafe actions and conditions immediately. Talk to your colleagues and seek solutions together.

If in doubt, contact your supervisor or the Health and Safety department.

If no one listens, you have the right to escalate the issue within thyssenkrupp.

You do not need to worry about any negative consequences if you really make use of the we stop-card. That is my promise to you!

On behalf of the thyssenkrupp Board

Oliver Burkhard
Member of the Executive Board and
Chief Human Resources Officer (CHRO) thyssenkrupp AG

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ation immediately. At thyssenkrupp, the we stop card was developed for this very purpose, through which the Executive Board grants permission and delegates the power for this purpose.

6.1.3 Safety and health specialists

The companies included within the scope of this manual shall guarantee appropriate consultancy by safety and health specialists.

It is the task of these specialists together with company physicians (see section 6.1.4 "Company physicians") to advise and support legal entity boards, managers, all further executives, supervisors, and employees in all matters of safety and health, including the creation of employee-friendly

working conditions. This includes, for example:

- Advice for the planning of the plant facilities, and the design and maintenance of industrial facilities
- Advice regarding the procurement of tools and supplies for work and *personal protective equipment*, working materials, and the implementation of working processes
- Advice on designing workplaces and work processes, and the working environment
- Risk assessment of the working conditions
- Monitoring of safety and health measures
- *Incident* investigation

Due to their advisory function, safety and health specialists are not allowed to be incorporated in the line organization of the company. As a staff function they should be answerable to the senior company or site management. They are neither obliged to take directives nor react to external influence while performing their duties or utilizing their specialist safety skills. Occupational safety and health specialists are obliged to report regularly, at least annually, on the performance of the duties assigned to them.

6.1.4 Company physicians

The companies included within the scope of this manual shall ensure appropriate consultation by suitable physicians – in Germany, the appointed company physicians.

It is the task of the company physicians in cooperation with safety and health specialists (see section 6.1.3 "Safety and health specialists") to advise and support legal entity boards, managers, all further executives, supervisors and employees in all matters of safety and health, including the creation of employee-friendly working conditions.

This includes, for example:

- Advice for the planning of the plant facilities, and the design and maintenance of industrial facilities
- Advice regarding the procurement of tools and supplies for work and *personal protective equipment*, working materials, and the implementation of working processes
- Advice on how to design workplaces and processes, and the working environment
- Advice in matters concerning occupational physiology and psychology
- Assessment of the working conditions
- Carrying out medical investigations and assessing the results thereof
- Individual medical advice

The medical investigations and consultancy shall be carried out by appropriately qualified physicians who are acquainted with the particular hazards at the workplace. As a rule they are specialists in occupational medicine.

Due to their advisory function, company physicians are not allowed to be incorporated into the line organization of the company. As a staff function they should be answerable to the senior company or site management. They are neither obliged to take directives nor react to external influence while performing their duties or utilizing their expertise in occupational medicine. They have to maintain medical confidentiality. Occupational physicians are obliged to report regularly, at least annually, on the performance of the duties assigned to them.

6.1.5 Health managers

Health managers have an exclusively advisory and supporting function, and should support the supervisors in their respective sphere of responsibility in measures towards enhancing situational and behavioral prevention.

Core tasks include:

- Providing executives and supervisors with competent advice in behavioral and environmental prevention-related issues
- Enhancing the awareness of *health promotion* at the workplace among executives, supervisors, and employees
- Helping in the development, implementation, and evaluation of needs-based *health promotion* measures
- Organizing and moderating relevant working groups

The tasks of a health manager may also be fulfilled by a safety and health specialist, a company physician, a human resources manager, or any other individual, provided they have the required knowledge.

6.1.6 Safety coordinators

In Germany, companies (with more than 20 employees) included within the scope of this manual shall appoint safety coordinators. Safety coordinators only have an advisory and supporting function. They are intended to support supervisors in implementing their tasks in their respective areas of responsibility and in fulfilling their duties in occupational safety and health management.

Their main tasks are:

- To encourage colleagues at work to act in a safety-conscious manner and to be a role model
- To regularly make sure that guards and protective devices and *personal protective equipment* are available and used correctly
- To give tips and recommendations for eliminating defects and hazards

Safety coordinators are not authorized to give instructions. They hold an honorary office in the Group companies. They do not bear any special responsibility for the implementation of occupational safety and health management and therefore cannot be held liable to a greater extent than normal.

6.1.7 Radiation protection coordinators

Owing to the special significance of the hazards from *ionizing radiation* for people, there is a statutory obligation in many countries to appoint *radiation* protection coordinators. For example, this is necessary for operating an X-ray facility or radiometric measuring device.

The responsibilities of the *radiation* protection coordinator include:

- Planning and defining technical and organizational protective measures
- Checking that the *radiation* protection-relevant facilities, devices, and equipment are fully functional
- Checking of effectiveness of guards and protective devices, and protection regulations
- Ensure the control of individual dosimeters, when required
- Instruction of employees working in *radiation* protection areas
- Ensuring compliance with legal documentation obligations

6.1.8 Laser protection coordinators

Handling *laser radiation* puts the health of humans at risk. Therefore in many countries there is a statutory obligation to appoint laser protection coordinators. For example, this is a prerequisite for operating certain laser equipment (classes 3R, 3B, or 4 following European standardization).

The responsibilities of the *radiation* protection coordinator include:

- Monitoring the safe operation of laser equipment
- Selecting the requisite *personal protective equipment*
- Monitoring the correct use of *personal protective equipment*
- Informing the responsible supervisors about defects and failures

6.1.9 Employee representatives

Depending on the *statutory regulations* and national practices, the employee representatives shall be involved in the planning, implementation, and monitoring of occupational safety and health management activities.

In Germany the works council's responsibilities include:

- Co-determination and co-design of company rules in safety and health
- Monitoring compliance with the rules passed for the protection of the employees in the Group companies

In other European countries important to thyssenkrupp, such as France, Italy, Spain, and the United Kingdom, safety and health committees elected jointly, or by the employee representatives, play an important creative role.

Irrespective of the relevant *statutory regulations*, the endeavor shall be made to regard safety and health as the joint responsibility of employees and employers and to implement it.

6.2 Group organization

Corporate and downstream levels of the Business Areas shall create an appropriate operational and organizational structure for occupational safety and health management. In particular, this organizational structure shall ensure employee support and a consistent flow of information. The organizational structure shall be documented.

- Functional operational and organizational structures created for the management structure of the Group?
- Committees, councils, further bodies established as set out in this manual?
- Regular meetings ensured and documented?

Subject to the changes resulting from the reorganization of the Group, the following bodies must be set up within the Group to ensure an appropriate and effective organization of occupational safety and health management.

6.2.1 Committee Occupational Safety and Health at Corporate level

An Committee Occupational Safety and Health (Committee OSH) is to be established at Corporate level. The committee meets regularly and at least once a year. Rules of procedure shall be defined for the committee, which, following preliminary approval by the Governance Committee, shall be approved by the Executive Board of thyssenkrupp AG. The basis for this is the sample rules of procedure for committees approved by the Executive Board of thyssenkrupp AG. Minutes shall be taken.

The Committee is headed by the CO/CHRO. Further members are the CHROs of the Business Areas (BA/CHRO), the Heads of the corporate functions Human Resources Strategy (CO/HRS), People Development & Executives Management (CO/PED), the Head of Occupational Safety and Health (CO/HRS-OSH), the Head of Occupational Safety, and a representative of the European Works Council (EWC) as well as of the Group Works Council (GWC).

Further functions, e.g., spokespersons for disabled employees, executive employees, or other departments, may be involved where required.

The role of this top-level Committee for occupational safety and health management in the Group comprises the strategic steering of Group-wide occupational safety and health management. Within the framework of this steering, the key action areas for the individual planning periods are defined.

6.2.2 Council Occupational Safety and Health at Corporate level

The Council Occupational Safety and Health (Council OSH) is chaired by the Head of Corporate Occupational Safety and Health. The council comprises the Head of Occupational Safety, and the Heads of Occupational Safety and Health in the BAs. Further functions, e.g., a representative of the Group Works Council, spokespersons for disabled employees, executive employees, or other departments may be involved where required. The Council meets once a quarter. Minutes shall be taken.

The main duties of the Council include:

- Ensuring coordination between Corporate and the Business Areas
- The identification of potential key action areas and programs
- Formulating resolution proposals for the Committee Occupational Safety and Health at Corporate level

6.2.3 Committees/Councils Occupational Safety and Health in the Business Areas

The BA/CHROs are obliged to establish an Committee Occupational Safety and Health at BA level.

Rules of procedure shall be defined for the Committee, which shall be approved by the Management Board of the corresponding Business Area. The sample rules of procedure for Committees approved by the Executive Board of thyssenkrupp AG may be used as a basis.

For committees at organizational levels below Business Area level, it is recommended that rules of procedure are defined on the basis of the sample rules of procedure for committees approved by the Executive Board of thyssenkrupp AG. It is possible to document the principles of cooperation by the Committee in a simplified written form. Decision-making authority shall however always be delegated to the Committee by resolution of the body or Committee transferring the authority (e.g., resolution by the Management Board at the corresponding organizational level).

The individual Committee/Council OSH may be combined with existing bodies such as a central safety and health body or replace these bodies. The Committee/Council OSH meets regularly and at least once a year. Minutes shall be taken. The Committee OSH at BA level is chaired by the corresponding BA/CHRO; it comprises the BA Head of Human Resources & Development (BA/HRD) and the BA Head of OSH. The Chairs of the Committees/Councils OSH, where available, at the next lower level (usually the Business Units) shall also participate. Further functions, e.g., employee representatives, spokespersons for disabled employees, executive employees, or experts, may be involved where required.

The role of the Committee OSH is to steer occupational safety and health management from a BA perspective. Within the framework of this steering, the key action areas defined Group-wide are specified in concrete terms for the BA. BA-specific priorities and programs are defined for the individual planning periods.

In the BAs, the BA/CHROs ensure a further-reaching, appropriate body structure at lower organizational levels in their Business Areas (Business Units, Operating Units, etc.) to guarantee effective management in all organizational units. Depending on their duties, the individual bodies shall be referred to and managed as committees or councils where they meet the criteria for committees or councils set out by thyssenkrupp AG. Criteria for a committee include in particular decision-making authority delegated by the Management Board at the corresponding organizational level and/or monitoring of at least one process of relevance to the entire organizational level. By contrast, Councils simply prepare decisions for another body (e.g., Management Board, Committee) relating to a process of relevance to the entire organizational level.



6.2.4 Councils Occupational Safety and Health in the companies

In companies included within the scope of this manual with more than 20 employees the responsible legal entity boards or managers have a duty to establish a Council OSH at the company level. It may be combined with an existing body such as a central safety and health body. The Council OSH should meet at least every six months; meetings at quarterly intervals are recommended. Minutes shall be taken at these meetings. The Council OSH at the company level is chaired by the respective member of the legal entity board. Represented therein are the second management level, the relevant specialists for occupational safety, company physicians, health managers, employee representatives, and, where applicable, safety coordinators. If required, further functions – such as, for example, a spokesperson for severely handicapped employees or special experts – can be consulted.

The role of the Council OSH comprises of coordination of the objectives and measures at the Group company level and serves the purpose of regular internal advice. Company-specific objectives and measures are agreed for the individual planning periods. It shall be determined to what extent the Council OSH shall simultaneously perform duties required to be carried out pursuant to the law.

6.2.5 Duties of the Heads of OSH from Corporate and the Business Areas

Corporate and each Business Area shall appoint a Head of Occupational Safety and Health with professional qualifications. In addition to their administrative reporting line within their respective management organization, all Heads of Occupational Safety and Health at Corporate and in the BAs as well as the lead OSH experts have an additional functional reporting line direct to the top management within their unit.

While implementing the below described tasks, information and consultation among the Heads of OSH of the BAs, and Corporate shall be ensured as being in accordance with the network organization and the governance rules.

The Head of CO/HRS-OSH has the following duties with respect to occupational safety and health management:

- Develop Group-wide policy, strategy, objectives, guidelines, measures, and minimum standards
- Define, plan, and initiate measures with Group-wide synergy potential
- Monitor data and key performance *indicators* to be collected Group-wide
- Perform *audits*
- Group-related communications and external representation
- Establish and maintain a Group-wide OSH community
- Advise executives, supervisors, and specialists on occupational safety and health management issues

The Head of occupational safety and health in the BAs are responsible for the following tasks with respect to occupational safety and health management:

- Help develop the Corporate framework specifications
- Develop BA-specific policy, strategy, objectives, guidelines, measures, and minimum standards within the framework defined by Corporate
- Actively support the realization of Group minimum standards in the BA, taking into account BA-specific requirements
- Pool BA interests and align them with Corporate and the other BAs to find a collaborative approach
- Define, plan, and initiate measures with BA-wide synergy potential
- Monitor and support the collection and assessment of data and key performance *indicators* in the BA
- Ensure adequate auditing
- Establish and maintain a BA-wide OSH community
- Advise executives, supervisors, and specialists on occupational safety and health management issues

Competence and awareness



Qualified and competent leaders and employees who possess the necessary ability, knowledge, and skills to carry out their activities safely and healthily contribute significantly to the success of occupational safety and health management.

Comprehensive training and regular instruction for those involved are therefore indispensable for occupational safety and health management to function. Training and instructions help employees and leaders to understand, accept, and successfully implement all relevant measures and *procedures*.

Training and instructions do not merely serve to provide pure information. They are also intended to motivate the operational stakeholders to act with safety and health in mind and to promote awareness for a positive position on all questions of safety and health.

The scope and contents of training courses and instructions always depend on the existing accident and health risks. If there is a high company risk, more extensive and more frequent training courses and instructions are required as a rule. In addition to the results of the risk assessment (existing risks and derived measures), employees shall also be appropriately informed of recent *incidents* and the related investigation results. In this context, the contribution each individual can make to a safe and healthy working environment, and the consequences of non-compliance with rules and instructions shall be communicated.



Procedure defined to identify all necessary training and instruction?



Training and instruction completed?



Documentation available?



Regular repetition ensured?

The training and instruction program shall be designed to also accommodate the individual qualifications of the participants. For example, the vocational qualifications and language skills of the participants shall be taken into account.

Training courses and instruction activities at all events should also be used for communicating to leaders and employees, in an appropriate form, the basic principles of occupational safety and health management in the Group, i.e., the Mission Statement and Vision, the Group's Occupational Safety and Health Policy, the Group's objectives in the sphere of occupational safety and health management, etc. Employees shall also be informed that they are not permitted to follow any instructions that may endanger themselves or add dangers to the area of activities.

It is important that training and instruction are not understood as the one and only, i.e., sole measure for creating the desired awareness levels. Rather, it is up to leaders to support raising awareness through exemplary behavior, appropriate consultation and participation, and appreciative feedback.

Definition of terms

Competence as defined in this manual means the ability to identify, assess, and manage the knowledge and skill of accident and health risks.

Measures

Each company included within the scope of this manual shall ensure that its leaders and employees have the necessary competence levels using the following process steps.

"All employees shall be given instruction about the hazards that arise during their activities and the necessary protective measures to be taken."



The following process steps are to be considered:

1. Determine the necessary competence and develop a training and instruction concept

The level of qualification to be achieved by employees should be defined in the training and instruction concept. This is based on the results of the risk assessment (see chapter 3 "Workplace risk assessment") and the relevant *statutory regulations*.

Important criteria are:

- Designation of the target groups
- Compilation of learning objectives
- Description of the contents of training courses and instructions
- Definition of the repetition frequency
- Definition of the responsibilities for planning, implementation, and documentation

The relevant supervisor is responsible for timely implementation of the requisite instruction and training measures.

2. Conduct training and instruction

All leaders and employees shall be given instruction on the hazards that arise during their activities and the necessary protective measures to be taken. The instruction shall be received before starting to work and it shall be repeated at regular intervals.

Instruction shall be given personally. E-learning programs may be used as an effective supplement.

3. Check the achievement of learning objectives

The achievement of learning objectives shall be adequately checked. This can, for example, take place in the form of a written or oral test at the end of the course, or by observing on-the-job implementation of what has been learned. Appropriate methods of verification shall be mutually agreed between all parties to the agreement. Should it be established that participants have not understood training or instructions fully or correctly, or that relevant content has not been covered, the content shall be communicated again in a way the affected individuals can understand.

4. Create documentation

Training and instruction measures shall be documented in an appropriate form.

The documentation should at minimum include:

- Date, duration, and title of the course
- Names and, if possible, signature of the participants
- Description of the contents

When the reaching of the learning targets is confirmed by an exam, then proof of this needs to be documented and recorded.



Communication

8

Targeted communication enhances the awareness for safety and health and increases individual *competence* and motivation to act in compliance with safety and health regulations and measures.

It also facilitates the collection and success-oriented implementation of employees' ideas and suggestions for improving occupational safety and health management.

Therefore, effective communication structures shall be created that guarantee and support the smooth exchange of information between executives, supervisors, and specialists, employee representatives, employees, and third parties. When designing communication approaches, the individual requirements of the communication partners, e.g., language, literacy, and culture, shall be taken into account.

- Continuous flow of information ensured in the company?
- All levels and functions involved?
- Procedure defined for informing suppliers, contractors, and visitors?
- Customers and the general public considered appropriately?
- Specifically determined who communicates with whom, when, about what, and in which manner?

It is sensible to present, in the form of a table, who communicates with whom, when, about what, and in which manner both internally and externally. It shall be determined which evidence on internal and external communication is to be prepared and archived (see chapter 9 "Documented information and its control").

8.1 Internal communication

Companies included within the scope of this manual shall establish communications structures above and beyond any Council OSH that may be required to enable a continuous flow of information to and from employees.

For example, the members of the second management level and all other management levels below shall ensure the flow of information to the respective next lower management level. Regular meetings or departmental meetings are suitable for this purpose.

At the lowest management level, talks about occupational safety and health take place between the relevant supervisor (for example, a foreman or group leader) and the staff for which he is responsible.

Besides regularly recurring topics, such as accident occurrence, the Occupational Safety and Health Policy is to be included in the internal communication as well as its objectives and the relevant measures and their implementation.

All employees shall be informed that they are permitted to approach a member of their Council OSH within their organizational unit if their concerns regarding occupational safety and health are not given sufficient attention by their direct supervisors.

“Targeted communication enhances the awareness for safety and health and increases individual competence and the motivation to act in compliance with safety and health regulations and measures.”



8.2 External communication

An appropriate level of information about occupational safety and health management shall also be forwarded to third parties, for example suppliers, third-party contractors, and persons who are to be given access to thyssenkrupp company premises without having sufficient knowledge of the operational accident and health risks (personnel unfamiliar with the site). At the latest, when entering non-public areas of the company premises, external persons shall be informed to an appropriate extent of the accident and health risks, the measures to be taken by them, and how to act in the event of an emergency.

8.2.1 Suppliers

Suppliers shall be informed about the occupational safety and health management requirements set by thyssenkrupp and declare their agreement therewith as soon as possible, and at the latest when they receive an order. The regulations relating to the “thyssenkrupp Supplier Code of Conduct” shall be observed.

8.2.2 Contractors

Contractors shall have already been informed about the occupational safety and health management requirements set by thyssenkrupp and declare their agreement therewith as soon as possible when the contract is awarded. Insofar as the work is to be carried out on a thyssenkrupp company site, the Group company shall reach agreement with the contractor on relevant potential mutual risks in order to be able to agree on suitable protective measures. Further notes relating to this are to be found in section 10.17 “*Contractor management*”.

8.2.3 Customers and the general public

Transparency and communication can actively contribute to the enhancement of the thyssenkrupp image as a safety- and health-conscious company. Therefore, occupational safety and health management should be mentioned appropriately in communications with customers and the general public.

Documented information and its control

9

For the purpose of a transparent representation of the occupational safety and health organization and the processes, each company included within the scope of this manual with more than 20 employees shall prepare appropriate *documented information*.

- Documentation of the organization and processes available?
- Manual, process/operating, and work instructions up to date?
- Processes defined for the:
 - Compilation, identification, and approval?
 - Change/update?
 - Archiving/storage?
 - Destruction of all relevant documents and records?

When a certification is desired, these requirements apply regardless of the size of the company.

This *documented information* shall also put across to outsiders simply and comprehensibly how occupational safety and health management is organized and implemented in the Group company. This also includes setting out how occupational safety and health management at the Group company is linked to the next-highest level.

The *documented information* can also be used as verification for external bodies and thus creates additional legal certainty.

Documented information control pursues the objective of having all valid and relevant documents and records available whenever required. This is also valid for *documented information* from external sources.

Each company included within the scope of this manual shall introduce and maintain a system that serves to provide proof on demand that the statutory and other requirements are met. This may be necessary at short notice, for example after *incidents*, if the relevant authority requests the results of the risk assessment and the relevant proof of instruction. The Group companies are therefore well advised to subject all relevant records to a control process.

Definition of terms

For the purposes of this handbook, *documented information* means all *controlled documents* as well as the associated *forms* and *records* relating to occupational safety and health management.

Controlled documents are documents in which the organizational structures and processes of occupational safety and health management are described officially as *Regulations* or *Operating Instructions*. Some examples of them are:

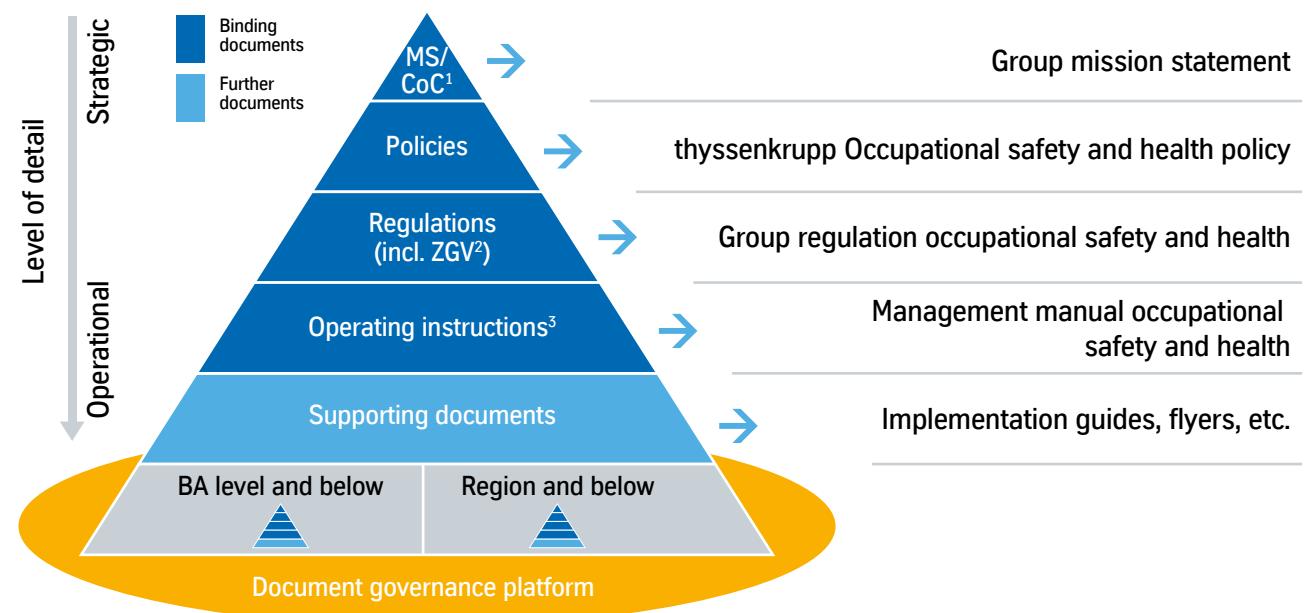
- Occupational Safety and Health Management Manuals
- Process instructions
- Operating and work instructions

Controlled documents at Group level are to be structured according to the following document hierarchy: Mission Statement and Code of Conduct, policies, regulations, operating instructions, and supporting documents. An appropriate document hierarchy shall be created at the Group company level.

Forms are documents in which the form of the record is predefined.

Filled-out *forms* and other evidence are termed *records*. They describe what was done and – if appropriate – when something is to be repeated and at which intervals. Examples of these are instruction evidence, measurement reports, indices, *incident* reports, etc.

The OSH documents align themselves to the document hierarchy of the Group



1 MS = Mission Statement; CoC = Code of Conduct

2 Specific requirements for dealing with Transactions Requiring Approval (TRA) described in Group Regulation Document Architecture

3 Operating Instructions below BA level are generally not covered by Group Regulation Document Architecture. However, scope can be extended by respective board resolution (opt-in); in that case, resources have to be provided by the respective organizational unit

Measures

The following process steps shall be defined for compiling, updating, and controlling *documented information*:

- **Compilation.**

When compiling *controlled documents* they shall be marked in such a manner that the version and the author are identifiable. The designation shall make sure it is possible to have an unmistakable reference to the relevant process.

The creation of *forms* predefines the framework of a record. Each form shall be marked so that its purpose is evident.

The manner in which records are to be marked shall also be defined so that they can be identified conclusively

- **Approval**

Controlled documents are approved by the signature of the person(s) responsible, stating the date and current version. This can also be done by means of digital signatures.

- **Provision**

All *documented information* shall be accessible to the relevant groups and persons. The provision and distribution of the current version shall be determined accordingly.

- **Review/change/update**

It is important to check and update, as necessary, *controlled documents* and *forms* at regular intervals. If *controlled documents* or *forms* are changed or updated, they shall be approved again. Bodies and persons thereby affected shall be informed.

- **Archiving**

Preliminary records of *controlled documents* shall be archived. The archiving takes place such that potential damage or loss can be excluded. When the storage period is defined the relevant *statutory regulations* shall be observed.

When records are archived it shall be borne in mind that it shall be possible to find, read, and identify them at any time for as long as they are archived. When the term of storage is defined, the relevant statutory provisions shall be taken into account as well as the liability periods and customer requirements.

In the case of confidential records it is also expedient to keep them adequately protected and describe the *procedures* for destruction.

Appendix 9 "Mandatory information to be documented" lists the *documented information* that the company shall keep available to comply with the requirements of this manual.



Operational implementation

The occupational safety and health management of a company is always only as good as its implementation in the company.

Sections 10.1–10.12 provide information and hints on dealing with typical hazards and stress at the workplace within the Group companies.

Sections 10.13–10.16 describe general hazard-related approaches for preventative measures. In conclusion, section 10.17 addresses the topic of management of contractors.

The implementation depends on the respective *statutory regulations* and the results of the risk assessment. In individual cases, employees from Group companies may be exposed to risks that are not dealt with further or included in this chapter.

10.1 Tools, devices, machines, and equipment



Procedures defined:

- For procurement?
- For commissioning?
- For energy control and power lockout?
- For regular inspection?



Employees trained and instructed in:

- How to operate crane installations?
- How to work on electric systems?

Tools, devices, machines, or equipment are employed in almost every activity in the Group. Therefore, safety and health has high priority with regard to handling such technical equipment in the Group.

Measures

In the Group companies only tools, devices, machines, and equipment may be used that are suitable for the intended purpose and in sound operating condition.

The safety and health requirements shall already be taken into consideration at the time of procurement. Suppliers shall receive written information regarding the *statutory regulations* to be complied with and the specific requirements of thyssenkrupp. Furthermore, efforts should be made to ensure that suppliers declare their compliance with the relevant *statutory regulations* to the appropriate extent and in appropriate form.

The supplier shall ensure that delivery is accompanied by operating instructions that describe how to operate the machine or equipment safely. All operating life cycles shall be included in these operating instructions: Installation/assembly, commissioning, usage, cleaning, the elimination of errors, inspection and maintenance, and demolition and disposal. The operating instructions shall be written in the language of the hosting country, i.e., the country the items shall be used in. The same applies to information and warning notices attached to a machine or equipment. Symbols and pictograms should be given preference over information in text form.

Prior to commissioning, machines and equipment shall be subjected to an appropriate acceptance *procedure*. At the time of acceptance, special attention should be paid to ensuring that all the intended guards and protective devices are in place and in working order, and that hazardous points cannot be reached from the outside and all equipment and accessory parts required for safe operation are in place.

The supervisor responsible shall perform acceptance activities. The result of acceptance is to be documented in an acceptance certificate that shall be signed by all parties involved.

Tools, devices, machines, and equipment shall be checked regularly to establish if they are safe to operate. The scope of the test, the test intervals, and the qualification of the tester shall comply with the respective *statutory regulations*, the manufacturer's information, and the company's empirical values. The results of the tests shall be documented in an appropriate form. Documentation is not required for hand tools.

Irrespective of the regular testing, the users of tools, devices, machines, and equipment shall check them for visible defects before starting work or using them. If a defect is found that cannot be eliminated by the user, they shall report it immediately to their responsible supervisor so that the latter can provide a remedy. No equipment with safety-relevant defects may be used.

In Germany, operating instructions must be drawn up based on the risk assessment in accordance with the relevant *statutory regulations*; to inform employees of any possible hazards and measures for the safe operation of machines and systems at their workplace.

Incidents due to machines or equipment suddenly starting frequently figure among the *incidents* that occur. Therefore, the companies shall define and implement *procedures* with which *incidents* due to unexpected and inadvertent start-up by machines or equipment – or due to the sudden release of stored energy – can be prevented.



On most machines and systems, it has proven successful to secure all switches and fittings that can trigger a dangerous movement of the machine or system with a padlock and a warning label to prevent inadvertent restarting of machinery before entering the danger zones. In addition, all energy stored in the system shall be eliminated or secured.

The Implementation Guide “Energy Control and Power Lock-out Program” describes the energy control and power lock-out processes for machines and equipment step by step.

Special requirements for crane installations

Crane installations may only be operated by employees who are qualified for this work. The training shall include practical exercises under typical operating conditions. The company shall be in a position to validate the qualification. Furthermore, employees shall receive familiarization instructions on handling the respective crane installation.

Special requirements for electric systems

Only personnel with special qualifications are permitted to work on electric systems. The systems shall be correctly activated and protected against being switched on again. On no account may work be carried out on live parts. Special protective measures shall be taken in the few justified exceptional cases.

10.2 Industrial trucks and motor vehicles



Procedures defined:

- For regular inspection?
- For preventing unauthorized use?



Employees trained and instructed?

Accidents with industrial trucks and *motor vehicles* as a rule cause exceptionally severe injuries. Therefore, the safety of vehicles and the responsible conduct of the drivers are subject to very high requirements.

Definition of terms

Vehicles as defined in this section are mechanically driven, non-rail-bound surface vehicles.

Measures

In the companies included within the scope of this manual only vehicles that have been deemed suitable for the intended purpose and that are in safe operating condition may be used. To this end, the vehicles shall be checked regularly – at least once a year – by a competent person to ensure that they are in a safe operating condition. The results of these checks shall be documented.

Irrespective of this, the vehicle driver shall check the vehicle for visible defects before starting work or using it. If a defect is found that cannot be eliminated by the driver, they shall report it immediately to their responsible supervisor so that the latter can provide a remedy. No vehicles with safety-relevant defects may be used.

Vehicles may only be driven by employees who are qualified for this work. Besides this, they shall be appropriately authorized to do so by the company.

The training shall include practical exercises under typical operating conditions. The company shall be in a position to certify the qualification. Furthermore, employees shall receive instruction on how to handle the specific type of vehicle.

“Vehicles may only be driven by employees who are qualified for this work.”

Vehicle operation

Vehicle drivers shall adapt their driving to the ground, visibility, weather, and traffic conditions and to the driving properties of the vehicle. They shall be capable of controlling their vehicle reliably at all times.

When loading vehicles, the manufacturer’s instructions regarding the permissible gross vehicle weight, the maximum load per axle, etc., shall be complied with. The load shall be stowed in such a manner that safe operation of the vehicle is ensured.

When the vehicle is being loaded and unloaded it shall be ensured that it does not inadvertently start to move, tilt, or topple over, and does not endanger people due to objects falling down, tipping over, or rolling away.

To prevent unauthorized use of the vehicles they shall be safeguarded when the driver gets out. The ignition key shall be removed when the vehicle operator moves out of sight and unauthorized use cannot be excluded.

Vehicles with internal combustion engines may only be fully or partially operated in closed spaces if it is certain that no dangerous concentration of exhaust fumes can arise in the breathing air.

10.3 Hazardous substances

- Procedure defined for the introduction of new hazardous substances?
- Safety data sheets available and up to date?
- Containers for hazardous substances suitable and marked? No beverage bottles!
- Compressed-gas cylinders secured against falling?
- Storage areas and cabinets kept orderly, adequately lit/ventilated, and properly identified?
- Bans on storing certain materials together observed?
- Emergency materials available?

For reasons connected with production technology it is not possible to entirely avoid using *hazardous substances* at thyssenkrupp. Employees may also have to handle *hazardous substances* on an unplanned basis, e.g., asbestos during building, construction, or repair work in existing buildings. However, by handling them responsibly, accident and health risks relating to these substances can be reduced to a minimum.

Definition of terms

Hazardous substances are substances, mixtures, and products that may represent a risk to the health or safety of humans or to the environment.

Hazardous substances exhibit one or more of the following properties or can release substances that possess such properties:

- Explosive, oxidizing, extremely flammable, highly flammable, flammable
- Very toxic, toxic, harmful
- Corrosive, irritant
- Sensitizing
- Carcinogenic, harmful to fertility, mutagenic
- Dangerous for the environment

Moreover, substances and mixtures are also regarded as *hazardous substances* that, because of the manner in which they are used in the workplace, may endanger the safety and health of persons.

Hazardous substances can present themselves as solid matter, liquids, gases, or aerosols (for example as smoke, fumes, dust, etc.) and can enter the body by being breathed in, or swallowed, or through the skin. This can cause acute or chronic damage to health.

Measures

Before a *hazardous substance* is introduced it shall first be investigated whether a less hazardous alternative is available, for example a substitute substance that is not classified as hazardous.

If no suitable alternative is available, the risks connected with the use of the *hazardous substance* shall be assessed and appropriate protective measures defined. For the risk assessment, not only the hazardous properties of the substances shall be taken into account, but also the expected duration of exposure and possible routes into the body.

The most important source of information in this case is the material safety data sheet that the manufacturer or supplier of the substance shall provide. If the manufacturer or supplier fails to do this, the material safety data sheet shall be explicitly requested by the unit responsible for purchasing the substance in the relevant company. Each company included within the scope of this manual shall ensure that updated material safety data sheets are available for all the *hazardous substances* used within the company and that they can be accessed. Material safety data sheets should not be older than three years.



“Before a hazardous substance is introduced it shall first be investigated whether a less hazardous alternative is available.”

Depending on the applicable *statutory regulations*, a list of all the *hazardous substances* used in each operation shall be compiled and updated. This list of *hazardous substances* serves to provide quick information about the type, the application site, and rough quantity of the respective *hazardous substances* in different company areas.

In Germany, operating instructions must be compiled based on the risk assessment in accordance with the relevant *statutory regulations* in reference to informing employees at their workplace about possible hazards and measures for the safe handling of the applied *hazardous substances*.

Suitable containers shall be used for storing and transporting *hazardous substances*. Only the quantity required to continue the work may be stored in the workplace; i.e., no more than is required for one day, as a rule. For larger quantities, suitable storage areas shall be set up. *Hazardous substances* shall be kept in these areas in a clear and orderly manner and segregated according to requirements. Packaging and containers shall be kept closed. Adequate *lighting*, ventilation, and identification of the storage area shall be provided. Equipment shall be available to prevent the uncontrolled spreading of leaking liquids and liquefied gases. Compressed-gas cylinders shall be secured against falling. Smoking is prohibited.

When filling containers, attention shall be paid to ensuring that the latter are identifiable as *hazardous substance* containers and suitable for the substance to be filled into them. For this purpose, the containers shall be clearly and permanently marked with the trade name and hazard symbol according to GHS (Globally Harmonized System of Classification and Labelling of Chemicals). It is explicitly prohibited to fill *hazardous substances* into beverage bottles or receptacles that might be mistakenly thought to contain foodstuffs. Very toxic and toxic substances shall be kept under lock and key. With regard to potential air pollutants, measures that prevent their release should have priority over other measures, especially over *personal protective equipment*.

Only if – despite technical or organizational measures – the development or release of air pollutants cannot be prevented, or limited to tolerable concentrations, shall suitable respiratory protection devices be used. The provisions in section 10.15 “*Personal protective equipment*” shall be observed. Depending on the *statutory regulations*, employees who are regularly exposed to certain *hazardous substances* are subject to preventative occupational medicine (see section 10.13.1 “*Preventative occupational medicine*”). In many countries this applies, e.g., to the handling of asbestos.

10.4 Biological hazards

- For equipment involving water-mix cooling lubricants: Procedure defined for regular maintenance and cleaning?
- For work on waste, wastewater, or ventilation and air-conditioning systems: Hygiene rules defined?
- For working areas severely contaminated by pigeons or mold infestation: Professional cleaning/decontamination arranged?

In such sectors as biotechnology and genetic engineering, biological substances are used for specific purposes. Although this is only occasionally the case in the Group, thyssenkrupp employees may also be exposed to *biological hazards* at other locations. Examples thereof include handling water-mix cooling lubricants or maintenance and repair work on biologically contaminated equipment.

Definition of terms

The term *biological hazards* encompasses microorganisms (fungi, bacteria, etc.), viruses, and cells that may trigger allergies, infections, or toxicities. It also includes all parasites that can settle as such in the human body.

Measures

The risk assessment is used by companies included within the scope of this manual to determine competently whether employees may be exposed to *biological hazards* that are accompanied by a higher health risk. The health risk depends on the likelihood that a potential disease will occur and its severity, the danger that it will spread to other people, and on the options for its prevention and treatment.

Employees who are exposed to certain *biological hazards* are subject to the regulations on preventative occupational medicine (see section 10.13.1 "Preventative occupational medicine") in accordance with the applicable statutory provisions.

In Germany, operating instructions must be compiled based on the risk assessment in accordance with the relevant *statutory regulations* on informing employees at their workplace of possible hazards, and of the measures for safe handling of the relevant *biological hazards*.

The following activities deserve attention on principle:

- Activities involving contact with water-mix cooling lubricants or other aqueous emulsions or solutions used in recirculation systems
- Maintenance and repair work on waste, wastewater, or ventilation and air-conditioning systems
- Work in archives

Owing to their composition, water-mix cooling lubricants are inevitably subject to microbial colonization. Besides a potential risk of infection, there is the risk that allergies could be triggered, especially in the case of poorly maintained equipment attacking by mold.

Regular maintenance, cleaning, and – if necessary – disinfection of the equipment is therefore very important. The cooling lubricants themselves shall be tested regularly. The test results are to be recorded in an inspection plan. By complying with basic hygiene rules (e.g., eating, drinking, and smoking banned in the workplace) it is possible to prevent germs and nutrients from inadvertently getting into the cooling lubricant. Therefore, the water with which the cooling lubricant is prepared should be of drinking water quality.

When maintenance and repair work is carried out on waste, wastewater, or ventilation and air-conditioning systems, germs often find their way into the human body via a smear infection. Compliance with basic hygiene rules therefore represents an important protective measure during such work.

If maintenance or repair work is carried out in working areas that are severely contaminated with pigeon droppings, feathers, cadavers, or nesting material, special caution is required. Health risks can be caused by pathogens and toxic substances in pigeon feces, on the one hand; on the other hand, they can be caused by allergens in feces and feathers and by pigeon parasites. Before starting work the areas shall be professionally cleaned and thereafter disinfected as best possible. These measures, including disposal, require appropriate specialist skills and suitable equipment and therefore as a rule they can only be carried out by a professional firm.

In archives, mold infestation of archive material can trigger allergies in employees. As a rule such an infestation can only be eliminated by means of expensive decontamination measures. Mold formation shall be prevented by adjusting the room *climate* and sufficient ventilation.

10.5 Radiation

- Authorities informed of use of radioactive material/X-ray/laser equipment, and authorized?
- Radiation/Laser Protection Coordinator appointed?
- Devices/tanks bear the relevant warning signs?
- Employees instructed?
- In the case of ionizing radiation also:
 - Control and exclusion areas established?
 - Employees given medical examinations?
- Procedure available for required work permit?
- In the case of electromagnetic fields also:
 - Entry to hazardous zones prohibited?

Depending on the work task and environment, employees may be affected by different types of *radiation*, for example, thermal *radiation* or ultraviolet *radiation*. The human organism can tolerate such *radiation* up to a certain point.

However, excessive exposure can have an adverse effect on health. Depending on the type of *radiation*, it affects the eyes, skin, internal organs, and/or the whole organism. Therefore, the objective has to be to protect employees from excessive *radiation* in the workplace.

Definition of terms

Radiation is the word for the propagation of energy in the form of waves or particles. Depending on the wavelength, the *radiation* spectrum is divided into *ionizing radiation*, *optical radiation*, and *electromagnetic radiation*.

Optical radiation distinguishes between thermal *radiation* (*infrared radiation*), visible light, ultraviolet light (*UV radiation*), and *laser radiation*. *Optical radiation* not including *laser radiation* is collectively also referred to as non-coherent *optical radiation*.

General measures

In the risk assessment *procedure*, companies included within the scope of this manual shall competently determine whether employees could be exposed to harmful *radiation*. Depending on the relevant legal limit values, suitable protective measures shall be taken.

Measures that aim at preventing *radiation* from arising and at reducing *radiation* propagation should always be given priority over other measures, especially over *personal protective equipment*. The most effective measure is often to shield off the *radiation* source. Only if the effect on humans cannot be reduced to an acceptable level despite technical and organizational measures should *personal protective equipment* be used. The provisions in the relevant section 10.15 “*Personal protective equipment*” shall be complied with.

10.5.1 Ionizing radiation

Technology has numerous applications for *ionizing radiation*, such as, for example, in automatic control engineering or materials testing. However, *ionizing radiation* could harm human cells; therefore, handling radioactive *radiation* sources and X-ray equipment requires extreme caution.

Definition of terms

Ionizing radiation is the collective term for X-ray (*X-radiation*) and the *radiation* produced by the decay of radioactive substances (α -, β -, γ -, and neutron-*radiation*).

Measures

In compliance with the relevant *statutory regulations*, the appropriate authority shall be informed of the handling of radioactive substances and the installation and operation of X-ray equipment, and authorization shall be sought. Besides this, in many countries a *radiation* protection coordinator shall be appointed in writing (see section 6.1.7 “*Radiation protection coordinator*”).

Devices and tanks containing radioactive substances and equipment for the purpose of generating *X-radiation* shall bear the relevant warning signs.

Activities involving *ionizing radiation*, e.g., the X-ray of welding seams for quality assurance on construction sites, which are to be carried out outside of permanently equipped workplaces, may only commence after a written work permit has been issued.

If the applicable statutory limits are exceeded, the *radiation* protection areas shall be marked as control or exclusion areas. In these areas the *radiation* values shall be measured and logged if this is necessary for reasons of *radiation* protection. Persons who have access to these areas shall be instructed prior to entering them for the first time, and at regular intervals thereafter, about the special hazards and the protective measures to be complied with. The whole body dose received during the time spent in restricted access and exclusion areas shall be measured and documented.



Employees who are exposed to *ionizing radiation* at work are subject to the regulations for preventative occupational medicine (see section 10.13.1 "Preventative occupational medicine").

10.5.2 Laser radiation

Laser sources generate a highly concentrated *optical radiation* that can be a hazard to the eyes, skin, and the internal organs. The health risk depends on the laser source output, the wavelength of the *laser radiation* and the exposure of the human being.

Definition of terms

Laser radiation is the term for electromagnetic *radiation* with wavelengths between 100 nm and 1 mm that arise as the result of stimulated emission.

Measures

As a matter of principle, equipment in which *laser radiation* is generated, transferred, or applied shall bear the appropriate warning signs.

Special measures shall be taken if the accessible *radiation* is a hazard for the eyes and/or skin or if it can cause fire and explosion hazards. According to European standardization this applies to class 3R, 3B, and 4 *laser radiation*.



In compliance with the relevant *statutory regulations*, companies operating laser equipment of classes 3R, 3B, and 4 must appoint a laser safety officer in written form (see section 6.1.8 "Laser protection coordinators"). The respective qualification requirements shall be observed. Employees who spend time in areas with such dangerous *laser radiation* shall be regularly instructed about the special hazard and in the protective measures to be complied with.



10.5.3 Electromagnetic fields (EMF)

Electromagnetic fields can induce irritation and a thermal effect in the human body. The irritating effect caused by low-frequency EMF directly influences muscle and nerve functions. At very high field strengths, serious disorders of the central nervous system and cardiac function may occur.

The higher the frequency, the greater the thermal effect. Localized heating of the eye due to microwave *radiation* can, for example, lead to irreversible cataracts and hence to loss of eyesight. In the wireless and radar technology sector severe burn accidents are known to occur in systems operated at very high outputs.

Other effects of EMF on the human body have not been sufficiently documented by science. This applies especially to the so-called electronic smog, i.e., low-strength EMF, which may have a long-term effect on the body.

Definition of terms

Electromagnetic fields (EMF) as understood in the present manual are electric or magnetic fields in the frequency range from 0 to 300 GHz. EMF form the spectrum of electromagnetic *radiation* below the range of visible light.

Measures

Low-frequency EMF diminish greatly at increasing distances. Protective measures against such EMF should therefore aim at keeping persons at a distance, e.g., by means of safety fences or barriers. By contrast, high-frequency EMF can be shielded well.

If EMF cannot be reduced to a tolerable level by technical measures, limitation of the time spent in the relevant zone comes into consideration as a protective measure. Higher exposure areas shall bear the relevant warning signs. Employees who spend time in such areas shall be regularly instructed about the special hazard and the protective measures to be complied with.



Special attention shall be paid to persons with heart pacemakers and other implants in their bodies. In this case there is a risk that the implants will malfunction or that other undesirable effects may arise. Entry to hazardous zones shall therefore be prohibited and marked with the appropriate prohibition signs. As a rule, access shall be decided on a case-by-case basis.



10.6 Fall hazard

- Potentially dangerous edges equipped with guard rails, safety fences, parapets?
- Floor openings covered?
- For ladders:
 - Procedure defined for regular inspection?
 - Only used for short-term, light work?
- For scaffolds:
 - Only erected by qualified personnel?
 - Procedure defined for inspection and release?

The accidents that take place show that the danger of falling shall never be underestimated, not even for work taking little time.

Definition of terms

A *fall hazard* exists if a person can fall down from a workplace or *traffic route* and is highly likely to thereby suffer severe injuries. A *fall hazard* always exists if workplaces or *traffic routes* are:

- On machines, wall openings, and exposed flights of stairs or landings that are located more than 1 m
- In all other cases more than 2 m higher than the areas below them and no appropriate measures have been taken to protect against falls. In addition, a *fall hazard* always exists if workplaces or *traffic routes* are adjacent to

areas of water or other liquid or solid materials into which a person can sink. Slopes and excavations with an incline of more than 20° are also considered a fall risk.

Sufficient fall protection is given if the distance of the workplace or *traffic route* from an adjacent wall or some other solid limitation is so small that persons can save themselves or at least cannot fall through it.

Measures

Workplaces and *traffic routes* shall be secured so that nobody can fall down. For this purpose, potentially dangerous edges shall be equipped with guard rails, safety fences, or parapets. Covers are permissible for floor openings if they have sufficient load-bearing capacity and are secured to prevent slipping.

Structural installations to prevent falls may only be foregone if there are compelling operative reasons against them and fall protection is ensured in some other way. The substitute measures shall then be defined on the basis of a risk assessment. Potential substitute measures can be the attachment of safety scaffolding, safety nets, or other safety equipment. Only if no other fall-protection measures are feasible or purposeful may recourse be taken to *personal protective equipment*. Here the provisions of section 10.15 “Personal protective equipment” shall be observed.

The Implementation Guide “Working at Height” describes which measures should be taken to avoid falls; in addition, it explains step by step the process of setting-up programs.

Special requirements for ladders

Special requirements apply to ladders. Ladders may only be used for climbing up or down for construction or mainte-

“Workplaces and traffic routes shall be secured so that nobody can fall down.”

nance work (including cleaning work). They may definitely not be used as constant *traffic routes* or workplaces.

An exception can only be made if short-term light work is carried out from the ladder and if the employee keeps both feet on one rung. If heavy or bulky tools or materials are used, even if the work is only of short duration, a working platform, scaffold or a similarly suitable workplace shall be arranged for.

Ladders shall be inspected by a competent person at regular intervals to establish that they are in a proper condition. This does not, however, absolve the employee from checking ladders for visible defects before starting work and reporting any defects to his responsible supervisor.

Special requirements for scaffolds

Scaffolds may only be erected or altered by qualified personnel and shall be released in writing by a competent person before they are used for the first time. They shall be sufficiently stable and they shall also be equipped with an anti-fall guard (guardrail system or protective wall) if the distance from a neighboring wall or some other solid limitation exceeds 30 cm.



10.7 Falling objects

- For the transportation of loads by crane:
People prevented from standing/walking under suspended loads?
- For material storage in shelving systems:
Materials secured and stacked properly?
- For work at various levels:
 - Scaffolds and working platforms fitted with guard rails, safety fences, or parapets?
 - Coordination of work ensured?
- For work on elevator installations: Shaft entrances properly secured?
- For work in trenches and pits: Walls properly banked or shored?

The risk of being hit by *falling objects* is greater than is frequently assumed. Incidents caused by *falling objects* can occur during all types of transportation work or during building, construction, and repair work, and often result in severe or even fatal injuries.

Definition of terms

The term *falling objects* comprises all objects that could fall or be dropped from a higher level (e.g., workplace, *traffic route*, installation, roof) and injure people.

The term *lifting equipment* comprises all equipment for lifting and, if applicable, subsequently suspended loads, e.g., cranes, winches, wire rope/chain hoists, and telescopic fork-lift trucks.

Load handling attachments are components or equipment parts that do not form part of the *lifting equipment* but enable loads to be lifted, e.g., c-hooks, lifting magnets, cross-beams, and grabs.

Measures

Activities during which objects may fall and endanger people shall be systematically recorded and assessed with respect to the risk of accidents. Technical and organizational measures should generally always take precedence over the use of *personal protective equipment*, as they provide an equal measure of protection for all. A risk assessment is carried out to determine whether supplementary *personal protective equipment* is required. A description of the *procedure* and information on possible protective measures can be found in the Implementation Guide "Protection from *Falling Objects*".

"The risk of being hit by falling objects is greater than is frequently assumed."

The following working situations should generally be considered:

- **Suspended loads**

There is always the possibility that objects may fall during the transportation of loads suspended by cranes or other *lifting equipment*. Suspended loads shall therefore not be transported over people's heads. Conversely, people shall not stand/walk under suspended loads. An appropriate safety clearance shall be observed.

The permitted load-bearing capacity of all *lifting equipment* and *load handling attachments* shall be clearly displayed and permanently attached to the equipment or made available to the operator. Lifting accessories such as chains, ropes, or slings for securing loads shall be used in the proper way, stored, and regularly inspected. *Lifting equipment* and *load handling attachments* may only be used by employees with the appropriate aptitude and training (see section 10.1 "Special requirements for crane installations").

- **Storing materials in shelving systems**

When filling or emptying shelving systems, materials that are not properly secured or appropriately stacked may fall out. Pushing materials through the shelving and into other materials may also cause objects to fall out. Materials shall therefore always be secured and stacked properly. Appropriate measures shall be taken to prevent materials being pushed through freestanding shelving and double shelving if workplaces or *traffic routes* are located behind them.

- **Working at various levels**

Simultaneous activities at different levels present particular risks. Scaffolds, working platforms, etc., shall therefore be fitted with suitable guard rails, safety fences, or parapets. Depending on the type of activities to be carried out, further measures such as the installation of protection nets or protective scaffoldings should be taken. All openings shall be covered or secured by means of guard rails, barriers, or balustrades. Particular attention shall be paid to coordinating work. Before starting work, it shall be checked whether transportation of materials or movements of people and vehicles, etc., may result in mutual risks. When it is not possible to reliably prevent tools or

working materials from falling onto *traffic routes* or workplaces, they shall be appropriately protected by other means, e.g., protective roofing or protection nets.

- **Work on elevator installations**

When working on elevator installations there is a general risk that people or objects may fall into the shaft through unsecured openings or fall down when working in the shaft. Shaft entrances shall therefore always be secured to prevent people or objects falling into them.

- **Work in trenches and pits**

When working in and near trenches and pits, there is also a general risk that people or objects could fall into them. Furthermore, the sides may collapse. Trenches, pits, and the surrounding areas shall therefore be appropriately secured. During excavation work, suitable embankments or wall shoring and an appropriate safety clearance for the movement of vehicles or storage of materials shall be ensured.

10.8 Tanks and confined spaces



Procedure defined for approving work in tanks and confined spaces (issue of a work permit)?



Work permits available on-site?



Measures systematically implemented?

When working in *tanks and confined spaces*, increased hazards can arise due to limited space for moving, unusual air composition, or special installations. Therefore, work in *tanks and confined spaces* shall be planned and executed with special care.

Definition of terms

The term *tank and confined spaces* covers all areas surrounded by solid walls in which the room to move and the air exchange are restricted, e.g., boilers, tanks, silos, pipelines, shafts, and channels, etc. This also applies if the areas are only partially enclosed by solid walls, e.g., in the case of open pits.

Work as referred to in this section is all activities for which people get into *tanks and confined spaces*, i.e., enter, climb in, creep in, or duck in.

“In principle, work in tanks or confined spaces may not be started until a written work permit has been issued.”

Measures

In principle, work in *tanks and confined spaces* may not commence until a written work permit has been issued. For this purpose, all companies included within the scope of this manual shall define a process that describes the *procedure* for issuing a permit. The work permit shall name the defined protective measures. The work permit shall be issued by the responsible supervisor on the basis of a risk assessment. The employees involved shall be informed about the contents in comprehensible form.

Special attention should be paid to the composition of the air in the *tank and confined space* for the risk assessment. Potential hazards owing to shortage of oxygen or excess oxygen, or to air pollutants, shall be considered. As a rule, measurements are required for this. Inert gases with which containers and pipes are filled in welding processes are not breathable for human beings, for which reason leaning into or entering the filled zones is life-threatening if no suitable respiratory protection is worn.

Typical sources of gases in shafts and pits are putrefaction processes, which can lead to hazardous concentrations of methane, hydrogen sulfide, or carbon dioxide. Besides the risk of asphyxiation there is also the risk of explosion under certain conditions. During work at least one lookout shall be on-site to maintain the connection with the employees in the *tank and confined space* from the outside. The lookout shall be able to initiate the defined emergency and rescue measures at any time. Only if hazards from a shortage of oxygen, *hazardous substances*, or installations can be excluded, and the *tanks and confined space* can be exited at any time without outside help, is it possible to forego the lookout.

When entering the shafts of wastewater systems it is particularly important that rescue measures have been prepared and that suitable emergency equipment is in place. Depending on the depth and risk situation, a permanent lifeline shall be used to protect the employee from falling and ensure that, in the event of an emergency, they can be rescued quickly and without endangering anyone else.

10.9 Hot work

- Procedures defined for approving hot work (issue of a work permit)?
- Permits available on-site?
- Measures systematically implemented?

When carrying out *hot work* there is always a higher risk of fire because combustible materials located at some distance from the working position can be ignited by sparks. This may happen even after a significant delay. Also, welding and cutting torches, soldering lamps, etc., that have been put into operation and are placed down or switched off represent a hazard.

Definition of terms

Hot work refers to the following types of work: Welding, thermal cutting, thermal spraying, abrasive cutting and soldering, and heat bonding and thawing with an open flame.

Measures

Hot work outside the workplaces intended for the purpose may not be started until a written work permit has been issued. For this purpose, all companies included within the scope of this manual shall define a process that describes the *procedure* for issuing a permit. The work permit shall name the defined protective measures.

The fire protection measures typically include the removal or covering of flammable substances, the sealing of floor and wall openings, and the provision of fire wardens and a fire watch. As protection against explosions, sealing and ventilation are measures that can be taken. The work permit is to be issued by the relevant responsible supervisor on the basis of a risk assessment. The employees involved shall be informed about the contents in comprehensible form. Work that entails a fire hazard shall be prohibited if it is impossible to definitely rule out a danger of explosion.

10.10 Physical stress



Bearing loads from lifting, carrying, and similar manual transportation activities as well as by constrained posture or continuously repeated movements minimized as far as possible?



Employees instructed?

The human body lacks the aptitude for bearing the loads from lifting, carrying, and similar manual transportation activities. Especially when loads are heavy and repetitive they can cause adverse effects on health that manifest themselves in back pain and can cause long periods of sick leave. However, not only the load weight and frequency of repetition are important; posture and the ergonomic conditions in the workplace, the work environment, the load, and any aids that may be used also play a role. It is therefore impossible to define a general upper limit for the weight of a load.

Any type of activity in which a person is forced into a certain posture over a longer period of time is also detrimental. Standing, sitting, leaning forward, squatting, kneeling, or similar postures lead to overloading of the individual muscle groups or joints, and possibly also overloading of the cardiovascular system. Early degeneration, inflammation of tendons and muscles, as well as increased blood pressure could be some of the consequences. Aids, which compel an individual to a certain movement of the body, can also lead to an incorrect load. The benefits and risks must therefore be carefully weighed up.

Activities that are associated with constantly repeated movements can also have similar effects on individuals' health. A typical example of such repetitive activities is manual assembly-line work. In combination with extreme movements in the joints or high physical effort, the musculoskeletal system is subjected to particularly severe and usually one-sided strain. The consequences of such activities are often musculoskeletal complaints in the hand-arm-shoulder area. Over time – depending on the type of stress – painful, long-term illnesses can develop, such as the so-called carpal tunnel syndrome, i.e., inflammation of the wrist tendon sheaths.

Definition of terms

Manual handling of loads refers to all ways in which a load is conveyed or held by means of human strength, especially lifting, carrying, pushing, pulling, and supporting a load.

Constrained posture or static activity occurs when employees have to adopt physical postures over a longer period of time due to the activity performed, the work equipment used, and/or the workplace design, which do not allow any or only limited possibilities of movement.

Continuously repeated movements are identical or similar work processes that are repeated at short intervals of seconds or minutes over a period of at least one hour.

Measures

The work should always be organized such that the accident and health risks from manually handling loads, *constrained postures*, or *continuously repeated movements* are avoided. If this is impossible due to the type of activity, appropriate measures shall be taken to reduce the risk to a tolerable measure.

The following considerations may be helpful for defining the measures for *manual handling of loads*:

- Can the load weight be reduced, e.g., by dividing the weight into several smaller units?
- Can aids, such as lifting aids, be made available to make manual handling easier or to reduce the time it takes?
- Can the ergonomic conditions be changed to make manual handling easier, e.g., by avoiding twisting the body?
- Can the employee arrange the work in such a way that the *manual handling of loads* alternates with other work?

In the event of strains caused by *constrained posture* or constantly repeated movements, it helps to assess measures based on the following questions:

- Can the workplace be changed in such a way that it can better meet the body dimensions of the employees and their requirements for movement and clearance spaces, working heights, and visual and grasping area?
- Can the workflow be designed in such a way that there is a switch between different postures (e.g., sitting and standing)?
- Can aids be provided to support the performing of the work, e.g., holding or joining devices, visual aids?
- Can auxiliary aids be made available that relieve the body, e.g., support aids, arm rests, floor mats, knee pads?

It should be noted that compulsive postures are sometimes triggered by employees reacting to unpleasant environmental conditions, such as inadequate *lighting*, glare, or draughts.

Employees who are exposed to accident and health risks because they manually handle loads or adopt *constrained posture* or repetitive movements shall receive instruction and, in doing so, shall be informed of the risks and possible behavior and counter exercises. This instruction shall take place before work is started and it shall be repeated at regular intervals.

10.11 Mental workload

- Mental workload that could arise from the task/duty, work organization, working environment, or social relationships taken into account?

Work not only has a physical but also a psychological effect, in other words, for example, it also influences employees' concentration, creativity, and motivation. The effects can be beneficial but also hazardous to health, depending on the quality of the working conditions and cooperation with fellow employees. Well-structured and well-organized working conditions have a positive effect on health and on the quality of an employee's work. On the other hand, working conditions that are poorly structured and organized may increase the risk of accidents at or on the way to/from work (*commuting accidents*) and of diseases and ailments. In order to identify possible risks within an acceptable time period, *mental workload* shall be systematically documented as part of the risk assessment.

Definition of terms

The term *mental workload* covers all factors having an influence on the way in which employees feel, think, and act. They arise from the type of task/duty, work organization, social relationships, and the working environment to which employees are subject.

Measures

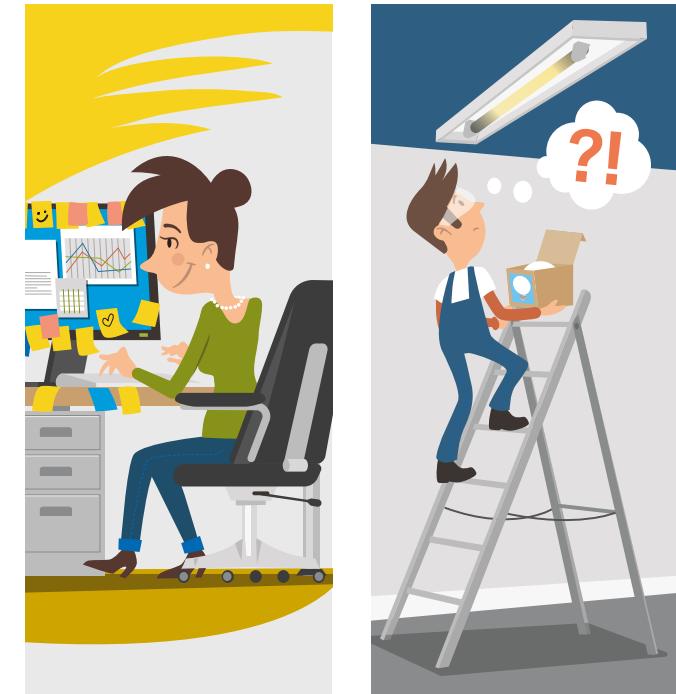
The objective is to establish working conditions that are as health-promoting as possible. Measures are then necessary at the latest when a situation of chronic inappropriate *mental workload* is identified. Inappropriate *mental workload* can arise not only from the frequency and intensity but also from multiple *incidents* of workload. Conversely, for example, a supportive working atmosphere can have a positive effect and balance out workload peaks to a certain extent.

In the interests of being able to objectively assess the working conditions and derive effective measures, employees ought to be closely integrated into and involved in this process as experts on their respective activities. Improvement measures relate to the design and structuring of the

- Contents of work content/work task
- Work organization
- Social relationships
- Workplace/working environment

The focus is on the conditions under which employees work. Where necessary, the improvement of working conditions can be usefully supplemented by targeted measures towards individual *health promotion* (e.g., stress management training).

The Implementation Guide "Dealing with *mental workload*" describes how *mental workload* within the day-to-day working environments can be identified and provides information about potential measures for improvement.





10.12 Design of the work environment

10.12.1 Traffic routes

- Traffic routes sufficiently dimensioned, clearly identifiable, and without trip hazards?
- Pedestrian and vehicle traffic separated?
- Stairways/steps fitted with handrails?
- Escape/rescue routes marked?
- Emergency doors/exits kept clear?

One important prerequisite for the safety of pedestrians and vehicles in the on-site traffic is adequately dimensioned *traffic routes* designed for safety.

Definition of terms

Traffic routes are areas designated for on-site pedestrian and vehicle traffic, primarily roads, paths, passages, corridors, ramps, and steps.

Measures

Traffic routes should be clearly designed and kept as straight as possible. They shall be designed so that they are sufficiently wide and high for the intended use, in compliance with the relevant *statutory regulations*. When designing *traffic routes* for vehicles, the width of the vehicles including the

“Traffic routes should be identifiable as such to ensure that they are not used for other purposes, for example for storing materials.”

freight and the safety distances from the edge and from the oncoming traffic shall be taken into account. If a *traffic route* is used both by pedestrians and vehicles, a safety distance of at least 0.75 m from the edge is required as a rule. Basically, it is advisable to separate pedestrian and vehicle traffic by means of structural installations, e.g., safety fences. If *traffic routes* for vehicles are located so close to doors, gates, stair exits, passages, or tunnels that there is a risk to people when crossing, separating structures are imperative.

Traffic routes should be identifiable as such to ensure that they are not used for other purposes, for example for storing materials. It has proved worthwhile to distinguish *traffic routes* in work or storage facilities by means of surface markings.

To prevent stumbling, slipping, and falling accidents, *traffic routes* should be built to be as even and skid-resistant as possible. Installations such as shaft coverings or gutter drains shall be embedded so that no trip hazards arise. Attention shall be paid that stairways have sufficiently large,

stable steps with an even distance between them. They shall be equipped with at least one handrail if the length of the stairway makes this necessary. *Traffic routes* that also serve as rescue routes shall lead to the outside or into a safe-guarded area by the shortest way possible; they shall be marked as rescue routes. It shall be possible to open doors along the rescue routes without any aids whenever there are people in the work area.

10.12.2 Lighting



Workplaces and traffic routes appropriately lit?



No glare?

Humans assimilate around four fifths of all sensory impressions through their eyes. Good *lighting* is therefore not just a prerequisite for safety and health in the workplace; it also serves to preserve the employees' will and capacity for achievement.

Definition of terms

Lighting refers to the illumination of a room or object by artificial light.

Measures

Workplaces and *traffic routes* shall be designed and equipped in such a manner that appropriate *lighting* can be guaranteed. The *lighting* shall be appropriate for the visual task and provide safe orientation. At workplaces that are permanently occupied, the rated light intensity should not normally fall below 200 lux. The relevant *statutory regulations* shall be complied with.

“The lighting shall be appropriate for the visual task and provide safe orientation.”

It is not just the luminosity that is decisive for the quality of *lighting*, but also the distribution of the light density in the room as well as the quality of the color reproduction. Especially safety colors shall be able to be seen correctly. When selecting and arranging lamps and lights, care shall be taken to avoid glare and flicker effects. Lights are subject to an aging process, which is accompanied by a reduction in output. Therefore, compliance with the intended luminosity shall be checked at appropriate intervals.

10.12.3 Climate and air quality



Climate in rooms appropriately adjusted?



Non-smoking employees protected from tobacco smoke?



Special impurities of the air assessed?

The health and well-being of human beings is significantly dependent on the climatic ambient conditions and *air quality*. Only if the *climate* permits sufficient heat exchange with the environment and adequate breathable air is provided can the human body maintain its full ability to function.

Definition of terms

The term *climate* subsumes all physical environmental factors that affect the heat exchange between the human body and its environment.

The term *air quality* addresses the question of air purity. *Air quality* is high when the air is free of impurities.

Measures

The *climate* in the work rooms shall be adjusted so that the health of employees is not at risk.

In detail, the following climatic factors shall be taken into account:

- Air temperature
- Air humidity
- Air velocity
- Heat *radiation*

Besides the relevant *statutory regulations*, regional conditions and the physical work load, the type of clothing, and the time of exposure shall all be borne in mind when adjusting the room *climate*. If the company operation causes special climatic burdens or impurities of the air to arise, these shall be reviewed explicitly in the context of the risk assessment and suitable protective measures shall be taken. This also applies to outdoor workplaces where employees are exposed to heat or the cold or specific impurities of the air.

Tobacco smoke significantly reduces *air quality*. In work spaces, measures shall therefore be taken to protect non-smokers from the health risks associated with tobacco smoke.

10.12.4 Noise

- Noise areas competently determined and marked?
- Noise reduction measures taken?
- Employees medically examined?

Noise stresses the human organism and if exposure is excessive it can cause adverse effects on health. Furthermore, *noise* disturbs concentration, communication, and the perception of acoustic signals in humans. Therefore, the *noise* level in the workplace should always be kept as low as this type of operation allows.

Definition of terms

Noise refers to the sound that disturbs people or can have adverse effects on health. High *noise* areas are areas in which the threshold for *noise* hazardous to hearing is exceeded.

Measures

Companies included within the scope of this manual shall determine potential *noise* areas competently in the context of the risk assessment. If the relevant statutory limits are exceeded, appropriate noise-reduction measures shall be taken. If in individual cases there are no stricter statutory limits, an equivalent permanent sound level of 90 dB (A) applies in noise-reduction measures.

Noise-reduction measures that aim at reducing the generation or spreading of *noise* should always have priority over other measures, particularly over *personal protective equipment*. Only if the generation or spreading of *noise* that is hazardous to hearing cannot be prevented in spite of technical or organizational measures shall appropriate protective earplugs or earmuffs be used. In this case, the provisions of section 10.15 "Personal protective equipment" shall be complied with. High *noise* areas shall be marked by the relevant mandatory signs.



Employees who regularly work in high *noise* areas are subject to the regulations for preventative occupational medicine (see section 10.13.1 "Preventative occupational medicine").

10.12.5 Office work

- Sufficiently large desk?
- Enough free space for legs?
- Office chairs adjustable and stable?
- Monitors large enough and free from glare/reflections?
- No trip hazards in traffic routes?

Office work entails specific health hazards that are often not recognized, or are recognized too late. Lack of movement and bad or *constrained posture* when working with a monitor can cause disorders that not only impair performance, but also entail longer periods off work. Furthermore, signs of eye fatigue can occur, which manifests itself in headaches and stinging eyes or tears.

In offices, too, there are accident risks that shall not be underestimated. These include above all tripping, slipping, and falling as well as falls from office chairs or other pieces of furniture that are used instead of a ladder.

Definition of terms

Office work refers to planning, project, administration, and communication activities in which a desk, office chair, monitor, and input devices such as a computer keyboard or mouse are used as the central working equipment.

Measures

Office workplaces shall be designed to prevent bad or *constrained postures* and permit a healthy measure of movement to take place. This entails appropriate furnishing of the office workplace with a sufficiently large desk and enough free space for the legs. The office chair shall be adjustable and provide sufficient stability. The employee should be able to place both feet flat on the floor when sitting down. If this is not possible because of the height of the desk, the workplace should be equipped with a footrest. Height-adjustable desks avoid these problems and, at the same time, encourage an ergonomically favorable posture because they permit individual adjustment of the working height to the body height of the employee.

The size and picture quality of the screen shall be appropriate for the task at hand. It shall be installed in such a manner that glare and reflections are avoided. As a rule this is

achieved by ensuring that the line of vision of the employee when looking at the screen runs parallel to the façade windows.

In order to prevent bad posture, portable devices such as notebooks or netbooks may be used at permanent workstations only in combination with a separate screen and keyboard.

In order to prevent tripping or falling accidents, *traffic routes* shall be kept free of obstacles. Special attention shall be paid to electric lines and telephone and data cables that are laid loose on the floor and can become a tripping hazard in office areas.

To avoid *incidents* from falling, files and other heavy or bulky objects should, if possible, be stored at a height that can easily be reached when standing on the floor.

If a certain height is exceeded and the employee is unable to safely reach the files, a suitable ladder or tread shall be supplied for the employee to use.

“Lack of movement and bad or constrained posture when working with a monitor can cause disorders.”

10.13 Individual health

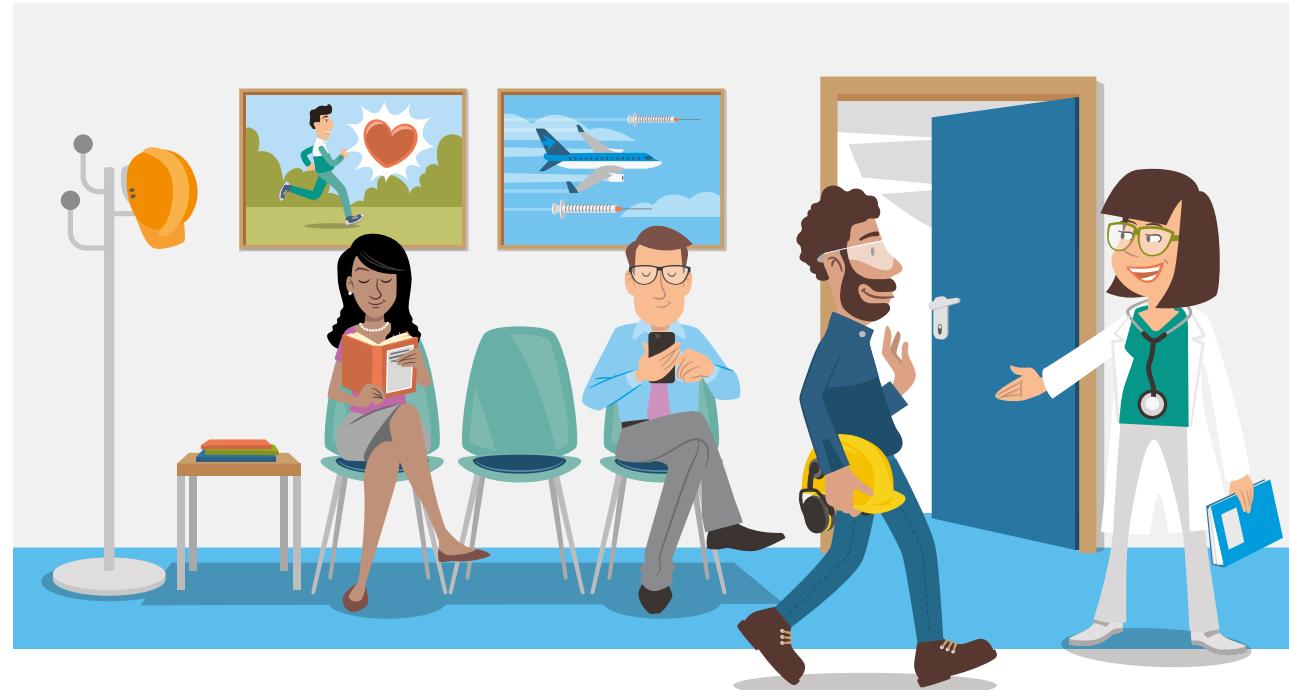
10.13.1 Preventative occupational medicine

- Procedure defined for identifying the required preventative occupational medicine?
- Preventative occupational medicine realized as scheduled?
- Documentation available?
- Regular repetition ensured?

Preventive occupational medicine is an important part of the company health protection policy. It contributes towards the identification of greater health hazards in the workplace. This makes it possible to counteract occupational illnesses at an early stage and to permanently maintain the employees' ability to work.

Measures

Each company included within the scope of this manual shall determine the necessity for occupational medical prophylactic examinations based on the risk assessment. Preventative occupational medicine shall be planned in compliance with the relevant *statutory regulations*, and its scheduled implementation shall be monitored. It is the responsibility of the respective supervisor to register the employees for preventative occupational medicine. The company physician (see section 6.1.4 "Company physicians") advises them in this



matter. The examination and consultation scope depends on the hazard situation and the relevant *statutory regulations*.

The employee is informed about the result. It is recorded in a healthcare file taking into account the physician's obligation to secrecy. If necessary, measures are derived therefrom. These examinations shall be carried out by appropriately qualified physicians. As a rule they are specialists in occupational medicine.

In Germany the provisions of the Ordinance on Preventive Occupational Medicine, in particular the differentiation between mandatory and optional preventative occupational medicine, shall be observed.

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10.13.2 Medical aptitude tests

- Procedure defined for determining the activities for which medical aptitude tests are necessary?
- Necessary guidance/examinations performed as scheduled?
- Documentation available?
- Regular repetition ensured?

Medical aptitude tests, also known as health suitability tests, serve the purposes of determining an employee's health-related suitability for a specific work activity. Medical aptitude tests are particularly intended for those working activities that are deemed on the basis of the risk assessment to harbor the possibility of putting at risk a medically unsuitable employee or third parties. They therefore directly serve the purpose of *incident prevention*.

Tests performed within the framework of the recruitment *procedure* similarly constitute a form of medical aptitude tests. It is performed on behalf of the employer in the interests of verifying the candidate's medical aptitude for the intended position.

The relevant *statutory regulations*, in particular with respect to data protection, shall be observed. Depending on *statutory regulations* and national practice, the employee representatives should be involved. In Germany, the relevant company parties shall agree rules for conducting the risk assessment, implementing medical aptitude tests, and offering alternative workplaces.

The standards described in this manual should be applied where aptitude tests are carried out, provided the practice doesn't oppose any legal restrictions or statutory provisions.

Measures

Each company included within the scope of this manual shall, on the basis of the risk assessment, determine the necessity for medical aptitude tests in connection with the following activities:

- Driving and control activities
- Activities involving *fall hazards*

Respective supervisors are responsible for registering employees for medical aptitude tests. The company physician (see section 6.1.4 "Company physicians") advises them in this matter. The scope of the examination depends on the accident and health-related risks relating to the intended activity and on the relevant *statutory regulations*. The minimum content is described in Appendix 10.13.2. a.

The employee is informed about the result. It is recorded in a

healthcare file, with account being taken of the physician's obligation to secrecy. Unless determined otherwise by law, the employer is merely provided with the information as to whether and/or subject to which requirements the employee is suited to the activity in question. Supervisors may not assign work to employees who are evidently unable to perform such work without endangering themselves or others. An employee found to lack the psychological or physical ability for performing a work activity shall be offered a replacement activity; this shall take place in dialog with the respective supervisor, the company physician, the employee himself/herself, and the employee representative, with account being taken of the company's operational possibilities.

The guidance/examination and assessment shall be carried out by appropriately qualified physicians who are acquainted with the particular hazards at the workplace. As a rule they are specialists in occupational medicine. It is up to the respective personnel department to register candidates for the recruitment medical test. The scope of the guidance/examination depends on the intended job and the workplace in which the candidate is to work. The specifications arising from the relevant *statutory regulations* shall be complied with. The candidate is informed of the result of the recruitment medical test; it is kept in the healthcare file, taking into account the physician's obligation to secrecy.

"Respective supervisors are responsible for registering employees for medical aptitude tests."

The customer only receives the information as to whether and under what circumstances the candidate is suitable for the intended job. Like the occupational medical prophylactic examinations, the recruitment medical tests shall be carried out by suitably qualified physicians.

Recruitment medical tests for executives are basically set out in the employment contracts. Potential minimum content is defined in Appendix 10.13.2 b. Where additional specific hazards exist such as frequent activities abroad involving special health risks, this shall be taken into account in medical aptitude tests.

10.13.3 Medical travel advice

- Countries defined for which there is a necessity for medical travel advice/medical travel examination?
- Advice sessions/medical travel examinations completed?
- Documentation available?

Medical travel advice is a further key element of the company's occupational health protection activities. It plays a part in identifying and taking preventative action against heightened health risks that might arise in travel in certain countries. The presence of heightened health risks is to be as-

sumed in all countries situated in the geographical zone between 30 degrees of northern latitude and 30 degrees of southern latitude, even if only partially within these limits, as well as in the polar regions. Heightened health risks can also arise in countries in the temperate zones with hygienic shortcomings or uncertain healthcare. The company physician (see section 6.1.4 "Company physicians") or another physician experienced in travel medicine can provide advice here.

Medical travel advice comprises advice on behavioral measures, vaccinations, and malaria prophylaxis.

Measures

Each company included within the scope of this manual shall, on the basis of the risk assessment, determine for which destination countries there is a necessity for medical travel advice and for which countries a medical travel examination needs to be performed. It is essential for a company physician to be involved and, if necessary, for a physician with specific expertise to be consulted, as a rule, a specialist in tropical medicine.

Respective supervisors are responsible for registering employees for medical travel examinations. The scope of the advice depends on the hazard situation and the relevant *statutory regulations*, and the focus is on providing comprehensive travel-related information and advice on the necessary vaccinations and formulation of a vaccination proposal. Depending on national practice, vaccination may also be carried out. The information and advice shall take account of the respective places of work and the accommodation and working conditions. Medical travel advice is to be provided before each further trip because of the possibility of new outbreaks of infections or travel risks having arisen since the last trip.

On the other hand, a medical travel examination is, as a rule, only necessary every three years, but earlier where the appearance of new diseases or medical necessity are involved. The minimum contents of medical travel advice and examinations are listed in Appendix 10.13.3 "Minimum content for medical travel advice and examinations". The relevant statutory and, in particular, data protection regulations are to be observed and complied with in this connection.

Note:

thyssenkrupp uses the tool "TravelTracker" to improve the foreign and travel security. Travelers are advised to provide their e-mail address and mobile phone number in the thyssenkrupp TravelWorld, so that the responsible Security Officer can make direct contact via e-mail or SMS in case of crisis.

10.13.4 Promotion of individual health behavior



Appropriate measures established for health promotion?

Activities for the promotion of individual health behavior are aimed at enhancing the health and well-being of the employees and, at the same time, at boosting their motivation and performance. Appropriate measures for the promotion of occupational health therefore constitute a vital element in the sphere of individual health.

Definition of terms:

Health promotion means the health-promoting design of working and organizational conditions by the employer and the strengthening of individual health behavior.

Measures

Companies included within the scope of this manual are directed to offer measures, as appropriate and after taking into account the respective operational possibilities and needs, of the following areas of *Health Promotion*. The respective working time models shall be taken into account:

- **Exercise**

Exercise offerings aimed at boosting employees' physical activity, for example fitness training or running courses.

- **Nutrition**

Measures in the sphere of nutrition can, on the one hand, have a positive effect on individual employees' eating habits, for example in the form of individual nutritional counseling. On the other hand, offering wholesome food and beverages can help in systematically and sustainably improving the conditions for healthy nutrition in the company.

- **Stress management**

Training, counseling, or courses on the topic of stress management with the objective of providing employees with support in handling stress situations. At the same time, relaxation offerings such as progressive muscle relaxation or autogenic training help boost the individual's resources so that stress is perceived as less burdensome.

- **Addiction prevention**

Training, counseling, or courses on addictive behavior, with the objective of sensitizing employees to the necessity for the responsible handling of addictive substances. This includes, for example, stop-smoking programs or counseling on the topic of alcohol/drugs or medication misuse.

- **Medical screenings**

Medical screenings within the framework of targeted campaigns, e.g., diabetes screenings, provide the possibility of addressing typical risk factors and offering employees corresponding preventative measures.

- **Other non-work-related health risks**

There may also be a need for measures towards individual *health promotion* beyond the aforementioned thematic areas, for which reason the thematic areas referred to ought not to be seen as an exhaustive list but instead should be added to according to need.

The Implementation Guide "*Health Promotion*" explains step by step how to set goals and measures, gives practical examples, and provides background information.



10.13.5 Employee Assistance Program (EAP)

- Possibility of offering psychosocial support reviewed?
- Employee Assistance Program established where necessary?

As part of the promotion of individual health, it is also important to offer psychosocial advice and support (Employee Assistance Program). Qualified experts such as psychotherapists, educators, and coaches can provide individuals with counseling on professional and private matters – in one-to-one meetings and also via video chats or by telephone or e-mail. This service can be provided by internal specialists or external service providers. Prerequisites for this are strict confidentiality and anonymity.

“As part of the promotion of individual health, it is also important to offer psychosocial advice and support.”

The counseling can cover coping with emergencies or personal crises, psychological problems, or difficult management situations, for example:

- Crisis management after a serious/fatal *occupational accident*
- Death of a relative
- Conflicts in the family or partnership
- Financial distress
- Addiction
- Difficult professional situations
- Brief coaching for executives and supervisors

Measures

Depending on requirements and the operational possibilities in each case, companies included within the scope of this manual should give consideration to establishing an Employee Assistance Program to deal with personal crises when they happen and work to proactively and professionally prevent them.

10.14 Reintegration management

- Possibility of establishing a company reintegration management system reviewed and, where necessary, implemented?

Reintegration into company operations is a process deployed after an employee's long absence from work due to health-related incapacity. The objective is to clarify whether the incapacity can be surmounted, by which means and with

which aids renewed incapacity can be prevented, and whether the job can be retained to avoid health-related terminations.

Measures

Depending on the *statutory regulations* or the respective operational possibilities, companies included under the scope of this manual shall give consideration to setting up a company reintegration system so that employees can be reintegrated into the work process in line with their capabilities after a long, health-related period of absence from work. To this end a structured approach should be selected, which starts with making contact with the employee in question as soon as the defined period of absence is reached. The clarification of options and limits in terms of reintegration is followed by a decision on implementation and on the next steps and specific individual measures. The following functions can advise any affected employees in addition to the responsible leader: company physician, personnel manager, works council, and severely disabled representatives (if available). The implementation of the measures is followed by an evaluation of the effectiveness of the measures.



10.15 Personal protective equipment



Procedure defined:

- For selection and release of suitable personal protective equipment?
- For provision and regular inspection (if required)?



Work areas clearly marked?



Employees instructed?



Right way to use practiced?

It is not always possible to prevent employees from exposure to accident and health risks by technical or organizational measures. In such a case companies shall provide appropriate *personal protective equipment* to enable employees to be healthy and safe at work.

Definition of terms

Personal protective equipment is all the items of equipment that are destined to be worn or used by persons in order to protect them from hazards at work.

Personal protective equipment includes for example:

- Earplugs or earmuffs
- Protective helmets
- Protective goggles
- Respiratory protection masks
- Protective gloves
- Safety shoes
- Fall protective equipment
- Cold or heat protection clothing

Working clothes without any special protective function, such as an overall, do not count as *personal protective equipment*.

Measures

Personal protective equipment may only be used on the condition that accident and health risks cannot be sufficiently reduced by other appropriate protective measures. Technical and organizational protective measures shall generally take precedence.

The necessary protective measures are defined in the context of the risk assessment (see chapter 3 “Workplace risk assessment”). If unacceptable accident or health risks remain after all options have been exhausted, companies included within the scope of this manual shall provide appropriate *personal protective equipment*.

The areas in which *personal protective equipment* shall be worn shall be clearly marked with the specified mandatory signs. The company shall define a release procedure for the selection of suitable *personal protective equipment* and make sure that only appropriately approved protective equipment is procured and handed out.

The right way to use the *personal protective equipment* shall be explained to the employee and if needed be practiced with them. This instruction shall take place before work is started and it shall be repeated at regular intervals. The employee shall use the *personal protective equipment* and handle it with care.

Before work starts, or prior to each application, the employee shall check the protective equipment for visible defects. If a defect is found that cannot be eliminated by themselves, they shall report this to his responsible supervisor so that the latter can provide a remedy. Protective equipment intended as protection against fatal hazards (e.g., protective equipment against falling or special clothing to protect against chemicals) shall be inspected additionally at regular intervals by a competent person to establish if it is in the proper condition.

The manufacturer's information shall be taken into account when defining the intervals and the scope of *inspection*. Observance and implementation of these checks are the responsibility of the responsible supervisor.



10.16 Work permit procedures for activities with specific hazards

Experience has shown that certain activities are associated with particular hazards. They shall therefore be planned and carried out with particular care.

Measures

Activities involving special hazards may only be started after a written work permit has been issued, if they are carried out outside permanent workplaces, which are set up for the relevant activity. These activities include activities within the Group:

- Activities involving *ionizing radiation* (see section 10.5)
- Activities involving *fall hazards* (see section 10.6)
- Activities in *tanks and confined spaces* (see section 10.8)
- Activities involving *hot work* (see section 10.9)

The work permit to be issued represents a binding agreement on the protective measures to be taken, and must therefore be signed both by the person responsible for carrying out the activity, and by the person responsible within the company. The work permit shall contain information on the period of validity, the geographical area of the activities, as well as on the termination or removal of safety measures after the activities have stopped. Samples of work permit are available at we.net.

On the basis of the risk assessment, the Group companies can define further activities for their area of responsibility for which a work permit shall be issued.

These can include:

- Activities in the vicinity of high-voltage overhead lines
- Activities in the area of railway tracks
- Earth drilling, excavation, and excavation work
- Demolition work on buildings and facilities

Activities involving particular hazards shall be overseen by a supervisor who shall verify the implementation of the established protective measures. The supervisor shall have authority to issue instructions to all staff involved.

10.17 Contractor management



Procedure defined:

- Contractor selection and award of contract?
- Planning and induction?
- Monitoring and assessment of the work?
- Feedback after the contract has been executed?

It is the declared objective of thyssenkrupp to make no distinction between its own employees and the employees of contracting companies carrying out activities on behalf of thyssenkrupp with regard to occupational safety and health management (see Appendix 2, "Occupational Safety and Health Policy"). Achieving this goal requires the readiness and willingness of the contracting companies to meet the requirements imposed by thyssenkrupp. Furthermore, both sides shall cooperate in a spirit of trust on the planning and execution of the activities.

The standard for the requirements to be set from the point of view of occupational safety and health management are the accident and health risks associated with the planned activities. The higher the risk that someone could be injured during the execution of the contract, the more carefully the activities shall be planned and carried out. The basis for good planning is clearly defined statements of work; these should include the activities, which shall be avoided to prevent mutual hazards that could be expected from particularly those from the side of the contractor. Even contracts with a limited-scope contract

can result in considerable accident or health risks. The safety effort shall therefore not be made dependent solely on the scope and volume of activities.

Definition of terms

All third-party companies that provide services to thyssenkrupp based on a works or service contract are termed *contractors*. This does not include temporary employment contracts, and activities that do not bear increased accident or health risks.

Measures

For each company included within the scope of this manual an appropriate process for dealing with contractors shall be defined. The following process steps shall be described. To provide additional support, a sample process description is available at we.net.

Selection and award of contracts

When defining selection criteria for contractors, appropriate account shall be taken of occupational safety and health management aspects. Depending on the type and scope of the contract to be awarded, the person responsible for the selection of contractors shall obtain information on the occupational safety and health management and the accident record of the bidders; which shall subsequently be evaluated. Where appropriate, a questionnaire shall be used containing at least the questions, that are provided in the Group questionnaire "Contractor self-assessment – minimum content" (see Appendix 10.17 a). When using the IT system pronet, this questionnaire appears automatically. The Group company is free to supplement questions or obtain additional information from the provider through an additional audit.

Contractors that have successfully completed the selection and qualification process shall be included in a list of approved contractors. The list shall be reviewed at regular intervals and amended as necessary.

Contractors wishing to work for thyssenkrupp are to be informed of the applicable occupational safety and health management requirements, in particular when they go beyond the standard requirements of the Group. As a general rule, this is done when tenders are requested. Contractors shall agree to all requirements (see section 8.2.2 "Contractors").

The requirements shall be set down and agreed upon in the contract in the appropriate format. Depending on the relevant national *statutory regulations* and conventions, a catalog of sanctions can also be defined. Possible sanctions could be verbal or written warnings, stoppage of all activities, additional instructional measures, expulsion from the location, and in severe cases immediate cancellation of contract.

As a rule, the Purchasing Department is responsible for the selection process for contractors and awarding of contracts.

Planning and induction

Before the contractor begins any activities, the Group company shall name a person for the contractor to contact who is responsible for handling the contract on behalf of thyssenkrupp. The responsible person of thyssenkrupp shall be sufficiently informed of their exact areas of responsibility, their exact tasks, and their levels of authority in reference to contractors.

In turn, the contractor shall name a person to serve as a contact to thyssenkrupp. This person shall be authorized to issue instructions to employees of the contractor.

The responsible person of thyssenkrupp must agree with the contractor-responsible before starting work. It is a clear and important task of the thyssenkrupp-responsible at the Group company to induct the contractor-responsible with the contracted activities, and to determine any potential mutual hazards together with the latter. Where other parties are involved, they shall also be involved in the consultation process.

Where the activities extend over a longer period, the responsible parties should agree on regular appointments for the continuing coordination.

The purpose of the induction is to familiarize the person responsible at the contracted company with the general information for external parties and to inform them of the specific conditions at the site of operation. It is in the responsibility of the contractor-responsible to pass on the relevant information to the employees who are to be deployed in a verifiable manner.

Insofar as the work is to be carried out on the thyssenkrupp company site, contractors shall also receive relevant information on potential operational safety and health hazards that affect them directly when performing the activities, in addition to the general information for personnel unfamiliar with the site.

General information for external employees shall be provided before they start any activities. thyssenkrupp shall provide the necessary information. The contractor-responsible is responsible for ensuring that all their employees assigned receive and understand this information. On-site, the contractor-responsible has the duty to inform all employees of the specific operational hazards, the protective measures defined for them, and behavior during an emergency. The contractor duties also include that they shall document all instruction in an

appropriate form. It shall be comprehensible who received which instruction (see chapter 7 "Competence and awareness"). The contractor shall be able to present the documentation on-site upon request.

In turn, the contractor shall undertake the obligation to inform thyssenkrupp of all potential safety and health hazards that may arise from its activities. The basis is the workflow plan to be created by the contractor. All appropriate protective measures shall be agreed and set down in writing in order to prevent mutual hazards, e.g., with the aid of the form "Safety check to prevent mutual hazards" (available at we.net). When necessary a coordinator shall be appointed to coordinate the various trades and their associated activities.

Activities with specific hazards may only commence after a written work permit has been issued (see section 10.16 "Work permit procedures for activities with specific hazards").

Activities involving significant hazards shall be monitored by a supervisor who shall monitor the implementation of the established protective measures. It shall be agreed whether thyssenkrupp or the contractor shall provide the supervisor. The supervisor shall be appropriately qualified and given the authority to issue instructions to all staff involved.

Monitoring and assessment

The responsibility for executing the contract in compliance with safety and health considerations is borne by the contractor in principle. The Group companies have the obligation to check at regular intervals whether the agreed protective measures are indeed being observed. To this end, when appropriate the thyssenkrupp-responsible, a suitable person appointed by thyssenkrupp, or the designated coordinator shall visit the area of the intended activities and inspect it on the basis of

the criteria defined for the Group (see Appendix 10.17 b "Contractor management– questionnaire for monitoring and assessment"). The criteria list is stored and available in the pronet IT system. The Group company is free to use additional criteria. However, additional criteria shall not be taken into account in the overall evaluation of the contractor at Group level.

The frequency of on-site *inspections* shall be determined on the basis of the accident and health risks associated with the activities and previous experience with the contractor. When deviations are found during the *inspections*, the person responsible at the contractor must be informed so that they can take remedial action. When deviations are not rectified, an escalation process shall be defined.

The results of the *inspection* shall be summarized in an evaluation, which shall serve as a basis for subsequent awards of contracts. When pronet is used, the result will be automatically calculated by the IT system.

Feedback

At appropriate intervals and at the latest when the contracted activities have been completed, the contractor should be informed by the responsible person of thyssenkrupp for the awarding of contracts as to what extent the occupational safety and health management requirements were met from the point of view of the Group company. Any possible improvement potential detected shall be presented to the contractor.

This individual assessment should be incorporated in a regular overall assessment of the relevant contractor.

Emergency preparedness and response

- Potential emergencies systematically determined?
- Enough first aiders and fire protection helpers where necessary appointed and trained?
- Enough emergency communication systems/first aid materials/rescue equipment/extinguishing equipment available?
- Rescue chain defined and communicated?
- Alarm/emergency plans displayed and up to date?
- Concept for building evacuation prepared?
- Exercise carried out?
- Escape/rescue routes marked?
- Emergency doors/exits clear?
- Employees instructed?

Emergencies can never be ruled out at the companies' premises. Emergencies can occur, for example, in the form of accidents, fires, explosions, the impact of the elements, or disruptions of operations involving hazards to persons, the environment, or material assets.

Well-planned emergency preparedness is therefore imperative for the companies. For occupational safety and health management this means that precautions shall be taken for:

- Effective first aid and emergency medical care
- Effective alerts and evacuation of buildings
- The rescue of persons from hazard areas
- Preventive fire protection organization

All companies included within the scope of this manual shall determine potential emergencies, taking into account the relevant risks, and prepare appropriate responses.

11.1 First aid

In the event of accidents and sudden illness, first aid shall be provided as quickly as possible. Taking into account the relevant *statutory regulations*, companies shall also ensure that:

- Enough first aiders are appointed and trained to assume the responsibilities for first aid. Based on the type and size of the company, if required, company paramedics shall also be appointed
- The requisite facilities and equipment such as emergency communication systems, first aid rooms, first aid materials, rescue equipment, and rescue vehicles are available
- The rescue chain is defined and communicated
- The first aid measures are documented
- The employees are instructed on first aid topics prior to taking up their work and once a year thereafter

To ensure appropriate first aid in the case of severe injuries or diseases, the rescue chain in particular shall be defined. The rescue chain involves the following aspects:

- Reporting of the emergency
- Conveyance of rescuers
- Rescue of the injured/sick person(s)
- First aid
- Transport for further medical care

When defining the rescue chain it should be taken into account that psychological support may be required. Therefore, it shall be clarified in advance how the appropriate specialists can be requested and called in.

11.2 Building evacuation

Each company shall ensure that persons can leave hazard areas safely in an emergency. In order to be able to carry out evacuations in a structured, expedient manner, evacuation concepts shall be prepared and evacuation exercises carried out at regular intervals.

Detailed information about implementation is to be found in Appendix 11.2 "Evacuation".

11.3 Escape and rescue routes

In case of emergencies necessitating evacuation, persons shall be able to leave hazard areas fast and safely at any time. This takes place via escape and rescue routes and emergency exits.

Taking the relevant *statutory regulations* into account, the companies shall make sure that a sufficient number of appropriate escape and rescue routes and emergency exits are in place.

Escape and rescue routes and emergency exits shall

- Lead to safe areas over the shortest distance possible
- Be sufficiently and clearly marked
- Be equipped with doors or gates that can be opened in the direction of escape without any aids

They shall not be obstructed or confined.

11.4 Preventive organizational fire protection

Preventive organizational fire protection measures aim at

- Reducing the risk that fires can occur
- Ensuring early warning and successful fighting of a fire
- Restricting fires to the smallest area possible
- Enabling the rescue of endangered persons
- Keeping consequential damage down

For this purpose, companies shall ensure that, depending on the *statutory regulations*

- A fire protection coordinator is appointed in writing
- Enough fire protection helpers are appointed to assume the tasks of evacuation and firefighting
- Sufficient appropriate extinguishing equipment is present and that this is regularly inspected
- Employees are trained in how to handle extinguishing equipment and how to act in case of fire
- Alarm plans, fire protection regulations, and escape and rescue plans are available and updated regularly

Fire and explosion hazards shall be determined competently in the risk assessment and appropriate protective measures defined and implemented (see chapter 3 "Workplace risk assessment"). When carrying out *hot work* there is also a higher risk of fire. Such work may only be carried out after a written work permit has been issued (see section 10.9 "Hot work").

11.5 Pandemic contingency planning

A pandemic is an epidemic with a high risk of contagion, which can be caused by viruses. This disease can lead to higher mortality rates. By way of coordinated planning a company can ensure that its employees are protected against falling ill and its production activities can be maintained without putting the employees at risk. Depending on *statutory regulations* and national practice, the employee representatives should be involved in the planning.

Measures

Companies shall take measures to ensure that there is a pandemic plan in the event of a pandemic. Companies shall in particular ensure that

- A person is appointed to bear responsibility for pandemic precautions
- A crisis management team is appointed
- Medical personnel, if available, are appropriately trained
- A medically qualified person is appointed to maintain contact with the local public health system/authorities
- Pandemic helpers are appointed and trained
- Lines of communication are defined
- The stocking and issue of pandemic-related items (disinfectants, *personal protective equipment*, etc.) is organized
- Hygiene and damage limitation measures are known and implemented

Check



1 2

Effectiveness monitoring

- Procedure defined for the continuous checking of the implementation and achievement of the objectives and measures?
- Leading indicators included?
- Degree of achievement known?

To control occupational safety and health management successfully it is necessary to review at appropriate and regular intervals whether the objective and measures that are decided on during the course of regular planning (see chapter 5 “Objectives and measures”) are being implemented and the desired effects achieved.

Inspections and internal audits can only achieve this to a limited degree because they provide mere snapshots. In order to guarantee prompt intervention, the current implementation status of the measures and the objectives already achieved shall be monitored with the aid of *indicators*.

Measures

Each company included under the scope of this manual shall define a *procedure* with which the implementation and achievement of its objectives and measures can be monitored. For this purpose, appropriate checking and monitoring measures shall be implemented and *indicators* shall be defined and regularly analyzed. The reports of relevant company responsibles also provide indications (see chapter 6 "Organization"). If the implementation is not according to plan, the results shall be incorporated in the defined corrective process (see chapter 17 "Corrective process and continual improvement") so that continual improvement can take place.

Both leading and lagging *indicators* (reactive *indicators*) are to be used for monitoring. One reactive *indicator* defined for the entire Group is accident frequency, i.e., the number of accidents proportionate to the hours worked. After the number of accidents and the hours worked are input to the Personnel and Social Data Information System of the Group (PERSIS), the accident frequency is then automatically calculated.

The companies can, and should, name other lagging *indicators*, besides accident frequency, that help them to gain a picture of their own performance. Here are some examples:

- Time off due to accidents or illness
- Frequency of a specific type of accident (e.g., tripping accidents)
- Frequency of a certain type of injury (e.g., cuts)
- The number of accidents in a certain employee group (e.g., first-time employees) or in a specific area of the company

Lagging *indicators* have the disadvantage that they cannot be surveyed until the end of the stipulated period, when it is too late for corrective action. Therefore, they should be complemented by leading *indicators*. Leading *indicators* refer to the measures defined in the planning. They make it possible to monitor the implementation status of the measures and objective achievement on an ongoing basis. Corrective action can therefore be initiated before the reporting period ends. Typical leading *indicators* are, for example:

- The proportion of employees trained in a certain subject matter in relation to the required value
- The number of *inspections* performed by specific functional groups in relation to the required value
- The proportion of executives attending meetings of the Central Safety Committee in relation to the required value

Example

As an objective, the reduction of accidents with incised wounds by 10 percent was set. To meet this objective, among other things training on the subject of "incised wounds" as an individual measure was defined for all employees. Furthermore, it was stipulated that implementation was to be checked every three months. In this case the leading *indicator* might be the percentage of employees who have received training to date. Once the planning period is over, objective achievement is determined by reference to the "Number of accidents with incised wounds" lagging *indicator*.

The results of the effectiveness monitoring must be documented to enable early identification of long-term trends and developments and to have a sound database for subsequent evaluations.

Inspections 13

- Procedure defined for carrying out safety inspections?
- Executives and supervisors from all levels involved?
- Safety inspections carried out?
- Results documented and used for improvements?

Regular *inspections* are an essential element of occupational safety and health management.

They serve not only to identify and assess hazards; they also demonstrate the executives' interest in, and commitment to, the safety and health of their employees. Therefore, *inspections* should not be carried out by safety and health specialists and company physicians alone, but also by executives and supervisors from all levels, and additional specialist functions. Executives and supervisors thus contribute substantially towards creating the desired safety and health culture at thyssenkrupp.

An *inspection* should not focus only on the workplace and work environment situations; it should consciously include the behavior of employees. Conspicuous behavior can be discussed directly with the employee concerned in order to find out the causes for any deficiencies. *Inspections* provide the opportunity to identify defects in the implementation of occupational safety and health management before an *incident* or health problems occur. It is important to name positive aspects during the dialogs with the employee in order to reinforce desirable behavior.



Definition of terms

Inspections within the meaning of this manual are *inspections* at and in workplaces and on *inspection rounds* in work areas performed with the objective of gaining an impression on-site of the implementation of occupational safety and health management and providing indications of where further improvements are required.

Safety Gemba Walks are a special form of *inspections*. They offer executives the opportunity to make their interest and commitment to the safety and well-being of local people visible, and enable them to exchange ideas informally with employees.

Measures

Each company included within the scope of this manual shall introduce and maintain a system that commits it to performing regular *inspections*; this is also valid for *Safety Gemba Walks*. Their scope and frequency depend on the existing accident and health risks and the relevant statutory regulations and Group internal regulations.

Regular *inspections* shall be carried out by:

- Executives and supervisors from all levels
- Safety and health specialists
- Company physicians

“Regular inspections are an essential element of occupational safety and health management.”

Safety coordinators and employee representatives shall be involved in the *inspections*, depending on national practice. The Group company shall determine which roles have to carry out which type of *inspections* and how often.

When a need for action is identified during *inspections*, this must be included in the corrective process (see chapter 17 “Corrective process and continual improvement”).

Performance and results of the *inspections* shall be documented in an appropriate form.

Internal audits

14

Internal *audits* are the central instrument for checking the company organization and the occupational safety and health management processes.

- Procedure defined for executing internal audits?
- Internal auditors appointed and trained?
- Audits executed?
- Reports available and used for improvements?

They serve to identify improvement potential as well as *opportunities*, and infer corrective action. For this purpose, the companies included within the scope of this manual are to introduce and maintain an appropriate system for internal auditing. The *procedures* for planning, implementing, and evaluating, involving the relevant company parties and reporting on them, are to be defined therein.

As a minimum, the *audits* should review the extent to which the requirements set out in this manual are met. Further requirements may arise, for example from *statutory regulations* or regulatory conditions.

Definition of terms

An *audit* in the meaning of this manual is a systematic, independently conducted, documented *inspection* and evaluation of how the operating organization and occupational safety and health management processes compare with the defined *audit* criteria.

14.1 Planning and preparation

Performance of internal *audits* should be planned in good time. In their preparation the *audit* planning of other disciplines (e.g., quality or environmental protection) should be taken into account in order to avoid unnecessary stress for the executives, supervisors, and specialists involved. The interdisciplinary planning is defined in an *audit plan*. The *audit* plan contains information about the areas to be audited, the *audit* dates, the auditors, and the frequency of the repeat *audits*. Wherever possible an *audit* should be carried out by two or more auditors. It may make sense to deploy auditors from other companies as well as the company's own auditors in order to obtain an unbiased assessment. The system to be applied should be agreed at the time of planning. Checklists guarantee complete acquisition of data and a structured analysis. For *audits* against the requirements of this manual, there is a detailed checklist available on we.net. An internal *audit* must be announced by the *audit* leader in written form to the companies concerned at the earliest possible time. The announcement should specify the date, the required participants, and the planned *procedure* as precisely and clearly as possible.

This is to ensure the company being audited is given the *opportunity* to provide the *audit* leader with all relevant documents in advance. When properly prepared, the *audit* team can perform the *audit* efficiently without losing time through additional document reviews. Reports on the results of previous *audits*, and other reviews and monitoring activities, are particularly valuable for efficient preparation.

14.2 Execution

Execution of an internal *audit* is usually divided into five steps:

1. Introductory talk

An introductory talk in which the parties concerned are informed about the objectives and *procedure* of the *audit* marks the beginning of the *audit*. There should be the opportunity to pose questions and express misgivings so that they are cleared up right at the beginning.

2. Interviews with executives, supervisors, and specialists

The objective of these interviews is to gain an impression of the extent to which the company is operating occupational safety and health management expediently and continual improvement is achieved. In these interviews, relevant *documented information* can be inspected on a random basis.

3. Inspection of documents

Inspection of relevant *documented information*, such as manuals and *procedures* and work instructions, is the method for checking if the documentation represents the existing organization and processes verifiably.

4. Company inspection

During the *inspection* of the predefined company divisions it is ascertained if the occupational safety and health management does indeed achieve the desired results. Nonconformities with *statutory regulations* or other binding requirements should be documented. It has proved expedient to address employees at random and question them about their skills and experience. The responses permit additional inferences as to the degree to which occupational safety and health management is established in the company and accepted and implemented by the employees.



5. Final discussion

The on-site *audit* ends with the final discussion in which the lead auditor informs the persons involved of the preliminary *audit* results.

14.3 Evaluation, reports, and corrective measures

The overall result of the *audit* arises from careful evaluation of the talks with executives, supervisors, and employees, the documents check, and the company *inspection*. The lead auditor transforms this result into an *audit report*, which he communicates to all relevant persons in agreement with

the company concerned. When a need for action is identified, the company shall take appropriate corrective action (see chapter 17 "Corrective process and continual improvement"). A written record of this must be kept.

14.4 Auditor qualification

Audits may only be performed by employees who are appropriately qualified. This means that auditors shall have a fundamental understanding of the systematic approach in occupational safety and health management. They shall know the existing accident and health risks and the corresponding *statutory regulations* and act independently and impartially. They shall also have sufficient social skills and personal qualities to be able to respond adequately to *audit* participants, and to ensure they themselves are accepted as auditors. The auditors should be independent in the sense that they are not deployed in their own area of responsibility and not subject to any conflict of interest.

When the *audits* are carried out a distinction is made between the lead auditor and any co-auditors. The lead auditor is responsible for the planning, implementation, and documentation of the internal *audit*. He should have accompanied an *audit* as co-auditor before leading an internal *audit* on his own responsibility.

"Internal audits are the central instrument for checking the company organization and the occupational safety and health management processes."

Investigation of incidents

Each *incident* generates a degree of high learning potential. However, this potential can only be utilized if *incidents* are recorded, examined, and analyzed systematically.

Corrective measures shall derive from an *incident* investigation. Both the *incident* investigation and the results of agreed corrective measures and their effectiveness shall be documented and archived. Companies included within the scope of this manual shall introduce an appropriate *procedure* for this.

Definition of terms

An *incident* is a sudden event that causes (accident) – or might cause (*near miss*) – an employee to be injured, fall ill, or die.

Occupational accidents are *incidents* that lead to an injury, disease, or death. The event shall have a sudden impact on the body during occupational activities, i.e., while a person is doing their job. No accidents at work – within the context of this manual – are illnesses without impact on the body. The same always applies to activities that serve purely personal or private purposes.

Occupational duties are understood to include activities performed within the framework of an employee's employment contract and which serve or should serve the company's interests.



Procedure defined for:

- Reporting incidents and serious and fatal accidents?
- Reporting and classification in PERSIS?
- Investigation?



Investigation carried out for all incidents?



Results documented, statistically analyzed, and used for improvements?

In addition to the actual work content, occupational activities also include:

- Business meals if participation therein is of an obligatory nature
- Business trips. These also include activities inevitably arising in connection with the business trip and which are not to be classified as purely personal or private matters
- Sporting activities or events if these serve the purpose of compensating for workplace stress, are organized or encouraged by the employer, take place regularly, and participation therein is largely restricted to the company's own employees
- Company parties or outings if organized, encouraged, or sanctioned by the employer and open in principle to all employees or to the respective department

A *commuting accident* is an *incident* on the direct route to or from the employee's permanent residence and the place of their occupational activity that leads to an injury, illness, or death. In the event the regular work activity begins with the employee leaving their permanent residence (as is often the case with service technicians in the elevator business, for example), it is not a *commuting accident* but an *occupational accident*.

A *serious accident* as defined in this manual is any accident

- Causing life-threatening injuries to persons
- Resulting in amputation of limbs (arm or leg) or loss of eyesight
- Resulting in more than two persons with significant injuries

A *lost time injury* is an *incident* that prevents the employee from coming to work the next working day, i.e., the day after the *incident*.

A *restricted work case* is an *incident* in which the employee, due to and post an accident, is assigned temporary duties of a different nature to those they are expected to perform, or performed in a smaller scale, and/or smaller scope of services.

A *medical treatment case* is an *incident* in which the employee requires medical treatment beyond first aid but nevertheless continues to work without significant restrictions.

A *first aid case* is an *incident* in which the employee continues to work without significant restrictions after a first aid treatment has been given. Each first aid treatment shall be recorded (see section 11.1 "First aid").

A *near miss* is an *incident* that does not result in injuries to persons, but which might have caused injury or death.

High Potential Incidents (HPI) are *incidents* that do not result in serious injury, but which could have resulted in a serious, including fatal, accident under slightly different circumstances (see section 15.4 "High Potential Incidents (HPI)").

15.1 Reporting of serious and fatal accidents

A reporting chain shall be defined for each company to ensure that serious and fatal *occupational* and *commuting accidents* are reported in a regulated manner to the Group Executive Board and to the CO/HRS-OSH department. Every BA shall decide whether to report directly to the Group Executive Board or via CO/HRS-OSH.

The report may be submitted on an informal basis or using the "Accident Short Report" form. At all events it should include all available information about the time and location of the accident, what actually happened, the number of company and/or contractor employees involved, and the expected severity of injuries.

If an informal report is initially submitted, the "Accident Short Report" form shall be completed in a second step and sent, with a photo of the accident site where possible, to the CO/HRS-OSH department. This department will then forward the report in anonymized form to the Business Areas to ensure they receive the information quickly. The form is to be found on thyssenkrupp we.net.

In the case of a fatal *occupational accident* the responsible executive will additionally report personally to the Chief Human Resources Officer of thyssenkrupp AG as soon as

possible, but not later than 21 days after the accident. The Head of the area directly affected together with the Head of the respective BU/OU will submit precise details about the circumstances of the accident, the causes, and a provisional *action plan*.

This meeting will generally also be attended by the Chief Human Resources Officer and the Head of OSH of the BA concerned, and two representatives of the CO/HRS-OSH department. The meeting may take the form of a video conference. In addition, a direct on-site appraisal can be carried out by the Executive Board or a representative of thyssenkrupp AG. Subsequent to the meeting, the unit concerned will finalize the *action plan* to avoid similar accidents. The CO/HRS-OSH department will approve the finalized *action plan* and review its implementation in an *audit* in consultation with the BA. This *procedure* will also be applied to fatal accidents involving subcontractors working for thyssenkrupp.

The Head of OSH of the respective BA shall inform the members of the Council Occupational Safety and Health at Group level of the results of the accident investigation at the appropriate time.

The internal accident reporting is no substitute for the report to the authorities or other competent external bodies.

15.2 Accident recording in PERSIS

Occupational and *commuting accidents* are recorded in the statistics in the Personnel and Social Data Information System (PERSIS) at thyssenkrupp. It counts the number of working hours missed due to the *occupational accident*. The day of the accident is not included. In the event an employee does not come to work the day following an accident, due to the effects of the accident, then the accident is to be registered in PERSIS. The maximum statistical absence is 182 days (= 6 months). If the injured party becomes unable to work at a later time, for example if the injury worsens, this applies from the first day of incapacity to work. Where *occupational* or *commuting accidents* with a fatal outcome are concerned, the number of working hours lost only has to be recorded if a period of absence from work actually arose. On the "Classification of accidents" input screen, supplementary statistical details are to be entered on each *occupational* or *commuting accident* reported in PERSIS. These details refer in particular to such details as the time of the accident, the nature of accident, the injured body part, and the type of injury. The input option can also be used for accidents sustained by employees of contracted companies if these are to be statistically recorded.

15.3 Recording of near misses

It is just as important to record *near misses* as it is to investigate the *occupational accidents*. This makes it possible to initiate appropriate corrective measures before damage occurs. Therefore, all employees should be sensitized for reporting *near misses* to the superiors. This can take place, for example, by way of a defined reporting *procedure* as part of the existing Ideas Management system.

15.4 High Potential Incidents (HPIs)

The *High Potential Incidents (HPIs)* are a special category of *incidents*. HPIs are *incidents* that do not result in serious injury, but which could, under slightly different circumstances, have led to a serious or even fatal accident. In the sense of this manual, the term "HPI" thus covers all accidents and *near misses* that had the potential for a serious *incident*. The risk matrix (Appendix 3.2) helps to decide whether an *incident* should be classified as an HPI or not. Where the *incident* has a risk score of 41 or higher (red zone), it shall be classified as an HPI.

HPIs offer proactive learning potential while *serious accidents* only provide reactive learning potential. Companies included within the scope of this manual shall therefore ensure recording and careful investigation, and report all HPIs in accordance with their BA's regulations.

15.5 Accident investigation

After each *occupational accident*, the details of the accident and its cause shall be investigated. The same applies to *commuting accidents* on the company grounds. Corrective measures to prevent further *incidents* are to be derived from the accident investigation and agreed with the relevant persons. The relevant supervisor is responsible for the accident investigation. The investigation should be carried out by an investigation team. The use of a neutral facilitator has proven successfully. In the case of illnesses that are suspected to be related to work activities, the same *procedure* should be followed.

15.6 Accident statistics

Accident statistics help to identify where accidents are most frequent. Each company and the higher levels in the Group organization shall therefore keep appropriate accident statistics.

It has proved worthwhile to incorporate the following information in the accident statistics:

- Number of accidents according to the international definition (≥ 1 day of time off)
- Frequency of accidents based on 1 million hours worked
- Classification of the accidents according to accident location (Where did it happen?), type of accident (What happened?), and injured body parts – it is expedient to classify accidents separately that have not actually occurred during work, but rather, for example, during sporting activities or events
- Development of accidents compared to the previous year or another suitable reference period

Management review

16

The management review by the management board or manager is the examination and evaluation of the organization introduced in the company and of the processes.

The results of this evaluation shall serve as input for the corrective measures process and are therefore an important component for the desired continual improvement process.

Measures

The responsible management board or manager shall perform a review of the existing occupational safety and health management systems at least once a year. The objective of this review is to ensure the continued suitability, relevance, and effectiveness of the organization and its processes.

- Process defined for the regular examination and evaluation of the occupational safety and health management system by the management board or manager?
- Results documented and used for improvements?

In particular, the management assessment should provide answers to the following questions:

To what extent were:

- The objectives met?
- The principles defined in the Occupational Safety and Health Policy fulfilled?
- The measures resolved in previous management reviews implemented?
- Other corrective and preventive measures implemented (see chapter 17 “Correction process and continual improvement”)?

Which development can be determined on the basis of:

- The evaluation of *incidents*, deviations, and corrective actions, and for continual improvement?
- The results of the assessment of compliance with *statutory regulations* and other requirements?
- *Audit* results?
- Feedback from employees regarding consultation and participation?
- The results of the identification of risks and *opportunities*?
- Annual reports of appointed persons, where required?

To what extent are the resources for occupational safety and health management adequately provided?

How effective is the safety and health management overall?

Is the system suitable, appropriate, and effective to achieve continual improvement?

Are there changes to the framework conditions that have an impact on safety and health management?

Is there a need for action due to, for example:

- Changes in company organization and processes?
- Changes in *statutory regulations* and other requirements?
- Feedback from interested parties?

What possibilities are there to better the integration of occupational safety and health into existing processes?

What immediate need for change arises from this assessment?

The results of the management review shall be documented in such a way that they can be utilized for the planning process of the following year (see chapter 5 “Objectives and measures”). When a need for action is identified, the Group company shall take appropriate corrective action (see chapter 17 “Corrective process and continual improvement”). A written record of this must be kept.

“The responsible management board or manager shall perform a review of the existing occupational safety and health management systems at least once a year.”

Act



Corrective process and continual improvement

When occupational safety and health management is implemented, changed framework conditions and nonconformities in relation to the target state will still continue to occur.

Changed framework conditions may, for example, arise from the use of new technologies, other raw or auxiliary materials, changed organizational structures, the changed skills and abilities of employees, new findings relating to accident and health risks and associated protective measures, or changed requirements from customers or the public domain. Every company shall be capable of identifying relevant changes and further developing their occupational safety and health management system in the interests of continual improvement. Adjustments are also necessary where nonconformities in relation to the target state are identified in day-to-day operations

- Procedure defined for the systematic recording, assessing, and processing of improvement potential?
- Action plans up to date and complete?
- Responsibilities, deadlines, and implementation status identifiable?

“For each company a procedure shall be implemented and maintained for recording, assessing, and processing findings and insights relating to improvement potential for occupational safety and health management.”

The following checking and monitoring measures can help to identify these nonconformities:

- Risk assessments
- *Inspections*
- Internal and external *audits*
- Effectiveness monitoring
- Employee survey
- Investigation of *incidents* and evaluation of relevant statistics
- Check of compliance with *statutory regulations* and other requirements (“compliance check”)
- Management reviews

In addition, insights can be gained from the Ideas Management, from maintenance reports, or other sources.

For the continual improvement of occupational safety and health management it is important that the newly won knowledge is incorporated into a corrective process.

Measures

For each company included within the scope of this manual a *procedure* shall be implemented and maintained for recording, assessing, and processing findings and insights relating to improvement potential for occupational safety and health management. Relevant results of the improvement process shall be appropriately communicated to employees and employee representatives.

The preparation of *action plans* is required for systematically working through the corrective process. The corrective measures, responsibilities, and timeframes are described in these *action plans*. Implementation of the *actions plans* is the responsibility of the supervisor in charge. The *action plans* should be checked regularly and, if necessary, adapted. After the measures are introduced, their effectiveness shall be checked by means of the aforementioned checking and monitoring measures; the results therefrom are to be documented.



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A O

Consultation and participation of employees

It is essential for the continual improvement of occupational safety and health management that all company stakeholders have the opportunity to participate. In this context, a distinction is made between consultation (consultation before decisions are taken) and participation (involvement in decision-making). The following table shows the topics on which consultation (column 2) or participation (column 3) should take place.

	Themes	Consultation	Participation
1	Context of the company	Determination of the needs and expectations for occupational safety and health management	
2	Occupational Safety and Health Policy	<ul style="list-style-type: none"> • Definition of the Group-wide policy • Preparation of a concrete declaration by the Group unit on the policy of the Group 	
3	Workplace risk assessment		<ul style="list-style-type: none"> • Performing the risk assessment • Definition of measures
4	Compliance with statutory regulations and other requirements	Definition of measures for the implementation of statutory regulations and other requirements	
5	Objectives and measures	Definition of objectives and derivation of measures to achieve them	
6	Organization	<ul style="list-style-type: none"> • Definition of roles, responsibilities, and authority • Outsourcing of occupational safety and health management functions or processes 	Definition of consultation and participation mechanisms
7	Competence and awareness		Determining the necessary competencies and training needs, and how to monitor their effectiveness
8	Communication		Defining the communication process in terms of what to communicate about and how to communicate it
10	Operational implementation	Integration of occupational safety and health management requirements in procurement and contractor company management	
12	Effectiveness reviews	Determination of what is to be monitored, measured, and evaluated in the course of the effectiveness review	
14	Internal audits	Planning, determining, and implementing the audit program	
15	Incident investigation		Investigation of incidents
17	Correction process and continual improvement	Recording, evaluation, and processing of improvement potential	

A 1

Context analysis

The following tables show, for selected examples, how relevant external and internal factors, as well as the needs and expectations of employees and other interested parties, can be documented. They serve as a guide to an appropriate documentation format and need to be developed individually by the Group companies for their respective circumstances.

Interested parties	Needs and expectations	Mandatory obligation (yes/no)?	Risks	Evaluation of risks (low, medium, high)	Opportunities	Evaluation of the opportunities (low, medium, high)	Measures	Evaluation of risks after implementation of measures
External								
Customers	Reliable deliveries and good production conditions	Yes	Loss of image and loss of orders	Medium	Positive corporate image and trusting customer relationship	Medium	Development and maintenance of an OSH management system	Low
Accident insurer	Effective occupational safety and health	Yes	Losses due to bonus-malus, recourse	Medium	Premium bonus	High	Development and maintenance of an OSH management system	Low
Regulatory authorities	Effective occupational safety and health, compliance with statutory regulations	Yes	Fine, penalties, imprisonment	High	Certainty of the law	High	Development and maintenance of an OSH management system	Low
Internal								
Employees	Safe and healthy working conditions	Yes	Lack of motivation and willingness to cooperate	High	High motivation and willingness to cooperate, gain of reputation as an employer	High	Consultation and participation within the framework of the establishment and maintenance of the OSH management system	Low
Relevant factors	Risks	Evaluation of risks (low, medium, high)	Opportunities	Evaluation of the opportunities (low, medium, high)	Measures	Evaluation of risks after implementation of measures		
External								
Compliance with the requirements of ISO 45001	No certification, customer and order loss	High	Improvement of the OSH processes	Medium	Conduct a gap analysis and implement new requirements	Low		
Internal								
Goal: to reduce the accident frequency rate	Measures not target oriented	High	Optimal use of resources and visible progress	High	Analysis of the accident situation and derivation of risk-oriented measures	Low		

Note: When identifying interested parties, a comprehensive approach is to be chosen. If ISO 45001 certification is desired, at least the following groups should be considered:

- Owners, shareholders, parent organizations
- Employees
- Customers, suppliers, contractors, and subcontractors
- Authorities
- Employers' organizations, business associations
- Employee representatives, trade unions
- Specialized organizations and personnel, academia, media
- Medical and other community services
- Local community and neighbors, visitors, non-governmental organizations, the general public

A 2

thyssenkrupp Occupational Safety and Health Policy

We give top priority to safety and health at work.

We focus on people. Everybody should be able to perform their work well at our company and return home safe and sound.

Our objective is therefore to provide safe and healthy working conditions in order to avoid accidents, work-related illnesses, as well as physical and psychological stresses at work.

We empower all employees who work for us to act in a safe and healthy way.

We jointly pursue a forward-looking safety and health culture.

We promote a culture in which we assume responsibility for each other. Everyone contributes to this.

Managers create the general conditions. They serve as a role model through their actions and perform their duties responsibly. Occupational safety and health and *health promotion* are management tasks.

Employees assume responsibility, are actively involved, and play a shaping role.

The employee representatives are consulted and able to participate so they can play an active role in developing the occupational safety and health culture.

The areas of occupational safety, health, and human resources provide effective support to managers, employees, and employee representatives in the realization of their rights and duties.

The development of occupational safety and health expertise is an integral part of human resources development.

We work systematically to achieve continuous improvement.

We comply with applicable laws and other requirements including the obligations we have imposed on ourselves as a matter of course. We apply appropriate consequences in the event of violations.

The same standards apply to partner companies and third parties as for us. This is taken into account in selecting and working with partner companies.

Our actions are focused on achieving continuous improvements in occupational safety and health management and our results.

Occupational safety and health and *health promotion* are an integral part of all our processes and are included from the outset – starting in the planning phase – in all technical, organizational, economic, and social considerations.

Where possible, we avoid accidents and health risks and give priority to technical and organizational measures over *administrative* and personal *measures*.

A 3.1 a

Overview of hazard/stress factors

1	1.1	1.2	1.3	1.4	1.5	1.6
Mechanical hazards	Unprotected moving machine parts	Objects with dangerous surfaces	Moving transportation or work equipment	Uncontrolled moving objects	Slipping, tripping, ankle twisting, falling	Falling from height
2	2.1	2.2	2.3			
Electrical hazards	Electric shock	Electric arc flash	Electrostatic charges			
3	3.1	3.2	3.3	3.4	3.5	
Hazardous substances	Gases	Vapors	Aerosols (e.g., dusts, smokes, fumes)	Liquids	Solid matters	
4	4.1	4.2				
Biological hazards	Infection hazard from pathogenic micro-organisms (e.g., bacteria, viruses, fungi)	Irritating or toxic effects of microorganisms				
5	5.1	5.2	5.3			
Fire and explosion hazards	Flammable solid matters, liquids, gases	Explosive atmosphere	Explosives			
6	6.1	6.2				
Thermal hazards	Hot media/surfaces	Cold media/surfaces				
7	7.1	7.2	7.3	7.4	7.5	7.6
Physical hazards	Noise	Ultrasonic or infrasonic sound	Whole body vibrations	Hand-arm vibrations	Non-ionizing radiation (e.g., UV-,IR-, laser radiation)	Ionizing radiation (X-rays, nuclear radiation)
8	8.1	8.2	8.3	8.4		
Work environment factors	Climate (e.g., heat, cold)	Lighting, light	Drowning	Asphyxiation		
9	9.1	9.2	9.3	9.4		
Physical stress	Heavy dynamic work	One-sided dynamic work	Static work	Combination of dynamic and static work		
10	10.1	10.2	10.3	10.4		
Psychosocial factors	Poor job design	Poor work organization	Poor social relations	Poor workplace design		
11	11.1	11.2	11.3			
Miscellaneous hazards	Arising from humans	Arising from animals	Arising from plants or plant products			

A 3.1 b

Risk matrix

		Likelihood of occurrence of the potential damage	Very unlikely, virtually impossible (3)	Unlikely (5)	Likely (7)	Almost certain (10)
		S	Severity of the potential damage			
Negligible (1) No significant injury/minor injuries	L		Personnel are rarely exposed to the hazard	Personnel are rarely exposed to the hazard but the event occurrence is quite probable or	Personnel are frequently exposed to the hazard	Personnel are frequently exposed to the hazard
Low (2) Minor injuries (employee can resume their normal work at the latest on the following day)			Event occurrence highly unlikely ("not heard of to date")	Personnel are frequently exposed to the hazard but the event occurrence is hardly likely ("has been heard of, but no occurrence to date")	Event occurrence is quite likely ("Events have occurred occasionally")	Event occurrence is quite probable ("Events have already occurred more frequently")
Moderate (4) Moderate injuries (employee cannot resume their normal work after one day)			Damage can be avoided/limited through reliable technical measures	Damage can be avoided or limited	Damage can be avoided or limited under specific circumstances	Virtually impossible to avoid/limit damage. Human error is to be expected.
Major (8) Multiple injuries (polytrauma) Life threatening injuries. Loss of limbs or eyesight.						
Death (10)						

Critical risk rating ($R = L \times S$)	Risk	Description	Note:
3–6	Minimal	Negligible risk	The hierarchy of controls shall always be observed when defining measures!
7–20	Low	Risk reduction advisable	
21–40	Medium	Risk reduction necessary	
41–100	High	Risk reduction urgently needed	

A 3.1 c

Guideline for the practical usage of the risk matrix

The following risk matrix supports you while defining and evaluating possible risks within the activity areas, and the associated risks of such an accident.

Two factors are relevant in determining the risk of an accident occurring:

- The likelihood of occurrence of a potential damage: How probable is it that the risk can lead to personal injury?
- The severity of a potential damage: How severe could the injury be, i.e., how serious would the injuries be for the casualty?

Here the most likely and plausible severity of a potential damage is to be anticipated.

The main objective is the elimination of any risks of an accident by the derivation of measures, or if in the event this is not possible, to reduce the impact to the minimum levels possible.

Established safety measures are also to be considered during the risk evaluation. The risk evaluation supports in assessing and determining whether the existing measures are appropriate and acceptable.

With the aid of the risk matrix the risk evaluation should be, when possible, completed by a group, to ensure the different perspectives and experience of all involved can be fully utilized and taken into consideration.

Steps for the correct usage of the risk matrix

The application of the risk matrix comprises of four steps.

Step 1:

Identify the relevant potential hazards and existing safety measures.

Initially identify any real potential hazards. This task is facilitated by listing the potential hazards and stress factors, which can be found in Appendix 3.1 a of this manual. To reiterate, existing safety measures are also to be considered.

Step 2:

Determining the severity of a potential damage

Using the first column of the risk matrix (severity of a potential damage), make a realistic estimation of the impact of an accident, that could result from the identified hazard.

The severity of a potential damage can be classified into the following five categories:

- | | |
|---------------------|--|
| 1 Negligible | No significant injury |
| 2 Low | Minor injuries: the employee can return to work the following day |
| 3 Moderate | Moderate injury: the injury is so severe that the employee cannot return to work the following day |
| 4 Major | Life-threatening injuries or possible loss of limb (arm, leg) or loss of eyesight |
| 5 Death | Loss of life |

Step 3:**Determining the likelihood of occurrence of a potential damage**

You need to determine the likelihood of occurrence of a potential damage. Orientate yourself towards the first row of the risk matrix. Four evaluations levels are available:

- 1 Very unlikely, virtually impossible
- 2 Unlikely
- 3 Likely
- 4 Almost certain

Each evaluation level has three criteria, to allow for an appropriate allocation of the level, all three conditions shall be fulfilled. When one or more of the criteria is not fulfilled, the next highest likelihood of occurrence level shall be assigned. The criteria take the following aspects into account:

- 1 Exposition: frequency of which the person is being subjected to the considered hazard
- 2 Likelihood of occurrence of an *incident*
- 3 Possibility of preventing or reducing the levels of injury: Can injury levels be reduced by reliable technical or organizational measures, or does the probability of an occurrence depend on the individual employee's abilities and their willingness to prevent an accident?

If desired, the evaluation levels for the likelihood of occurrence of a potential damage ("very unlikely" to "almost certain") could be extended with additional aspects. Due to the multitude of possible scenarios and the different evaluations of the frequency rates of the various risks, it is not possible to provide general valid statements on the reference values, i.e., benchmarks.

Step 4:**Determining the critical risk rating**

Read the critical risk rating in the field where the likelihood of occurrence and the severity of a potential damage intersect. This can give values between 3 and 100 and can indicate to what extent measures have to be implemented to reduce the risks. Here four categories can be distinguished, which can be identified from the color scheme of the field intersected in the risk matrix:

- 3–6 (Green) minimal: risk negligible. Additional measures are not necessary
- 7–20 (Grey) low: risk reduction advisable
- 28–40 (Yellow) medium: risk reduction necessary
- 50–100 (Red) high: risk reduction urgently needed

While determining the measures, the order of priority of the measures is to be adhered to: The primary objective is to completely eliminate of the hazards, or by minimizing, at source, the use of dangerous processes, working equipment, and/or working materials. If this is not possible, technical and organizational safety measures have priority over administrative or individual (*personal protective equipment*) safety measures.

After implementation of the safety measures, it is to be verified whether the measures have led to a reduction of the previously identified risks. It could be possible that new hazards exist that were not previously identified.

A 9

Mandatory information to be documented

A certain amount of *documented information* is essential for a functioning occupational safety and health management system. The following table lists the *documented information* that the company shall keep available to meet the requirements of this manual. In relation to *controlled documents*, this also applies to preliminary versions. In individual cases, it may be necessary to prepare further *documented information* for external interested parties.

- | | |
|------------------------|--|
| General remarks | <ul style="list-style-type: none">• thyssenkrupp Occupational Safety and Health Policy and, where appropriate, the supplementary declaration• Scope of application of the management system• Descriptions of all <i>procedures</i> required in this manual (see chapter 10 “Operational implementation” only as far as required after risk assessment)• Results of the context analysis |
| Plan | <ul style="list-style-type: none">• Results of risk assessments• Relevant <i>statutory regulations</i> and other requirements• Objectives and measures |
| Do | <ul style="list-style-type: none">• Description of the occupational safety and health management organization• Minutes of the Council OSH meetings• Training and instruction certificates• Proof of internal and external communication in accordance with own specifications• Proof of implementation of the established <i>procedures</i>• Emergency plans• Results of the evacuation drills |
| Check | <ul style="list-style-type: none">• Results of the effectiveness check• <i>Inspection</i> records and results• <i>Audit</i> evidence and results• <i>Incident</i> reports and statistics• Results of management review |
| Act | <ul style="list-style-type: none">• <i>Action plans</i> for the correction of detected deviations, with evidence of the processing stage, i.e., current status reports |

A 10.13.2 a

Periods/intervals and minimum content for medical aptitude tests

The following details refer to minimum periods/intervals and content. The relevant *statutory regulations*, in particular with respect to data protection, shall be observed. The same applies for regulatory provisions. The physician conducting the medical test may arrange for further examinations by a specialist (e.g., neurologist, cardiologist, etc.) in the event of an unclear diagnosis.

In exceptional cases, partial examinations that could also be conducted by the company physician may, in agreement with the company physician, be conducted by a physician selected by the employee at the employee's cost.

Minimum content for all health-related aptitude tests required according to section 10.13.2 "Medical aptitude tests" (for driving/control activities, activities involving *fall hazards*, or activities involving the use of heavy-duty respiratory protection). General medical history against the background of the work activity, in particular

- Cardiac arrhythmia, cardiac insufficiency, condition after a heart attack
- Circulatory disorders, condition after a stroke
- Head injury or whiplash injury
- Kidney diseases
- Diabetes mellitus or other endocrine disruptions
- Neurological or neuro-otological diseases
- Psychiatric diseases
- Pharmaceuticals or stimulants with effects on alertness and responsiveness/reflexes
- Vision disorders: e.g., blurring, double vision, eye floaters, visual field defects
- Dizziness symptoms: e.g., staggering vertigo, floating feeling, rotating feeling, tendency to fall, scotoma, instability
- Vegetative symptoms: perspiration, nausea, regurgitation, collapse
- Ear symptoms: e.g., tinnitus, hearing loss, condition after ear surgery
- Indications of other cranial nerve disorders
- Miscellaneous

Work history

- Workplace
- Work task
- Job familiarization/training
- Working hours

Additional examination content in connection with driving/control activities

- Examination with relevance to the job activity
- Eyesight and hearing capacity
- Urine strip test (albumin, glucose)

Particular attention is to be paid to

- Cardiovascular disorders
- Neurological and psychological abnormalities
- Changes in eyesight and hearing capability
- Sleep-related breathing disorders

Additional examination content in connection with jobs involving a *fall hazard*

Particularly important:

- Disturbance of equilibrium and/or consciousness, musculoskeletal disorders
- Neurological examination
- Check on eyesight incl. color vision and check on the field of vision, ideally with a perimetry test (initial examination and subsequently every 6 years)
- Hearing ability examination
- ECG
- Urine strip test (albumin, glucose)

Supplementary examinations

- Ergometry test after the age of 40, or when the employee's job activity is physically highly demanding, and/or in unclear cases
- Special blood or urine examinations in case of uncertainty

Additional minimum examination content in connection with job activities involving the use of heavy-duty respiratory protection

- Spirometry
- Quiescent ECG
- Ergometry test
- Visual acuity, distance
- Hearing test, air conduction
- Otoscopy if there is a possibility of absorption of gases or vapors via the auditory canal
- Blood sampling: blood count, fasting blood glucose level, creatinine, gamma-glutamyl transferase, alanine amino-transferase

Initial medical test	Before commencement of a job with corresponding health risk	
Follow-up medical test	Up to the age of 49	After 36 months
	Over the age of 50	After 12–24 months
Early follow-up medical test	<ul style="list-style-type: none"> • After several weeks of illness or physical impairment that can give rise to concerns as to the capacity to continue to meet the requirements of the job • If deemed necessary by the physician in the individual case • At the request of the employee who suspects a health-related risk if he/she continues his/her activity with this hazard • If indications emerge for other reasons that give rise to concerns as to the continued performance of the activity 	

A 10.13.2 b

Potential minimum content

for recruitment medical tests

for executives

The following details refer to potential minimum content. The relevant *statutory regulations*, in particular with respect to data protection, shall be observed. The same applies for regulatory provisions.

- General medical history
- Work history
- Preliminary physical examination
- Urine strip test (albumin, glucose)
- Eyesight check incl. distance to screen (60 cm)

The central element is the consultation and information on all health-related offerings in the company and Group.

A 10.13.3

Minimum content for medical travel

advice and examinations

Minimum content for medical travel advice

- Climatic and health-related impacts, for example:
 - Heat, coldness, humidity (dry periods, rainy seasons)
 - Period spent at altitude
- Vaccination advice
- If appropriate, advice regarding malaria prophylaxis, first aid kit
- Behavior in connection with and on long-distance flights
- Medical care
- Help in medical emergencies

The following environmental influences shall be taken into account in the risk assessment and referred to in the advice if they go beyond the normal risk to life:

- UV/ozone pollution
- Smog pollution
- Particulate dust pollution

Minimum content for a medical travel examination

- General medical history incl. vaccination history
- Work history
- Case history of previous stays abroad
- Whole-body status
- Urine strip test (albumin, glucose)
- Erythrocyte sedimentation rate (ESR) or CRP (C-reactive protein) test
- Blood count
- Liver and kidney values
- Blood glucose
- Quiescent ECG

Supplementary examinations (depending on the entry requirements of the destination country)

- HIV test
- Blood test for hepatitis A/B/C
- HbA1C value (long-term value for blood glucose)
- Stress ECG
- Chest X-ray (lungs)
- Other examinations depending on the individual risk profile

A 10.17 a

Contractor self-assessment – minimum content

		Yes	No	Not relevant
1	Does your company have a certified OSH management system, e.g., to ISO 45001? If so, please state what system you are using in the remarks field. Submit certificate from an accredited certification authority.			
2	Does your company ensure the support of a company physician and an OSH specialist?			
3	Does your company have a sufficient number of first aiders?			
4	Is it ensured that a risk assessment is available and kept up-to-date for all activities performed?			
5	Are the work resources and tools you provide regularly inspected by qualified individuals and are these inspections documented?			
6	Do all employees receive regular briefings on the risks that can occur during their work and the protective measures to be taken?			
7	Do you provide appropriate personal protective equipment for your employees, if required?			
8	Do you conduct regular safety inspections during work at your sites?			
9	Are occupational accidents documented and investigated and are corrective measures developed?			
10	Is it ensured that your subcontractors also observe all the aforementioned OSH measures?			

A 10.17 b

Contractor management – questionnaire for monitoring and assessment

	OSH contractor evaluation	Disagree	Tend to disagree	Tend to agree	Agree	Not relevant
1	The contractor's working area looks clean and tidy.					
2	The contractor ensures that emergency exits and escape routes, fire extinguishers, and other emergency equipment are freely accessible.					
3	The contractor observes the smoking bans in place.					
4	All contractor employees wear the prescribed personal protective equipment. The equipment is in good condition.					
5	Electrical tools and devices (e.g., on-site distributor boxes) are in good condition and used as intended.					
6	Tools and other work equipment are in good condition and used as intended. These include, e.g., ladders, scaffolds, hand tools, lifting aids and equipment, vehicles.					
7	The contractor stores hazardous materials appropriately.					
8	Employees behave and perform work safely.					
9	The contractor takes advice about potentially unsafe conditions or behavior seriously and acts to eliminate them.					
10	The requisite permissions are in place for the work to be performed and the prescribed protective measures are observed. This includes: general work permits, hot work, work in tanks and confined spaces, scaffolds.					
11	Employees are aware of the job-related risks and know how they should conduct the task.					
12	A willful breach of fundamental health and safety regulations was identified.					

*Note question 12: Can only be evaluated by OSH experts, critical criterion

A 11.2

Evacuation

In emergencies each company has a special duty of care towards employees, contracting companies, and visitors to ensure that persons can leave buildings and hazard areas safely.

The need to evacuate buildings, parts of buildings, or hazard areas may be given in the following cases:

- Fire
- Explosion
- Forces of nature
- Bomb threats
- Technical defects

It is therefore the responsibility of the executives to create appropriate organizational and technical conditions to enable people to get out of the hazard zones safely and in an organized manner in an emergency.

Evacuation concept

In order to be able to carry out structured, targeted evacuation, evacuation concepts shall be prepared. This includes taking into account important site-specific aspects.

The concept should contain the following elements at least:

- General description of the premises and the maximum number of people present
- Escape and rescue routes including their markings
- Escape and rescue route plans
- Dimensioning of escape and rescue routes
- Emergency exits
- Ban on use of elevators
- Safety *lighting*
- Assembly point(s)
- Type of alert (technical or organizational)
- Definition and specification of evacuation areas (e.g., partial or complete)
- Communication/information chain
- Appointment and identification of evacuation helpers and assembly-area coordinators
- Regulation of authority to give directions
- Communication arrangements for establishing that all concerned are in the assembly areas
- Appointment of fire response personnel
- Instruction/training
- Arrangements for groups of people who are unfamiliar with the area
- Arrangements for groups of people requiring help (e.g., persons with limited mobility)
- Material assets worth protecting
- Cooperation with the fire department
- Drills
- Special characteristics specific to the site

Evacuation drill

Depending on the hazard situation and the regulations to be taken into account, an evacuation drill should be carried out at regular intervals. The drill serves, for example, to:

- Reveal weak points in the evacuation concept
- Familiarize employees with the *procedure* and correct behavior during evacuation
- Analyze the evacuation *procedure*
- Familiarize evacuation helpers and assembly-area coordinators with the tasks
- Check the internal communication and information chain
- Test alert equipment (for example sirens, horns, optical signaling equipment, etc.)
- Practice cooperation between evacuation helpers and assembly-area coordinators and external forces (fire department, police, etc.)
- Optimize evacuation times

Responsibilities

The legal entity boards and managers are responsible for planning and implementation. As a rule this obligation is delegated to the company executives.

Safety and health specialists and other experts meet their responsibility to provide advice by supporting the executives with planning and implementation.

Confirmation of compliance with the requirements of ISO 45001: 2018

The compliance of this manual with the requirements of ISO 45001: 2018 has been confirmed by external parties.







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