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Guidelines - Required competencies and relevant training for management to improve safety performance

Orientations - Compétences et formations pertinentes pour l'encadrement en vue d'améliorer les résultats dans le domaine de la sécurité

Leitlinie - Für eine Verbesserung der Sicherheitsbilanz erforderliche Kompetenzen der Führungskräfte und entsprechende Schulungsmassnahmen



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Summary

This leaflet identifies the competencies and training required by management to create the conditions for implementing a sustainable safety culture in railway companies in terms of values, beliefs, attitudes and behaviour.

It posits a competence-based approach to safety management, underlining the importance of starting with the top management level, to ensure ownership of and responsibility for safety by individual managers and by the organisation as whole. Safety must be integrated with other strategic objectives, which should be written down, to ensure that potential conflicts between safety and other objectives are avoided. Individual and corporate safety goals and criteria must be aligned to ensure that management responsibilities for safety are clearly identified within the organisation as a whole.

The safety management system will normally be based on 5 steps following the Deming cycle:

- definition of policy and objectives,
- planning and procedures,
- implementation and operation,
- checking and corrective action,
- management review.

The leaflet then goes on to define the specific roles and required competencies for various managerial levels from senior management down and recommends forms of training to ensure that the relevant competency levels are achieved.

Finally, it includes a guideline for a training standard.

1 - Developing a sustainable safety culture - The role of management

1.1 - General

The trend nowadays is more towards a safety case approach that will gradually replace compliance with a set of regulations. The EU proposals for a Safety Directive governing railway operation will, de facto, require development of objective criteria for the acceptance of safety cases.

The progressive restructuring and privatisation of railway companies with the EU, including the separation of infrastructure from train operations management, allows new players to run their business using organisational structures and management methods different from those applied in conventional railway companies where safety in operations and the workplace played an important role.

Rail-based infrastructure and public transport include a wider portfolio of risks than other businesses have to address. Safety issues cannot be seen in isolation from the normal range of business risks and procedures. To achieve business objectives, we have to ensure that safety issues are correctly addressed and that senior management take on board safety aspects of work.

Rapid changes in organisational structures and management teams and their consequences for safety underline the importance of adopting a competence-based approach in the field of safety management.

Studies of spectacular accidents have highlighted the extent to which regulatory and management actions and behaviours had led to significant elements of the front line workforce perceiving performance as more important than safety. This context is important as it makes clear that the competence of organisations has to be seen as inextricably linked to the prevailing culture within both single businesses and with the wider railway system formed of multiple players.

Assuming that the management cadres of an organisation not only lead and direct business decision-making processes but also safety-critical issues, it is essential that their competence be built up and maintained in a systematic manner.

The relationship between a competent individual, the teams of which individuals are members and wider competence of the organisation should be considered. Up till now, thinking with regard to safety has been focused largely on front line safety-critical activities rather than those of a managerial nature.

The key to a sustainable safety culture is the elimination of thinking that safety is just a "bolt on" and should therefore be the reserve of safety specialists with special responsibility in this area and front line workers operating in a hazardous environment.

Thus developing competence and a positive safety culture is about developing aligned values, beliefs, attitudes and behaviours. Training is but one input required to secure the desired behavioural outputs. Furthermore managing safety should form part of a self-assessment process in a learning organisation.

These fundamentals of a sustainable safety culture require a more structured approach to the assessment and development of the competence of senior managers in strategic safety management.

1.2 - Definition of terms

The following definitions of competence and safety culture illustrate the dependencies between what are too often seen as discrete issues:

- **Competence** means the ability to undertake responsibilities and to perform activities to a recognised standard on a regular basis. Competence is a product of practical and thinking skills, experience and knowledge, which is influenced by personal attributes such as attitudes, beliefs and values. The precise combination required depends on what needs to be done, in what circumstances and how well. A person, a team of people or an organisation is competent when they work consistently to an expected level of performance. Expected levels of performance change over time.
- **Safety culture** is the product of individual and group values, of attitudes and patterns of behaviour that lead to a commitment to an organisation's health and safety management. Organisations with a positive safety culture are characterised by communication founded on mutual trust, by shared perception of the importance of safety and by confidence in the efficiency of preventative measures.
- **Senior management** in the context of this leaflet is a group of representatives in the company with individual and collective accountability. The principles described for this role can be considered valid up to the level of Board of Directors. They take decisions, define policies and goals and establish strategies to achieve the goals according to their field of responsibility. They are responsible for safety in their own field of business. Even if they partially delegate this responsibility, they still have to ensure that the organisation they have put in place is effective.
- **Middle management** in the context of this leaflet is a group of persons in the company who translate company goals into operational targets and programs. They are responsible for their decisions.
- **Supervisor**: a person in charge of a group of workers, responsible for the day to day work and working conditions. Even a senior manager may play this role as well.
- **Safety manager/safety specialist**: consultant vis-à-vis management with specific knowledge of safety aspects, whose work involves monitoring and auditing performance.

1.3 - Basic principles of a competence management system

All managers including members of the board should accept that they are accountable for safety.

In particular the Board of Directors play a very important role in determining the corporate safety culture of an organisation. Their decisions, and what they regard as important, set the scene for everyone else. Leadership and commitment from the top is the essential requirement of a strong safety culture and it must begin at Board level.

They can limit the extent by delegating parts of their personal responsibility to line operating positions but they still remain responsible for establishing an effective organisation and a no blame culture. They should consistently demonstrate their conviction and commitment to continually improving safety.

Competence and competence management are **not** simply concepts applied in respect of the front line work force performing work of a safety-critical nature. The senior management **must** accept that unsafe acts leading to loss may have their decisive roots in or close to the boardroom and are not essentially the failures of those at the sharp end.

Instead they should be considered as the product of the multiple interactions that happen in a such complex system as the railway organisation. These interactions involve different dimensions related to different organisational levels, i.e. management decisions, training plan, technological interface, specific working situations, people attitudes, etc.

A sustainable safety culture requires an open mind and a willingness to learn from loss instead of blaming the person directly in line. Lessons learned from accident investigation, the processes and decisions behind the scenes and understanding the safety performance are just a first step aimed at preventing recurrence.

However, safety management requires a clear and general acceptance that the key to safety improvement is the elimination of thinking that safety is a "bolt on" and an acceptance of the need for the total integration of safety within the wider processes by which businesses are managed.

1.3.1 - Competence Management System

The formal competence management system used has to embrace all management activity with a safety dimension. Ideally, it is just one component of the corporate processes for managing business risks and achieving business goals, including those related to the control of loss from unsafe decisions, acts and conditions.

To avoid a standards driven approach to managerial competency in safety management being mechanistic, paper driven, a response common to senior teams and individual senior managers, greater progress in developing their competency will be achieved by encouraging the adoption of evidenced good practice, providing guidance, tools and techniques. That can be adapted for application by each railway business according to its needs recognising of:

- the hierarchy of relationships between individuals, companies and the regulatory framework;
- the role of good practice in transferring knowledge;
- the requirement to develop organisational ability to interpret and develop appropriate responses to the requirements of laws, regulations, standards and targets for safety improvement in a way that leads to satisfying societal expectations for a safer railway;
- the need for businesses to understand and take responsibility for addressing safety risks in their control. By extension this equally applies to them playing their part in addressing risks shared with others.

1.3.2 - Assessment and development of senior management (teams)

The starting point in assessing and developing senior management capability is that a senior management group or team must be able to show that it is competent to manage an organisation that is capable of consistently working safely. In so doing the senior team will first need to systematically consider the safety risks they create and face as a result of current and planned business activity.

The process has to be designed to engage all members of the senior team, including those who may assert that they have no safety responsibilities. Identifying that some senior managers feel this way is a significant first step, as patently all of a senior team taking investment decisions will clearly need to have considered the safety implications before declaring themselves in favour of or against a particular decision. For example given the costs and wider commercial benefits should a train be built to meet or exceed the mandatory requirements?

1.3.3 - Cascade effect

The initial focus of supporting the development of the capability of senior management teams in strategic safety management will lead to an acceptance of a model that would better equip them to align the safety performance of middle and more junior managers with delivery of the organisation's safety objectives and the development of a progressive safety culture. Given the competency roots of this approach this can be translated into a will to demonstrate that managers can consistently achieve the level of performance to carry out their safety responsibilities effectively.

1.4 - Safety Management System

The Safety Management System is an effective and useful tool for disseminating a safety culture in a company. It allows safety performance to be measured at each level of the organisation.

The Safety Management System is part of the overall management system that facilitates the management of the safety risks associated with the business organisation. This includes the organisational structure, planning activities, responsibilities, practices, procedures, training, processes and resources for developing, implementing, achieving, reviewing and maintaining the organisation's safety policy.

The base of the safety management system should be the analysis of previous experiences that activates an ongoing learning process and a proactive approach towards risk prevention and organisational safety empowerment.

This system operates following the Deming quality circle, forcing the organisation to continual improvement. In fact the elements of a successful safety management process are:

1. **Safety policy**, i.e. the policy is authorised by the organisation's top management. It clearly states overall health and safety objectives and their commitment to improve health and safety performance.
2. **Planning**, i.e. the organisation shall establish a permanent procedure for the ongoing identification of hazards, the assessment of risks and implementation of the necessary control measures.
3. **Implementation and operation**, i.e. definition of the structure and responsibilities, identification of the personnel training, awareness and competence requirements, ensuring that a relevant safety system information is communicated to and from employees and other interested parties, documentation management, identification of operations and activities associated with identified risks, establishment and maintenance of emergency plans and procedures.
4. **Checking and corrective action**, i.e. establishing and maintaining procedures to monitor and measure the safety management system on a regular basis. This point can be accomplished by accidents, incidents, non-conformances and corrective and preventive actions, by records management and by audit activities
5. **Management review**, i.e. the system has to be reviewed to ensure its continuing adequacy and effectiveness based on the learning process related to the analysis of accidental events, injuries but also working practices and people attitude at work.

1.5 - Integrating safety with other strategic performance objectives

In most organisations where performance of managers was reviewed, there was no structured consideration of the extent to which a manager had or had not contributed to the delivery of the organisation's safety objectives.

Safety responsibilities of individual managers should be defined more explicitly to enable the reviewing manager and reviewee to agree the indicators against which successful delivery of safety objectives will be assessed.

The principle of the four key objectives can be carried forward from the competence model to the strategic safety management model.

Application of the model requires that there is a positive approach to the identification of roles having both direct and indirect safety responsibilities and therefore better identification of the hazards and risks that individual managers have to manage.

1.6 - Aligning individual and corporate goals and criteria

Before moving to review safety performance of individual managers an organisation should be evaluated itself helping the organisation and individual managers to improve safety performance.

There are regular benefits from asking if

- safety measures are delivered cost effectively;
- personal development needs are satisfied;
- do management actions contribute to delivery of organisational safety goals; and
- does the sum of individual objectives adequately cover the wider organisational safety goals?

When setting safety objectives, it is essential that their fit with other objectives is validated and that the safety objectives' delivery will not preclude achievement of wider objectives set an individual manager. A weakness of many performance reviews is that the evidence against which performance is reviewed is neither owned nor well understood by the manager subject to review. The evidence that is needed must be sufficient to enable a proper consideration of attitudes, beliefs and their application through behaviour.

Clearly the output of the review process is a portfolio of actions that need to be taken by the reviewed manager, the line manager and often elements of the wider organisation. In all cases the actions must be appropriate to the elimination of the hazard/control of the risks involved, prioritised, delivery of targeted safety performance and capable of definition in a way that enables progress to be monitored.

1.7 - Strategic responsibility and organisational learning

For this review process to work there has to be a senior team member (i.e. safety manager) willing to act as champion for the process with support from a committed and effective process manager able to equip reviewers with the necessary skills to undertake the reviews in a manner wholly aligned with the development of the corporate safety culture. This will only really be achieved when the organisation demonstrates that it has learning from the reviews to:

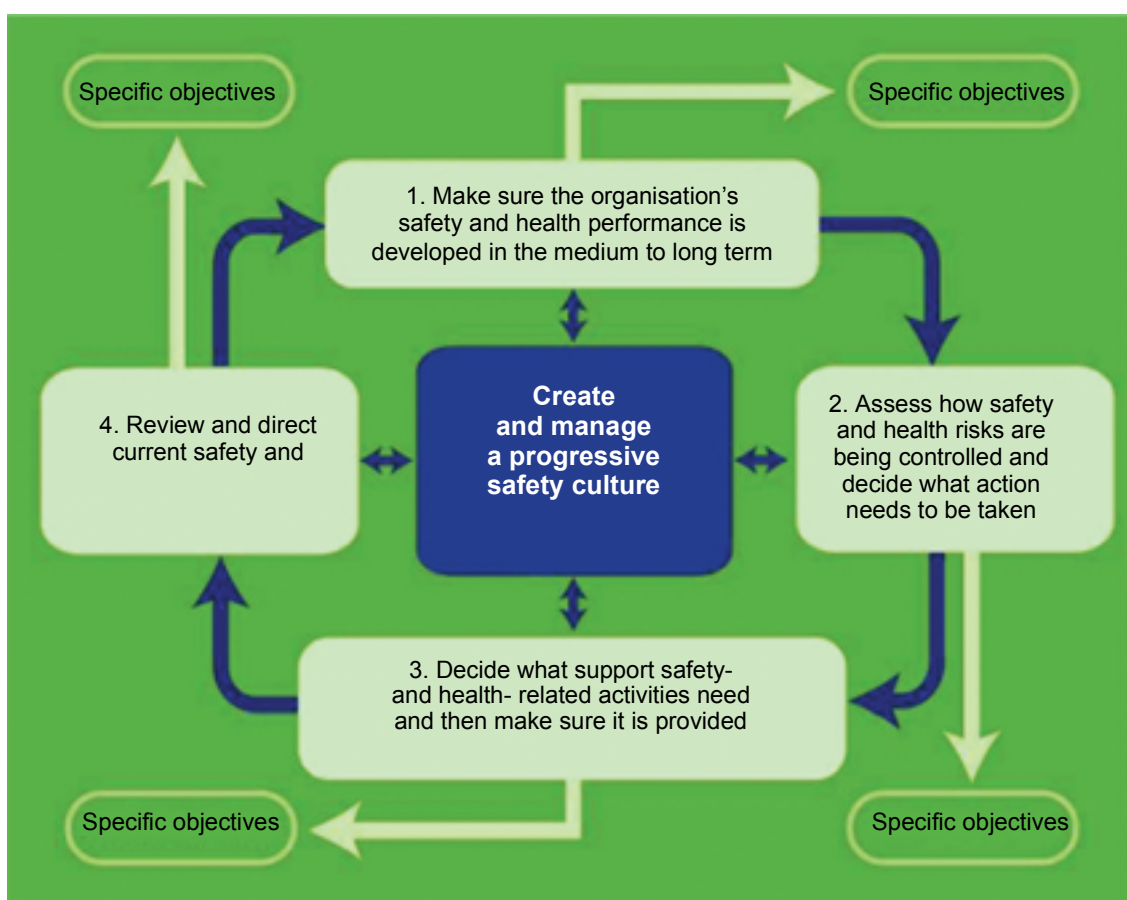
- identify and respond to mismatches between individual responsibilities and organisational objectives;
- target training and development spending and monitor its effectiveness;
- identify significant skills gaps and, where necessary, re-evaluate roles;
- improve succession planning;
- refine recruitment and selection requirements;
- evaluate the effectiveness of the review process.

1.8 - Players on the field and their role to ensure managing safety and build up a safety culture

1.8.1 - Senior management

The senior management is responsible for setting up the four objectives for a sustainable safety culture. It should strictly follow the above-mentioned Deming cycle with the actions of planning, doing, checking and reviewing.

The overall aim of applying this process is summed up in the following diagram where creation and management of a progressive safety culture are the outputs of delivering the four key safety objectives. These key objectives break down into a larger number of specific objectives.



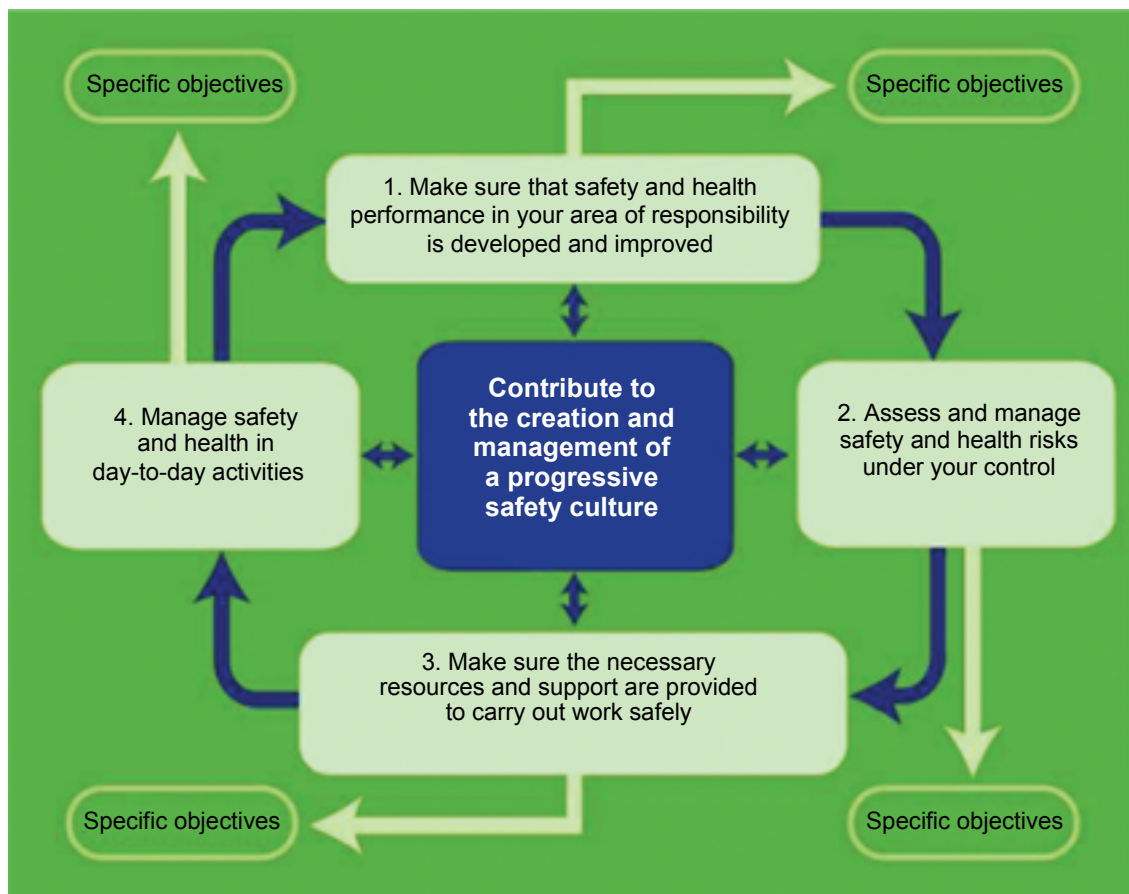
The above organisational objectives are the route by which a rigorous and open self-assessment will enable a management team to review:

- the effectiveness of their safety management policies and strategies;
- how well these policies and strategies are being implemented;
- the performance and training / development needs of the team and its members.

The management team itself will sponsor the process and is carrying the can for permanent improvement due to their safety accountability in the board.

1.8.2 - Middle management and supervisors

Starting from the four key safety objectives these should be transformed by the middle management and/or supervisors into more practical programs and actions:



1.9 - Skills and abilities needed to fulfil the new requirements

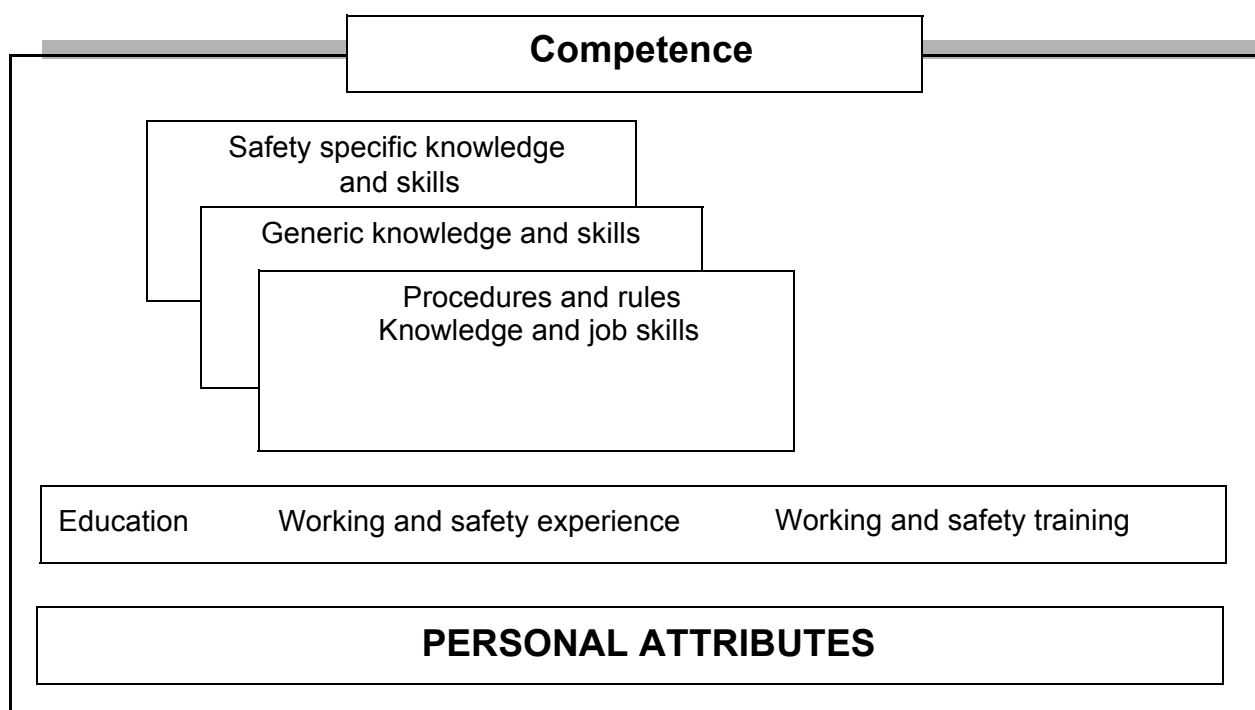
All skills and abilities, associated factors and competencies their personal attributes as well as their roles are briefly described in point 2 - page 10. The training requirements to achieve competence on the different levels and the ability to work within learning organisations are described in the guidelines for a training standard.

2 - Roles, competencies and training of management

The training methodology described in the Guidelines below (see point 3 - page 24) should be applied in different professional contexts and with different contents according to the various levels of staff involved. We must keep in mind the final purpose of this kind of training, that is to develop the adequate and best competencies to play an active and effective part in the safety improvement process. So in our analysis of the specific categories, we should consider the definition of competence given in point 1 - page 2.

Competence means the ability to undertake responsibilities and to perform activities to a recognised standard on a regular basis. Competence is a product of practical and thinking skills, experience and knowledge, which is influenced by personal attributes such as attitudes, beliefs and values. The precise combination required depends on what needs to be done, in what circumstances and how well. A person, a team of people or an organisation is competent when they work consistently to an expected level of performance.

As we can see in the below figure, derived from this model, competency is the sum of many factors, and we must investigate them all very carefully to highlight the winning professional aspects for the safety improvement process.



Now we shall deal with specific staff categories and we shall give a profile description for each category. Then we will try to identify the most important factors and competences in relation with safety performance, lastly we shall deal with the training required to develop such competences.

We identify five main professional categories of personnel directly involved in the safety improvement process:

- Senior management
- Middle management
- Supervisors
- Safety managers
- Safety specialists.

The first three categories are mainly responsible for the production processes, even if they are involved in safety issues. The last two hold a function as consultants for the different levels of management, having direct authority for safety and indirect authority regarding production priorities.

2.1 - Senior management

2.1.1 - Professional role description

Senior management hold responsibility for policy and business strategy and have a role in determining the organisational structure of the company.

Senior management should take necessary action to disseminate a positive safety culture throughout the organisation, characterised by communication founded on mutual trust, by a shared perception of the importance of safety and by confidence in the efficiency of preventive measures.

The policy followed by the senior management is the commitment to:

- carry out and observe all the applicable safety rules and good practice;
- integrate risk prevention into company policy, plans and processes and practice the prevention methods as an opportunity to improve the quality of the workplace;
- involve all the company levels in order to achieve prevention goals and establish a safe workplace, assuring a continuous safety training process;
- launch the experiences and develop the assessment of case studies;
- increase awareness of occupational safety;
- develop innovative technology and an advanced safety management system;
- define rules and procedures aimed at ensuring the highest safety levels relevant to the different risks related to the activities carried out in the company.

The senior manager has to develop a safety management system to embrace all management activity with a safety dimension. This system has to take in account all corporate processes, including the business aspects.

The safety system has to be maintained, checked, reviewed and developed.

A training policy for workers about safety has to be developed in order to control and minimise risk situations.

The requirements described in the paragraph relevant to senior management are valid up to the level of Board of Directors.

2.1.2 - Factors and competences associated with positive safety performance

Personal attributes

- Leadership attitude

It is characterised by the following elements:

- transformational leadership style (the manager has to be an intellectual model for subordinates and he has to be able to manage and run the individual tendencies so that the team reaches the company objectives)
- transactional leadership (the ability to manage incentives and rewards in order to increase the worker motivation)

- Geared to performance

- Taking decisions

- Communication

The following elements should be underlined:

- accuracy
- explanations, i.e. presentation modalities, capacity of involvement
- openness, i.e. identifying the signals and the messages of interlocutors

- Cooperation

- Problem solving

- Trust

Interpersonal trust between leaders and subordinates is important to organisational success (it reduces the need for formal contracts, it limits opportunistic behaviours and reduces the need for hierarchical control)

- Ethical behaviour

- Low fatalism, i.e. motivation to influence events

- High safety priority

- High risk-awareness

2.1.3 - Knowledge and skills

2.1.3.1 - Generic knowledge and skills

Senior managers should have knowledge and skills in company managing. Relationship and leadership with employees, planning and organising the work effectively, prioritising and focusing on matters of significance, communicating effectively, through personal linguistic and relational skills, providing an example and guidance to the subordinates, leading the subordinates to reach the company's objectives (including the safety and work targets), preventing and resolving conflicts.

2.1.3.2 - Safety specific knowledge and skills

Senior managers should have knowledge and skills in the area of safety, in terms of safety management systems (managing, checking, reviewing, developing), safety structure organisation, safety terminology, safety prevention principles, safety rules, responsibilities and tasks for the employer and the employees. They should be aware of the national as well as the EU situation in terms of laws, directives, trends, law harmonisation and the interoperability progress situation.

They should be able to integrate safety aspects with the business process, evaluating the economic cost of accidents and diseases as well as safety investment costs.

2.1.3.3 - Job knowledge and skills

Senior managers should have detailed knowledge in terms of general processes and activities, rules, tasks, clients, critical characteristics of the sector activity. They should be aware of the social and environmental impact of the company's activities as well as be aware of other competitor companies' performances, critical aspects and technical solutions, trends, future steps of the sector and the market.

2.1.4 - Education, working and safety experience and training

Senior managers should hold a university degree, or equivalent.

The above-mentioned knowledge and skills can often be enhanced through working experience, developing responsibility levels and professional growth.

The institutional part of the training support should deal with economic, financial and administrative aspects, communication and leadership techniques.

Information has to be supplied about the laws, rules and best practices to follow.

Another important part of the training concerns safety management systems and how to influence the company culture, emphasising how inadequate safety management affects the company business processes.

Attending annual safety seminars could be useful.

2.2 - Middle management

2.2.1 - Professional role description

Middle management supports senior management and has the responsibilities for carrying out the established policy, the business strategy and the scheduled plans.

Middle management should operate as a link between the senior management and the production line, communicating the received directives and verifying that the defined instructions have been correctly acknowledged by the operational level.

Middle manager then will report to senior manager the situation about production management and ongoing projects with possible criticisms of schedules and variations in the expected costs.

The middle manager is in charge of specific structures and has to understand how these structures interface with others, including safety issues.

The middle manager has to be involved in the safety management system even if his duty is not directly related to safety.

2.2.2 - Factors and competences associated with positive safety performance

Personal attributes

The required personal attributes that characterise middle management are generally similar to senior management ones.

- Leadership attitude

It is characterised by the following elements:

- transformational leadership style (the manager has to be an intellectual model for subordinates and he has to be able to manage and run the individual tendencies so that the team reaches the company objectives)
 - transactional leadership (the ability to manage incentives and rewards in order to increase worker motivation)
- Geared to performance
 - Taking decisions
 - Communication

Management participation and involvement in work and safety activities, as well as frequent, informal communication sessions between workers and management are recognised as critical behaviours.

The following elements should be underlined:

- accuracy
- explanations, i.e. presentation modalities, capacity of involvement.
- openness, i.e. identifying the signals and the messages of interlocutors

- Cooperation, i.e. cooperative relationships are characterised by a positive team spirit and willingness to cooperate with other team members and other teams, in order to achieve the organisation's goals.
- Problem solving
- Trust, i.e. the interpersonal trust between leaders and subordinates is important for organisational success (it reduces the need for formal contracts, it limits opportunistic behaviours and reduces the need for hierarchical control)
- Demonstration of concern, i.e. the concern about safety helps to define a reference framework for the workforce to guide appropriate task behaviours. These manifestations foster closer ties between managers, supervisors and workers, they encourage a free exchange of ideas on job improvement and they provide the opportunity for the early recognition of hazards and improper practices.

Worker-management interaction provides a clear indication of an overt, active and genuine concern for safety on the part of management.

- Ethical behaviour
- Low fatalism, i.e. motivation to influence events
- High safety priority
- High risk-awareness

Middle management should demonstrate their commitment to safety through their attitudes, behaviours and style of leadership.

These tend to be less tangible than the structural and procedural variables but nonetheless they are thought to have powerful effects on workforce safety motivation.

The structural factors are likely to be critical only at the lower end of the performance scale, they cease to discriminate once the company has achieved a reasonable level of advancement in safety management.

2.2.3 - Knowledge and skills

2.2.3.1 - Generic knowledge and skills

Middle management should have knowledge and skills in company management. Relationship and leadership with employees, planning and organising the work effectively, prioritising and focusing on matters of significance, communicating effectively, through personal linguistic and relational skills, providing an example and guidance to the subordinates, leading the subordinates to reach the companies objectives (included the safety and work targets), preventing and resolving conflicts.

2.2.3.2 - Safety specific knowledge and skills

Middle managers should have knowledge and skills in the area of safety, in terms of safety management systems (managing, checking, reviewing, development), safety structure organisation, safety terminology, safety prevention principles, safety rules, responsibilities, behaviours and tasks.

Middle management should cooperate to implement a safety management system and, in order to accomplish the commitment to develop it, the following conditions have to be fulfilled:

- good housekeeping and environmental conditions;
- good training facilities;
- clear safety policy, goals and targets;
- formal inspections at regular and frequent intervals;
- thorough investigations of all accidents and near misses;
- thorough record keeping;
- rules and regulations, regularly updated, and evidence of management and staff compliance with them;
- acknowledging that high priority be given to safety at company meetings;
- promoting an active safety committee and a high ranking safety officer.

They should be able to integrate the safety aspects with the business process, and they must always take into account the economic cost of accidents and diseases as well as the safety investment costs.

Safety should take priority over production goals. Such an emphasis has not been associated with reduced production performance, rather the opposite seems to be the case. Those organisations that have clear goals also tend to be more productive.

2.2.3.3 - Procedures and rules, knowledge and job skills

Middle managers should have detailed knowledge in terms of general processes and activities, rules, tasks, clients, subordinates' tasks and duties, critical characteristics of operational processes and services.

2.2.4 - Education, working and safety experience and training

Middle managers should have a university degree, or equivalent.

The above-mentioned knowledge and skills can often be improved by working experience, developing responsibility levels and professional growth.

The institutional part of the training support should deal with management aspects related to activity areas, the interaction between his structure and the other company structures. Information has to be supplied about the laws, rules and best practices to follow.

Other important parts of the training should deal with the safety management system and how to influence the company culture, emphasising how an unfit safety management affects the company business processes.

Basic information must be provided to middle management about the risk evaluation analysis so that they can assess correctly the document of risk evaluation prepared by the safety manager and carry out all proper technical and organisational measures related to a preventive approach.

In particular, the training dedicated to middle managers should deal with communication and leadership techniques.

Working group and teamwork theories have to be explained as these methods increase workers' safety capacity to behave conscientiously with each other, thereby meeting their social and autonomy needs.

Attending annual safety seminars could be useful.

2.3 - Supervisors

2.3.1 - Professional role description

The supervisor is an employee who has authority over other workers. He has to coordinate and supervise the working activities of his subordinate workers.

"He is the key man in industrial accident prevention. His application of the art of supervision to the control of worker performance is the factor of greatest influence in successful accident prevention" (Heinrich 1959, p. 22 - see Bibliography - [page 38](#)).

A safety responsibility derives from this role, as he is by law appointed to the following tasks and responsibilities:

- putting into effect all the safety preventive measures decided by the management;
- putting into effect a control plan on the equipment to assure safety operations;
- providing the workers the information required about the risks of their job;
- controlling the correct and persevering use of individual prevention tools;
- checking for other unforeseen risks that may occur during operations and taking the required precautions.

The task of controlling the correct and constant use of individual prevention tools is one of the main roles of the supervisor, it is the main reason for the institution of this specific role. In fact the supervisor, better than other figures, can keep a constant eye on his subordinate workers, just because he works with them.

As we can see from his responsibilities, the supervisor is called not only to put into effect the company procedures: actually there are some unforeseeable cases or situations, in which specific procedures are not available; in these cases the supervisor must take the right initiative: that is the "initiative duty".

2.3.2 - Factors and competences associated with positive safety performance

Personal attributes

A supervisor should possess personal attributes enabling him to act in accordance with the principles of safety prevention and the safety culture. Moreover he should be a steady controller of subordinates' behaviours and, at the same time, an example of safe behaviour so that he becomes a vehicle for spreading safe working practices.

Accordingly, a supervisor should be:

- ethical, i.e. fair, truthful, sincere, honest and discreet;
- observant, i.e. actively aware of activities, processes, procedures and workplaces;
- perceptive, i.e. instinctively aware of and able to understand situations;
- tenacious, i.e. persistent, focused on achieving objectives;
- self-reliant, i.e. able to act independently while interacting effectively with others;
- authoritative, i.e. able to enforce compliance with safety rules.

2.3.3 - Knowledge and skills

2.3.3.1 - Generic knowledge and skills

Supervisors should have knowledge and skills in managing people, planning and organising work effectively, prioritising and focusing on matters of significance, communicating effectively, through personal linguistic and relational skills, providing examples and guidance to the subordinates, leading the subordinates to reach safety and work targets, preventing and resolving conflicts.

2.3.3.2 - Safety specific knowledge and skills

Supervisors should have knowledge and skills in the area of safety, in terms of safety terminology, safety prevention principles, safety rules, safety responsibilities and tasks, rescue and emergency procedures, behaviours and tasks.

2.3.3.3 - Procedures and rules, knowledge and job skills

Supervisors should have detailed knowledge in their own job area, in terms of specific processes and activities, rules, tasks, clients, subordinates' tasks and duties, critical characteristics of operational processes and services, specific critical job situations, and every other issue relevant to the job. Furthermore, if they have specific job skills they generally are perceived as job reference and instructors so that they can directly and effectively teach safety rules and behaviours, thereby spreading the safety culture.

2.3.4 - Education, working and safety experience and training

Supervisors should have at least a secondary school education. The above-mentioned knowledge and skills can often be improved by working experience, and a new supervisor should be tutored for a certain period before acting independently. The length of the period depends on the specific job assigned. In any case an important part of this training support should deal with safety with regard to

his own activities and the activities of subordinates. There should be an information process on the laws, rules and best practices to follow. Furthermore, in order to develop the competencies and skills associated with positive safety outcomes, it is advisable that supervisors attend training on communication and leadership techniques and work and workplace analysis.

Attending annual safety seminars could be useful.

2.4 - Safety manager

2.4.1 - Professional role description

The safety manager reports to the CEO and to senior management and he has responsibility for the implementation of safety policy, compliance with rules and laws, commitment to development and improving safety performance.

The safety manager should act to ensure the dissemination of a positive safety culture in the organisation, characterised by communication founded on mutual trust, by shared perception of the importance of safety and by confidence in the efficiency of preventive measures.

The safety manager should single out and solve any critical situation whilst carrying out and improving all possible safety conditions. Particular emphasis should be placed on situations involving complex production processes or different responsibilities. The aim is to guarantee the integration of safety measures in the activities of all company departments.

The following safety aspects have to be assured:

- coordination among different company structures in order to identify the definition process for the safety policy, for its integration and implementation;
- identifying the positive conditions for dissemination of safety culture;
- managing of the audit structure and connected activities in order to assess the level of compliance of the company structures;
- providing a consulting service about safety to different company departments, specially to senior management, to safety specialists and procurement and technical departments;
- making sure that the internal communication lines and the training requirements are properly identified and verifying that the relevant needs have been met;
- issuing general safety procedures and specifications for management and control of safety issues;
- monitoring national laws and rules with the legislation and directives issued by the EU;
- monitoring and benchmarking accidents and workplace diseases by means of statistics.

The safety manager has to cooperate in order to develop a safety management system to embrace all management activities. This system has to take into account all corporate processes, including the business aspects.

The safety system has to be maintained, checked, reviewed and developed.

2.4.2 - Factors and competences associated with positive safety performance

Personal attributes

- Leadership attitude

It is characterised by the following elements:

- transformational leadership style (the manager has to be an intellectual model for subordinates and he has to be able to manage and run the individual tendencies so that the team reaches the company objectives)
- transactional leadership (the ability of manage incentives and rewards in order to increase worker motivation)

- Geared to performance
- Taking decisions
- Communication

The following elements should be emphasised:

- accuracy
- ability to communicate, i.e. making presentations, capacity of involvement.
- openness, i.e. identifying the signals and messages of interlocutors

- Cooperation
- Problem solving
- Trust

Interpersonal trust between leaders and subordinates is important for organisational success (it reduces the need for formal contracts, it limits opportunistic behaviours and reduces the need for hierarchical control)

- Ethical behaviour
- Low fatalism, i.e. motivation to influence events
- High safety priority
- High risk-awareness

2.4.3 - Knowledge and skills

2.4.3.1 - Generic knowledge and skills

Safety managers should have knowledge and skills in company management. They should have an ability to relate easily and leadership qualities. Other skills include planning and organising the work effectively, prioritising and focusing on matters of significance, communicating effectively, through personal linguistic and relational skills, providing an example and guidance to the subordinates, leading the subordinates to reach the companies objectives (included the safety and work targets), preventing and resolving conflicts.

2.4.3.2 - Safety specific knowledge and skills

Safety managers should have knowledge and skills in the area of safety, in terms of safety management systems (managing, checking, reviewing, development), safety structure organisation, safety terminology, safety prevention principles, safety rules, responsibilities and tasks for the employer and the employees. They should be aware of the national as well as the EU situation in terms of laws, directives, trends, law harmonisation and the interoperability progress situation.

They should be able to integrate the safety aspects with the business process, evaluating the economic cost of accidents and diseases as well as the safety investment costs.

2.4.3.3 - Job knowledge and skills

Safety managers should have detailed knowledge in terms of general processes and activities, rules, tasks, clients, critical characteristics of all sector activities. They should be aware of the social and environmental impact of the company's activities as well as be aware of other competitor companies' performances, critical aspects and technical solutions, trends, future steps of the sector and the market.

They must be able to influence new projects during the feasibility and engineering phases to guarantee the safety requirements.

2.4.4 - Education, working and safety experience and training

Safety managers should have a university degree, or equivalent.

The above-mentioned knowledge and skills can often be improved by the safety working experience, developing the responsibility levels with the professional growth.

The institutional part of the training support should deal with management aspects, specially related to safety, communication and leadership techniques.

Information has to be supplied about the laws, rules and best practices to follow.

Another important part of the training should deal with the safety management system and how to influence the company culture, emphasising how inadequate safety management affects the company business processes.

The competence to influence and interact with many players having different commitments needs to be developed with a view to integrating safety requirements with production goals.

Attending annual safety seminars is a necessary requirement.

2.5 - Safety specialists

2.5.1 - Professional role description

Safety specialists are professionals with a specific role within the company. They have no direct safety responsibilities but, on the contrary, they generally play an advisory role. Their "client" is the employer, who must accomplish some relevant issues, that may be different from state to state. The responsibility for the risk assessment document is, however, a recurrent duty for the employer in all the EU states. Generally the main focus of safety specialists is in supporting the employer in such duty, and in many cases a specific department is identified to run this business, the Prevention and Protection Service Department. The person in charge of such a department is a safety specialist as are the departmental staff on a more general level. In the following, we identify the safety specialist as the person in charge of the prevention and protection service department. If such a specific organisation does not exist in a particular EU company, the safety specialist is identified as the adviser figure with the professional job description in accordance with the items below.

They must support the employer in:

- identifying and evaluating risk factors;
- identifying health and safety measures in workplaces;
- proposing the safety prevention programs;
- proposing the safety procedures for the company activities;
- proposing information and training programs for the employees;
- providing general and specific risk information for the workplace, rescue and fire prevention procedures;
- providing adequate training on health and safety for all the workers, according to their workplace and profession.

In order to be very effective, these activities should be carried out in association with the activities and tasks of the employer, the company occupational medical officer and the Workers' Representative for safety.

2.5.2 - Factors and competences associated with positive safety performance

Personal attributes

In accordance with the previous tasks for the safety specialist, we can highlight some particular attributes in respect of training activities and teaching and communication skills. Furthermore they must be self-reliant and truthful, because they must be able to support the employer, always keeping an independent judgement in their risk evaluation work. Then they must be truly interested in safety issues and committed to ongoing safety improvements.

2.5.3 - Knowledge and skills

2.5.3.1 - Generic knowledge and skills

Safety specialists should be able:

- to plan and organise the work effectively,
- to prioritise and focus on matters of significance,
- to verify the accuracy of collected information,
- to lead the subordinates,
- to maintain the confidentiality and security of information.

2.5.3.2 - Safety specific knowledge and skills

- Safety, health, work legislative framework, knowledge of the best practices for safety prevention.
- Risk analysis methodologies and techniques.
- Prevention systems.
- Safety management systems.
- Planning and programming.
- Information and training program design.
- Analysis and control techniques and tools.

2.5.4 - Education, working and safety experience and training

Safety specialists should hold a middle-high level education. They should have work experience that contributes to the development of the knowledge and skills described above. This work experience should be in a technical or professional position involving the exercise of judgement, problem solving and communication, integrated with ongoing upgrading needs. Their training should be focused on technical subjects, law upgrading, safety management systems and prevention processes and techniques. Moreover they should be trained on the risk evaluation analysis and on the development communication skills.

Attending annual safety seminars is a necessary requirement.

3 - Guidelines for a standard training process

3.1 - Introduction

Training in occupational safety involves a series of educational measures aimed at providing staff with the necessary competences, encouraging them to pay due attention to safety and adopt new attitudes and appropriate behaviour.

The worker, with his emotions, behaviour and attitudes is the central focus of any management measures aimed at identifying occupational safety risks. The main objective is to protect workers and avoid workplace risks.

Occupational health and safety means taking account of human factors in relation to the socio-technical work environment.

Training, therefore, seeks to impart problem-solving skills with a view to finding new solutions for safety and health protection, transcending routine mental processes, preconceptions and prejudices and changing habitual and incorrect behavioural responses.

3.2 - Training objectives

Training programmes in occupational safety aim to:

- ensure knowledge and understanding of laws and regulations, with all their implications;
- provide users with useful tools to develop specific competences such as:
 - ability to analyse processes and events,
 - ability to understand all the relevant aspects of an issue,
 - ability to solve problems rationally rather than merely using intuition or common sense,
 - ability to make a risk assessment,
 - ability to learn from previous organisational experiences and re-use it when necessary,
 - ability to manage unplanned events and exceptions;
- increase awareness of the importance of adopting appropriate behaviour and using specific prevention tools.

Each training process must therefore be:

- **stable**, i.e. it must take into account the personal experience of trainees and have a permanent impact;
- **critical**, i.e. trainees must be actively involved in the training process and their critical faculty must be engaged, so that the learning is accepted and well retained;
- **verified and able to be evaluated**, i.e. the learning process must always be clearly identifiable, capable of evaluation, measurable and measured;
- **strictly related, embedded in the working practices**, people learn almost everything by doing during their daily working activities.

The above statements underline specific features which must always be considered. All training activities aim at producing all the necessary behavioural changes required to cover specific roles and responsibilities. These changes apply to knowledge, attitudes and skills. The training process must be designed in order to develop the above-mentioned changes by matching and comparing the past experience of staff with the new experience and knowledge acquired. Training is therefore something more than imparting information: it deals with the promotion, development and upgrading of knowledge, attitudes and skills through a new learning experience. These two processes (training and knowledge sharing), though different, must be considered together and not analysed separately because they both deal with a more complex process involving the development of human resources values.

Two categories of training process can be distinguished:

- professional and technical training, with the goal of acquiring and developing specific competences in order to be able to take on a specific role. Contents cover informational and technical matters;
- adaptation and behaviour training: deals with the acquisition of values, principles, new and adequate behaviours, changes in work approach. In this case the educational aspects prevail over informational aspects.

3.3 - Identification of training periods and requirements

Training requirements depend on the specific situation and context and therefore it is difficult to establish any universal rule. However, there are some particular situations where training is a necessity in order to guarantee safety and the basic conditions for staff to operate autonomously and in safety. These situations include:

- recruitment,
- changes in role, task, activity,
- technological upgrading,
- change in the value system and policy of the company,
- lack of competences.

These cases are only indicative and do not include all possible cases. The organisation must consider these cases in a training plan, combined with the outputs of an accurate analysis of the training requirements.

3.4 - Main characteristics of a training process

In point 2 - page 10, we have seen how ambitious the training objectives are and the complexity of the training process and the implications. In order to be effective, it must therefore include some specific characteristics and methods.

Participation and teamwork

In a learning session active participation is the basic ingredient required to ensure the link between the earlier experience of the trainee and the new awareness and proposed experience. Generally, learning is more effective if the learner is actively involved in the training process and if he finds his own answers to the questions arising during the learning session and the informational aspects of the programme.

The approach used must be mainly active, mostly because this kind of training is directed to adults who have their own work and study experience.

This implies that the use of classroom lessons must be limited to specific requirements and situations, while teamwork must be widely used. This method is particularly valuable because it can be effectively used for work activities. Team work training therefore implies that the figure of the trainer must often play the part of the "inspirer", coordinating discussion, providing the necessary stimulus for keeping the attention high and assuring an effective training session. This technique, broadly known and used in many fields, allows a complete participation by all the people involved in the learning process and therefore enhances interest, attention and learning; learning is without doubt altogether more effective both qualitatively and quantitatively.

A sequence of active techniques, described below, can be used. They facilitate knowledge with the purpose of:

- keeping the interest high during the training session;
- training people to listen to each others' opinions;
- developing a critical and active approach and debate.

Every member of a training session has his own experience and opinions that can be exchanged with those of others. In this situation the role of the trainer is to encourage the exchange among the participants providing them with the opportunity to discuss and to reach shared solutions. It is a good practice to ask the learners to analyse a problem individually, to discuss it and propose ideas and solutions; then it is advisable to collect the ideas and solutions together in the group, aiming to draw them all together at the end. The trainer plays an active part in steering the group, coordinating both the individual expositions and the final summing up session.

Sometimes it is worth identifying some detailed topics to be analysed in smaller groups. This kind of work in smaller groups aims at stimulating more effective individual participation than is possible in a larger group. Team work can be used both as a starting point for a traditional lesson and as the final summing up session. In the first case participants must already be familiar with the topic, even if they are not thoroughly conversant with it. The purpose of team work is in this case to stimulate debate and exchanges of views in order to explore all aspects of the issue. In the second case the discussion obviously refers back to previous lessons and the team work aims at filling possible gaps left by the training sessions and which could emerge during the discussion.

Another important and broadly-used method to encourage participation and debate is an appropriate use of exercises. Exercises are used to underline a specific problem or to apply a criterion or a technique, and they are actually useful for consolidating a lesson learned. These workouts can be individual or in a group and in this latter case they encourage critical exchange. Below we provide some suggestions as to how simple exercises can be designed. These do not require any specific skills.

One exercise consists in providing some lists of items out of order on a subject that must be re-ordered by the learners according to a specific criterion; these lists may contain correct and incorrect situations and the participants must recognise them.

Exercises usually use "case studies" as practical applications of training sessions. Case studies are one of the most used and well-known applications of the "active training methodology". They consist in an exercise for the learners, who must read a report regarding a specific situation (that is the "case"). The purpose is to encourage the analysis and the discussion of the case and finally deduce all the relevant aspects concerned.

Active techniques for stimulating participation may often involve the use of:

- didactic videos concerning the subjects analysed: they are used when it is necessary to enhance the concepts through concrete examples and emotional impact;
- video recording of the learners while they are participating in a team exercise or during a presentation. They are important because they highlight the team dynamics and the behavioural strategies adopted.

Definition of the objective

Coming back to the general features of a training process, we must remember a simple but important requirement: that is the clarity of the objective of the training process itself.

The objective must be discernable within the training programmes and it must be perceived by the learners. The objectives of a training process must be:

- defined and well identified at the beginning of the process, in the design phase;
- clearly stated to each participant at the beginning of the training session;
- presented in logical and coherent sequences;
- presented in an explicit and measurable way.

Clarity must also be a important feature of the message: to be effective the message must be clear, linear, structured and relevant. It has been proved that information which is too detailed and full of irrelevant content, presents a message of no utility for the learner or in some cases with negative effects.

Motivation

An adult's participation in a training process is the consequence of a conscious choice: therefore he must be interested from the beginning. The motivation comes from:

- the ambitions and the expectations as consequences of the initial awareness: lack or absence of knowledge and information;
- experiencing the training session as an opportunity to satisfy all his cultural and professional requirements and expectations.

Flexibility

Flexibility is a typical characteristic of training processes, always relevant to learners' and teachers' interaction. The specific requirements of learners and the structure of the training session must rest on a flexible basis because a rigid system cannot guarantee to meet specific requirements and different ways of teaching and learning capacities.

Integration

This is a basic feature of a training process, above all if we are considering a training process on occupational safety. In fact this process generally aims to promote safety culture at every work place and in every working activity; it also deals with adequate behaviour and so it is important to integrate occupational safety activities and other working activities dealing with organisation, development and occupational psychology, taking into account different life styles.

Multi-discipline approach

An effective training process must adopt a multi-disciplinary approach: this is fundamental because it has to embrace all the different aspects of the learner's former experience in order for the material to be well-learned and assimilated. Stable acquisition automatically follows, i.e. the learning has been permanently integrated, since it has come about through a critical and analytical process.

Teaching techniques

We present the three approaches to an effective training session:

- "thought - thought": this kind of teaching concerns a typical way of teaching: the teacher provides information and content to the learners (it is the classic lesson suitable for specific subjects such as safety regulations);
- "thought - action": the teacher provides information and contents to the learners and then asks the participants to assess what they have just heard through practical exercises (analysis techniques and tools);
- "action - thought": in this method the participants first have a specific test and do a practical exercise on a specific subject, then they analyse the results all together with the teacher to find out what is correct and what the best and most effective practice is in that given situation.

3.5 - Planning of a training process

3.5.1 - Identification and definition of the main issues to focus on

Planning of a training process starts with an accurate analysis of the problem to be dealt with, in order to point out all the aspects and problems which can be fully explored and solved. This implies that not all the subjects and problems can be correctly solved with this kind of approach.

3.5.2 - Analysis of the organisational context

Obviously, an essential feature is knowledge of the company in which the training process is to be planned and the company organisation. When the purpose is to train personnel for a new professional role which has not existed before, a prior analysis of all the functions related to the role is required, so all the relevant aspects can be incorporated into the planning of the training process.

3.5.3 - Identification and evaluation of knowledge and skill gaps

It is also important to assess the learners in terms of existing knowledge, former experience, education, specific interest in the training. A need analysis can thus be carried out taking into account these aspects. It consists in identifying all the gaps in knowledge and skills gaps that have to be filled in order for each member to be able to do his job properly. Later on we will see how this analysis can be integrated into a logical system.

3.5.4 - Setting training objectives

Once the specific gaps have been evaluated, these items must be used to define the specific objectives of the training process. Defining the training objectives clearly is a fundamental step in any planning activity. They can only be correctly defined if the previous steps have been properly carried out. Moreover, the effectiveness of the training process cannot be correctly evaluated if the objectives are not fixed in a clear and measurable way, so that the results can be measured. Planning the training process involves the following activities:

- creation of training cycles, sessions, units;
- choice of didactic methodology;
- choice of the teaching body;
- production of didactic materials.

Learning evaluation is another key planning step: it is not yet widely used but it must be carefully planned and carried out, as the logical consequence of the identification of measurable objectives.

Evaluation is also important for the teachers because from this they receive useful information on how to modify and improve the methods and content of their lessons.

3.6 - Training benefits

Many studies and statistics have shown the advantages of adopting a structured approach to training. There is evidence that it results in:

Better performance

- Less absenteeism
- Fewer delays
- Improvement in health and safety
- Reduction of conflicts and complaints
- Efficient achievement of targets

Higher productivity

- More efficient working
- Less external aid
- Less useless time

Better quality

- Fewer mistakes, process anomalies, re-processing
- More added value in process activities
- Decrease in accidents, complaints
- Reduction in legal costs
- Improved competitiveness

Moreover, it has been verified that when the working environment and conditions improve, this has a positive effect on employees' moods which impacts on the company's public image.

3.7 - The training process as a management system

We propose that training processes management be structured like management systems, on the model of *ISO standard 9000:2000, ISO 14000* (see Bibliography - page 38).

Why should the management system approach be applied to the training process?

Training process objectives have been described previously and they are very ambitious. The planning of this process must ensure that it is effective in a company context like any other activity. The training process must be grounded in the language, criteria, principles, logic and culture of management systems. This surely helps the training process to be integrated into a context incorporating all other company activities.

The reference model (not the only one but by far the most accredited) is the ISO context (9000:2000 and 14000): such a model has been designed to be applied to organisations of various kinds and dimensions, in different geographical, cultural and social situations.

The training process can produce results even if it does not conform to the management system model, but some aspects, like systematic measurement and management re-evaluation, must always be present. This is essential for a training process to be effective. Consequently an effective training process always contain these two aspects, which are typical of management systems. Many organisations use audit and re-evaluation activities even if they are not integrated with the whole of the company activities.

Let us consider that the training process outputs must be based on a systematic and coherent application of the following criteria:

- customer focus,
- process and systematic vision,
- prevention,
- systematic evaluation.

These are the basic concepts on which a training process can be built; they come from the same management system roots. In order to plan a training process on the model of management systems it is necessary to follow the famous steps of the virtuous circle of Deming, starting from the definition of a policy, then evaluation, planning and organising, execution, control and management re-evaluation. Such a system allows the organisation to define the objectives and to verify the execution and the effectiveness of the relevant activities, but, above all, to ensure continuous improvement through a re-analysis of the policies, the objectives and the implementation plans.

3.7.1 - Policy

Top management must define the company policy on education and training. This policy must be consistent with overall company policy.

The policy must:

- include a commitment to continuous improvement and cultural evolution of the company;
- include a commitment to conform to the company values;
- provide a reference context in which the activities must be carried out;
- be recorded, operative, kept active, and be applicable to all the staff;
- be available to the public.

3.7.2 - Planning and organisation

The organisation must establish and maintain a procedure to define and upgrade the expected competences for every professional role.

The organisation must establish and maintain a procedure to evaluate and upgrade the relevant competences for every professional role. The competence evaluation methods must be defined in this procedure and the evaluations must always be referred to these methods.

The organisation must establish and maintain a procedure for defining a document of training and formation requirements. This document must consider the discussions in progress concerning present and expected competences and it must constitute the reference document for the definition of training objectives, plans and programmes.

The process of training and education in the field of behaviours must be carried out in a very similar way. In fact it is important that the process starts with the definition of the expected behaviours, then the description of the present behaviours, the evaluation of the gap between present and target behaviours and therefore the estimation of the training and educational requirements. Both typologies of training are important in the field of occupational safety: for professionals in occupational safety training is sometimes more focused on the creation of specific competences; on the other hand, all the employees could have a training session on appropriate and safe behaviour.

The organisation must establish and maintain a procedure for defining the choice of the teaching body. This procedure must contain the minimum requirements in terms of scholarship, teaching experience, staff, and required upgrading.

The organisation must establish specific training objectives and targets for every relevant function and level inside the company. These objectives and targets must be consistent with the training policy. Records of training sessions, evaluations and results must be kept.

The organisation must establish specific training programs to ensure implementation of policy and to reach objectives and targets. This is a key element in implementing the system successfully. The program must describe how targets are to be achieved, the scheduling of the actions, the choice of the teaching bodies, the responsibilities.

All the roles and responsibilities in the training process must be identified inside the training management system. There will be specific procedures identifying the people involved, the specific tasks assigned and so on. However we underline the importance of referring to the people generally actively involved in the system, remembering that their responsibilities and tasks may differ from one company to another and that these specific matters are dealt with in specific procedures.

Management is the main subject involved in the training process and has much more weight than all others in the establishment of the management system: in fact whenever a cultural change must be planned, management must be strongly committed and hold strong convictions. An actual measure of the management involvement is the availability of the human and economic resources necessary in order to ensure the effectiveness of the training process itself. It should moreover provide for implementation of training programs in conformity with the stated policy. Other people involved deal with the other steps of the system. Another key role is played by the person in charge of the Training Management System: his role, functions and responsibilities are described below. The other key figure is obviously the worker. The worker is the receiver of the training process and he must always play an active part in this process and never be a passive participant in the training session: company performances depend on the commitment and the problem-centred approach of workers.

Another key figure, particularly important in occupational safety training, is the safety technician. This figure has been created by *European Directive 391/89 EEC* (see [Bibliography - page 38](#)): his activities and targets consist in co-operating with the management to improve working conditions inside the company, protecting workers' health, planning actions to improve health and safety, trying to reduce or eliminate safety dangers and risks. To do this, he is involved in many activities, some dealing with the spreading of information and training on occupational safety, dangers, risks, safety regulations, training and information programs. Quite often the safety manager plays the role of teacher himself for specific subjects dealing with safety.

3.7.3 - Executive actions

In order to implement training programmes, roles, responsibilities and authorities must be defined, communicated and recorded. The management must provide the necessary human and economic resources to implement and monitor the training plan.

The management must appoint/designate a training system manager who must have the requisite responsibility and authority in order to:

- guarantee that the training management system requirements are defined, applied and maintained;
- refer the results of the system to the top management in order to allow the re-evaluation of the system itself by the management.

The organisation must establish and maintain a procedure for defining an information system to be used for the training system; the organisation should also lay down the reporting lines for the various functions involved in the training process.

The organisation must record the information required to:

- describe the basic elements of the training management system;
- describe expected competence requirements in relation to present competence requirements and the relevant training needs;
- describe the training programs;
- define the teaching body and the selection criteria used;
- produce records of former training sessions and the results. These documents must be recorded according to a procedure, which must guarantee that the use of outdated documents is avoided.

3.7.4 - Monitoring and evaluation

Every training process should provide for an evaluation process to measure how far the set goals have been achieved and provide the date to undertake a critical analysis with a view to continuous improvement.

The evaluation must comply with a strict methodology in order to produce reliable conclusions. It is important that the evaluation process starts before the training process and continues during and after it. A number of different stages can be identified:

- preliminary evaluation: before the training session;
- diagnostic evaluation (ex ante and in process) defines the strengths and weakness and is useful for identifying what has been missed out and the various details of the training session;
- level evaluation (in process) measures the acquired competences;
- educational evaluation (in process) verifies the behavioural coherence and stability concerning the specific disciplines;
- control evaluation (final evaluation) verifies if the learner has acquired what he should have;
- permanent evaluation (on the job) should be done during the routine activities.

Certainly the most important evaluation phase is the preliminary evaluation because it allows the best educational choices to be made. This evaluation should contain a component of measurement and a component of judgment. The more correct and exact the preliminary evaluation, the greater the possibility will be of achieving the planned goals. It should be structured in different levels: identification of objectives and specific objects related to them, the elaboration of indicators and variables and the creation of some complex index that, combining different indicators, give a more critical view of the status of the art.

Evaluations must be carried out by the teachers during and at the end of the training session. Other evaluations must be made by specific personnel defined by the manager of the training management system, with a view to verifying the effectiveness of the training sessions. These verifications can be made after the sessions, with specific questionnaires in order to check whether messages have been received properly and in a stable way.

The above details deal with the evaluation of a training session. But the training management system itself must be subjected to evaluation and periodic re-examination. The organisation must establish and maintain programmes and procedures dealing with periodic audit. This audit must be carried out in order to:

- verify whether the training management system is (or is not):
 - in conformity with what was planned and the ISO regulation,
 - being correctly applied;
- provide management with relevant information.

The audit program must be based on the results of previous audits. The audit procedures should always state the purpose, the context, the object to be audited, the frequency and the methodology, the responsibilities and what is needed to conduct the audit.

3.7.5 - Re-evaluation

The top management of the organisation must periodically re-examine the training management system to guarantee that the system is operating effectively and in accordance with the specifications. This process must be conducted with the assurance that all the relevant information has been collected to allow a detailed evaluation. The re-examination must be recorded.

The top management may decide to amend policy, objectives and other elements of the system after the analysis of the re-examination results.

Re-examination should include:

- audit results, indicating
 - how far goals have been achieved and the effectiveness of the activities in terms of rate of achievement of objectives;
 - how far the system is able to adapt to new situations and information;
- all the outcomes from the interested parties.

Comments, conclusions, advice should be recorded.

3.8 - Ongoing development of the training system

Presently the training system is based mainly on the identification of roles and characterised by modular training processes. This allows relative flexibility in human resource deployment and therefore implies work productivity.

The definition of training paths based on the job to be carried out guarantees that the trainee will have the basic knowledge and cultural background required to do his work successfully.

As we have already said, the system must evolve on the basis of a model structured like management systems, along the lines of *ISO standard 9000:2000, ISO 14000*.

Directive 95/18 EC (see Bibliography - page 38) concerning the licences issued to railway companies, imposes on companies an obligation of "professional competence". They must demonstrate and record, among other things, that safety-critical staff, especially drivers, are fully qualified for that specific activity. Moreover, they must provide information on the training process and methodology.

A training system with quality certification is certainly the most appropriate tool for complying with European Union regulations.

The present system is based on the key concept of "competence". A person is defined as competent at a specific professional level if he is able to perform his tasks correctly. The verb used "to perform" gives a clear indication of the approach, based on the ability to do, and on proof of performance.

The system of identification of professional tasks and qualifications is normally based on a 5-tier system, ranging from the lowest (level 1) to the highest (level 5) concerning specialist and professional performance:

- Level 1 : routine work with high degree of repetition
- Level 2 : manual work involving generic skills to be used in different contexts
- Level 3 : work involving specific technical skills with complexity of execution
- Level 4 : activities implying a certain level of responsibility and decision
- Level 5 : activities requiring the application of complex principles, in complex and unforeseeable contexts.

In this system, the focal point must be found not in the training process which has instilled the competences, but in the product itself of training. The attention is all focused on the verification of existing competences: it is not considered interesting how, when and where they have been acquired, neither are the individual differences in learning acquisition considered important. The interesting thing is to establish the competence levels acquired, in the most accurate and "public" way. This means that in this context the accent is mainly on "being able to do" rather than on "having the knowledge". Scholastic and academic education (but also professional training) is still based on formulation of problems and hypotheses and their solutions in abstract terms. The ability to discuss, argue and find the contradictions in the arguments of a speaker are some main skills taught in academic education. The approach is therefore concentrated on problem solving: competence, at a fixed level, is the identification of the ability of a person in solving problems of specific complexity. Competence must therefore be visible and consist of being able to perform appropriately at fixed levels of complexity and cleverness.

3.9 - Criticisms of the competence model

This model has been highly criticised. One criticism deals with the difficulty of evaluating of the most complex competences at levels 4 and 5.

Above all however, there is a question as to whether all the competences must be expressed in terms of performance criteria. The need to develop adequate tools to analyse the different characteristics of jobs have therefore been underlined. This idea of competences seems totally artificial, because it does not take into account the complex environment in which people perform.

In fact, the achievement of the standards shows the capacity to execute operations, but not the understanding of the context by the worker.

The proponents of the competence model say that being able to perform correctly is sufficient proof of knowledge and comprehension of the context. However the problem is that working situations are so complex and include so many variables that competence cannot be stated once for all, and it cannot be considered valid in every occupational and organisational context.

Competence

Competence is an individual resource in a working performance situation or professional path. It is made up of a series of elements, some of which deal with the nature of the job (and that can be identified by the analysis of the tasks and activities done); whilst others concern personal characteristics. Competences may belong to three main areas:

- the area of the basic competences (for example basic computing, foreign languages, knowledge of regulations and laws) that are considered the requirements for the work and for professional development;
- the area of technical competences in which we find specific technical skills in the area of operational activities and working processes;
- the area of transversal competences like the ability to diagnose a situation, communicative skills, problem solving ability: all these are personal characteristics that are involved in the working activity and contribute to performance.

3.10 - From competences to behaviours

A deep analysis of traditional training systems has identified a crisis in the way of conducting a training process: this crisis deals with both basic education and ongoing professional training and involves both the training quality and the worker-activity relations.

As concerns the training quality crisis, the workers sometimes do not use the competences learned in training to face and solve ordinary problems in their daily work. This happens because the training process is not able to transform the knowledge acquired into active behaviour.

As concerns the second aspect, this is when a hiatus occurs between the worker and the activity: the worker fails to apply the acquired procedures when these are in conflict with the ordinary working situation. The discrepancy between the training content and the real environmental conditions is evident.

There are two suggested models:

- the model based on traditional classroom teaching: that is the model based on inputs:

this model, as we have seen in these pages, is based on the achievement of a certain level of performance through the learning of general principles;
- the model based on teaching in the working context: that is the model based on outputs:

this model reaches its effectiveness when it manages to integrate knowledge, skills and attitudes in the actual working context.

The two models are not necessarily antithetical and in opposition to each other; rather they may be integrated and they can become complementary. In fact the concept of training as a mere transfer of concepts and knowledge is over; now we must consider training in a context involving first the learner and around him his world, defined in cultural and social terms. Training activities must therefore be as far as possible aligned with the social and cultural context of the learner. Hence the trainer must develop a specific analysis of such contexts in terms of structure, information flow, hierarchy of activities, social relations and so on. The purpose is to identify the best way to organise the training session, trying to make the best use of "learning by context". This kind of learning should have a programme with the following features:

- similar features between the learning session and the routine learning;
- active participation with practical elements coming from routine working activities;
- involvement of the learners, practical exercises trying to avoid the risk of going outside the reference contexts.

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