

Safety & Loss Control Management
and the
International Safety Rating System

Safety management and the ISRS - INTRODUCTION

In the following article the International Safety Rating System[®] is introduced as a reference to:

- build a safety management (or "care") system in an organization as part of an improvement process leading to reduction of accidents and other mishaps and to obtain better control over activities. As such the ISRS helps to improve the bottom line as a loss control management tool.
- measure existing safety and loss control management activities and serve as a yardstick for safety management system evaluation. As such the ISRS is a means for providing and obtaining recognition for safety management performance. This can play a major role in Positive Risk Communication between responsible industry and societal partners (authorities, customers, insurance companies, workers, special other interest groups as well as the public at large).

The article places the ISRS in the context of safety management: the conscious and structured effort to obtain results in safety and loss control ¹.

Four key words are being used:

- the **PHILOSOPHY** on which the safety management approach is based - a five phase model.
- the **CONCEPT** - the "platform" model including the four main building blocks for an improvement process.
- the **PROCESS** - the most important steps to transfer concept into a structured improvement process.
- the **TOOL** - the ISRS as a tool to put safety management philosophy into practice.

¹ While the article focuses on safety the scope is really much wider and the principles discussed are also largely applicable to quality and control over environmental issues. "Safety" as discussed in this article relates to the broad concept also including (occupational) health and well-being.

Safety management is MANAGEMENT

Safety management is the MANAGEMENT of safety and uses the same concepts, principles and techniques as used in other areas of management.

Safety management is management of SAFETY. It is therefore important to establish what is meant by "safety". Traditional safety, directed exclusively at work injuries, or system safety which is directed at the functioning of an organization in a much broader context?

Safety management as meant in this article addresses the broader context of safety which touches and overlaps with quality, environmental care, productivity and problem-solving in a more general sense.

Safety management - GOAL ORIENTED AND INTEGRATED

The overall goal of safety management is to obtain lasting results in the area of safety. Fewer accidents therefore, fewer injuries, damages and production interruptions. But also fewer liability claims, protection of company image, etc. It is important to realize that a certain level of "safety care" will be the result of the same care or control system which is also responsible for the creation of a certain level of quality and a certain control over environmental problems. In the final analysis it should be clear that it is the same overall management system and the same people working in and with it that will have to care about the right way to do the work that has to be done. Right - without unnecessary expenses, accidents, interruptions, absenteeism, quality problems, etc. Safety may not, and cannot, be viewed as a separate item but must be considered as a part of an integrated approach in which all aspects have to be evaluated and considered in mutual relation.

Safety management - THEORY OR PRACTICE?

Often arguments are heard that safety is too much "theory" which is then placed opposite the much praised "practice". However, the "theory" often tells us how things should be and how work should be done while "Practice" shows us how things are and how work is actually being carried out.

The differences between "theory" and "practice" then often comes to show in the form of accidents, losses, injuries, things that go wrong. Undesired events happening because we did not take the time to do things properly, or didn't want to do things right, or didn't know how to do it, or maybe because we just wanted to finish a job quickly before the end of a shift or within the scheduled number of days for the job. Or because we did not realize what the results could be of our decision-making.

Theory or practice? It is one of the first tasks of the management function (all line levels, staff and workers included) to make the gap between "theory" and "practice" as small as possible, to provide quality work and prevent unnecessary loss to the organization. For many, it is also the only way to contribute to a lasting profitability of their company.

While considering this, it should be realized that decisions made at, and actions taken by, higher levels in the organization may very well contribute to the occurrence of the unwanted events which we may see in the form of accidents, sometimes catastrophes which make it to the screen in our homes. For example by allowing too tight a schedule for completion of a major construction or a turn-around. Or by directly or in-directly creating working conditions or systems in which the failure of one person at a given time and under certain conditions may very well mean the destruction or collapse of the entire system.

Safety Management - CONSCIOUSLY DEALING WITH RISKS

Safety management is related to the consciously dealing with risks and is intended to create a management system, or management systems, including:

1. the control of those "up-stream" decisions, activities and/or situations (the causes) which (can) lead to undesired events (the accidents, damages, incidents, losses, etc.)
2. the control of the consequences of undesired events, in case preventative control systems fail

When thinking about control of causes we should consider such things as:

- design of machinery, installations, workplaces
- design of procedures and instructions for work
- modification procedures for control of changes to processes, installations, work-methods, etc.
- purchasing/procurement of materials, machinery, equipment
- purchasing of services from third parties, such as contractors
- selection and placement of personnel
- periodic (re-)examination of personnel in relation to the hazards to which they are, or can be, exposed during their work
- (periodic) identification of "high risk" or "critical" tasks and, if necessary, the making of adequate procedures, rules or work practices
- periodic observation of the way these "critical" tasks are being carried out
- regular observation of the more "general" safety behavior

- training of management, staff as well as operators to carry out their specific tasks in the overall safety and loss control program
- periodic review and, if necessary, up-dating of existing procedures
- meetings involving various management levels as well as operating personnel to discuss and highlight special interest safety and loss control subjects
- performing periodic inspections to detect and correct undesired conditions and/or situations
- proper preparation for identified emergency situations
- analysis of accidents/incidents, damages, etc. to learn from what went wrong

Control of consequences means having the potential to provide adequate first aid and medical services to victims; to fight fires; salvage machinery, equipment or vital data; supply proper information to neighbors and the public at large. But also includes those actions necessary to deliver the end product or service to the market, soon after a major incident, to limit loss of market. In this (after-the fact) control phase, we must not forget that proper preparation is necessary involving manpower, equipment and procedures such that emergency actions can be carried out effectively should prevention measures fail.

Safety management - a (relatively) simple model for success - THE PHILOSOPHY

Safety management is directed at getting success in safety and the functioning of people and processes without problems, without accidents, without losses - in short: without undesired events.

A relatively simple model is given in figure 1 and assists to communicate basic control principles as well as those phases at which control can take place. It is important to realize that such a model is at best an approach to real live situations and never real live itself.

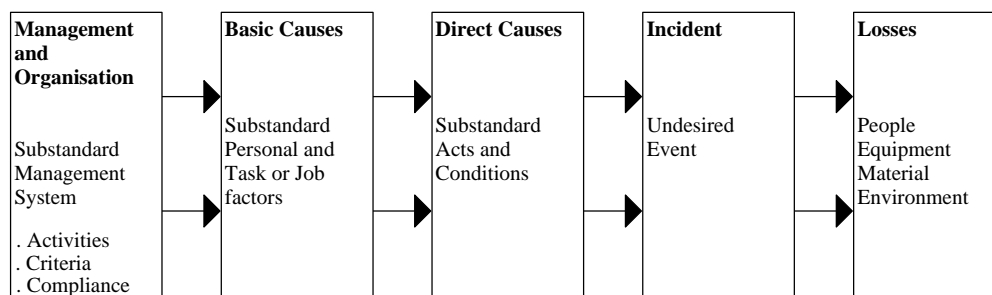


FIGURE 1

This "Loss - Causation model" which has been made by Mr. Frank E. Bird, Jr. of the International Loss Control Institute (ILCI) ² in the USA was based on an earlier model developed by Heinrich. This model can be considered a "negative" model since the outcome of failures in the various phases is loss. As such the model can be used to understand the various causes leading to accidents and as a framework for accident/incident investigation. To better serve the context of success in safety management, however, it may be better to put the model in a positive mode as follows:

SUCCESS
coming from
DESIRED EVENTS
originating from the
RIGHT ACTS AND CONDITIONS
based on the
RIGHT PERSONAL AND JOB FACTORS
which evolve from
RIGHT ORGANIZATION AND MANAGEMENT SYSTEM(S)

The various phases of this positive model are highlighted briefly below, moving from right to left:

SUCCESS

Success here means:

- no (undue) injury to people
- no (undue) damage to equipment
- no (undue) loss or damage to materials
- no (undue) damage to the environment
- no (undue) loss of market
- no (undue) damage to company image or brand-name
- no (undue) loss to image of management

Success, also in safety management, is not there for those who give up half-way but only for those who persist in their actions to obtain the desired goal. Panacea are not there - no "quick fixes". Lasting success can only be obtained by establishing structure in the activities identified to control undesired events and not by ad-hoc actions triggered by actual problems.

² ILCI became part of DNV in 1991

DESIRED EVENTS

Success comes from desired events, the things we want to happen. Conversely, success results from the lack of undesired events - work without problems and with only those incidents which were assessed in advance and accepted. A good management team knows the problems which can (and sometimes will) occur and has taken appropriate measures to prevent as well as to cope with potential consequences. A well-run organization experiences only relatively small problems which can be accepted or assumed by the organization and its systems - the major problems have been identified and analyzed in advance and proper control measures have been taken.

RIGHT ACTS AND CONDITIONS

Desired events evolve from the right acts of people and the right work conditions. Work being done by people who know what to do and know the risks involved. Who know how to prevent potential problems and who know how to act in case something may go wrong. The right acts and right work conditions are the results of proper selection, proper training, the right design, adequate purchasing, proper maintenance, proper motivation, etc. "Right" and "proper" as used here, mean: in accordance with standards set up to prevent unwanted events.

RIGHT PERSONAL AND JOB FACTORS

Right personal factors:

- persons who are physically and mentally capable for carrying out the work that has to be done
- persons with the right knowledge, experience and skills
- persons working without undue stress
- persons who are properly (self-)motivated to do what is necessary to prevent problems

Right job factors:

- adequate management and supervisory personnel knowing what they are doing, making proper decisions and knowing how to obtain the best results with their people
- proper design and modification of work areas, installations, processes
- purchasing/procurement of the right products, equipment, services, etc., without undue risk parameters
- adequate maintenance of installations, processes, workplaces, etc.
- availability of the right (and thus: safe) equipment, etc.
- proper (and this is also: safe) methods of operation and work

RIGHT ORGANIZATION AND MANAGEMENT SYSTEM

Lasting success in safety management can only be obtained as the resultant of a proper functioning organization with an adequate management system. Such a management system would include the combined activities to prevent undesired events and those (activities) to limit loss, should prevention fail. The management system should also include efforts necessary for the uncovering, and correcting, of those deviations in the various phases of the "Loss - Causation" model which could lead to adverse effects (i.e. accidents, damage, losses).

A proper system for loss control can only be set up when:

1. activities for success in safety and loss control have been identified
2. adequate minimum performance criteria have been set up for these activities

and includes:

3. activities to control the execution of necessary activities such that performance criteria and objectives are met, through a process of periodic measurement, evaluation, feedback, correction, etc. leading to desired bottom-line results.

Safety Management - DOING WHAT IS NECESSARY

Safety management in principle is simple: knowing what should be done to obtain desired results, knowing what the acceptable minimum performance criteria are and, last but not least: doing what needs to be done. And continue doing these things, until desired results have been achieved. And improve performance, if the desired results are not obtained. Ultimately safety (but also quality, environmental care, cost control, etc.) depends on the way work is being carried out. Thus the shop-floor gets an important place in our safety efforts and also the direct

supervisor and his people who have direct influence on the way work is being done and the way equipment and installations are being used.

But it is the management system (and the people working in and with it) which takes care of proper design and purchasing. And it is management who, through proper planning, prevents the occurring of undue workpressure setting the stage for errors, accidents and losses. It is the same management system which ensures that people in the organization know what is expected of them such that it effective "self-management" becomes possible. It is management who ensures that the right training is provided, accidents and incidents are properly analyzed and effective action is taken to prevent recurrence. It is management ensuring that adequate inspections are being carried out and maintenance of equipment and installations is properly done.

It is also management maintaining the discipline to make important those items which are necessary to obtain, and maintain, results in safety/loss control. Again and again, not just when there is time to do it, when it is convenient. Management who, by example, emphasizes that they mean what they say. Management providing leadership. It is the management system in which managers, staff and workers work together to obtain results and to improve what is being done: to close the gap between "theory" and "practice". And it is (senior) management who has the greatest influence on creating the management system that leads to lasting success.

In our society it is such that the people gets the government it deserves - this is through our voting system. In an organization, however, it is the other way around: management gets the organization and the people they deserve because management "chooses" organization and personnel. And also chooses the level of safety in the organization through the quality of the related management system.

No lasting success without an adequate management system! This is also true in the area of safety. It will not be possible to get where one wants to be, unless a proper steering mechanism exists, unless an adequate management (control) system has been set up.

Safety management is in particular involved with the establishment and maintenance of a management system directed at the prevention of those undesired events which lead to injury, to property damage, to damage to the environment and to related "indirect" losses. Lasting results can only be obtained by implanting in the organization a structure which enables the organization to direct its efforts towards the continuous prevention and control of problems, damages, accidents, injuries, environmental incidents, etc.

Safety management - necessary aspects - THE CONCEPT

Four supporting aspects or "building blocks" (see figures 2A and 2B) are required to bring about desired results and the level of safety performance "rests" on these:

- . adaptation of organization, meaning identification and establishment of work or activities and related criteria, necessary to produce the desired results. It means making a **PLAN** so that in the end the right things can be done in the right way. This will include the making of a company's own safety management "system".
- . development of people (**TRAIN**) in relation to the work to be done to obtain those results. This includes various types of training such as general introduction training as a basis for the improvement process as well as specific training for staff and management personnel to properly carry out the specific activities as requested by the plan.
- . execution of the required activities (**DO**) in accordance with criteria set, by people who know what to do, and why, until the desired results have been obtained. Obviously this is the heart of the matter: doing the right things in the right way. This is what will lead to results and success.

The foundation of this 3-dimensional ("platform") model is management **LEADERSHIP**, the true driving force of the improvement process.

ADAPTATION OF ORGANIZATION - WORK TO BE DONE - **PLAN**

To reach a destiny, a goal or objective, to obtain results, certain identified activities are necessary. The nature and quality of these activities determine to a large extent the failure or success of organizations and companies. To reach a certain level of "safety care" minimum criteria must be established for such activities as:

- leadership and administration
- leadership training
- planned inspections and maintenance
- critical task analysis and -procedures
- accident/incident analysis
- job observations
- emergency preparedness
- rules and work permits
- accident/incident analysis
- knowledge and skill training
- personal protective equipment
- health and hygiene control
- system evaluation
- engineering and change management
- individual communications
- group communications
- general promotion
- hiring and placement
- materials and services management
- off-the-job safety

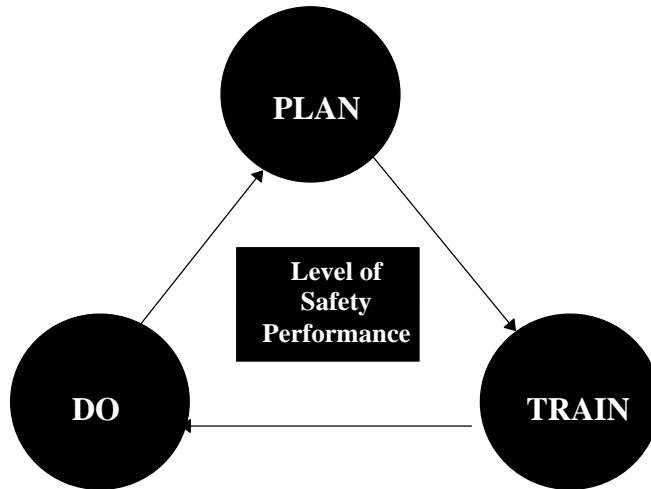


FIGURE 2A

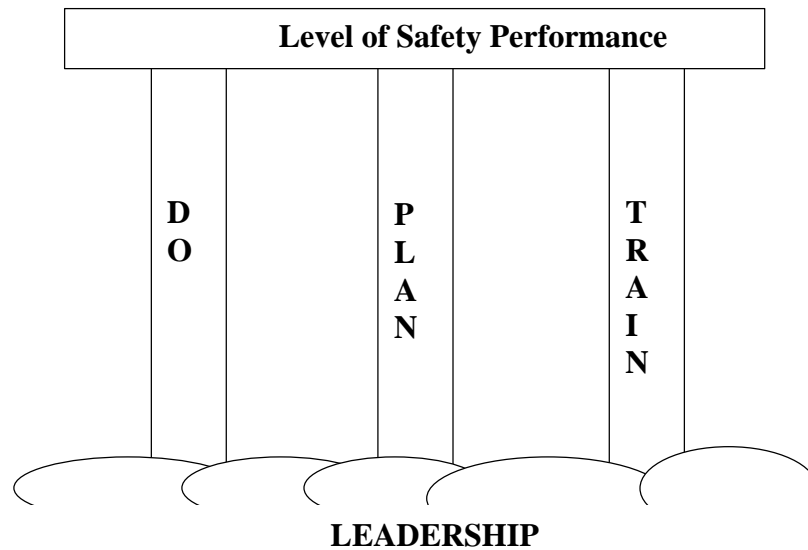


FIGURE 2B

Consecutive actionplans should be directed at setting up the management system incorporating the above aspects. Detailed criteria must be set up to clearly identify how activities should be carried out, by whom, when, etc. A Safety Management Manual (describing the activities forming the safety management system) should, over time, derive from such actionplans.

DEVELOPMENT OF PEOPLE - **TRAIN**

After establishment of what has to be done, people should receive adequate training for motivation, knowledge and skills to carry out the required work.

Adequate training (and re-training) is necessary for success and should be provided top-down in the organization. It basically consists of two "levels":

- general introduction training necessary to put "all noses in the same direction". "This is where we want to go together and that is the way we will do it".
- specific training following the establishment of detailed criteria for those activities which form part of the actionplan.

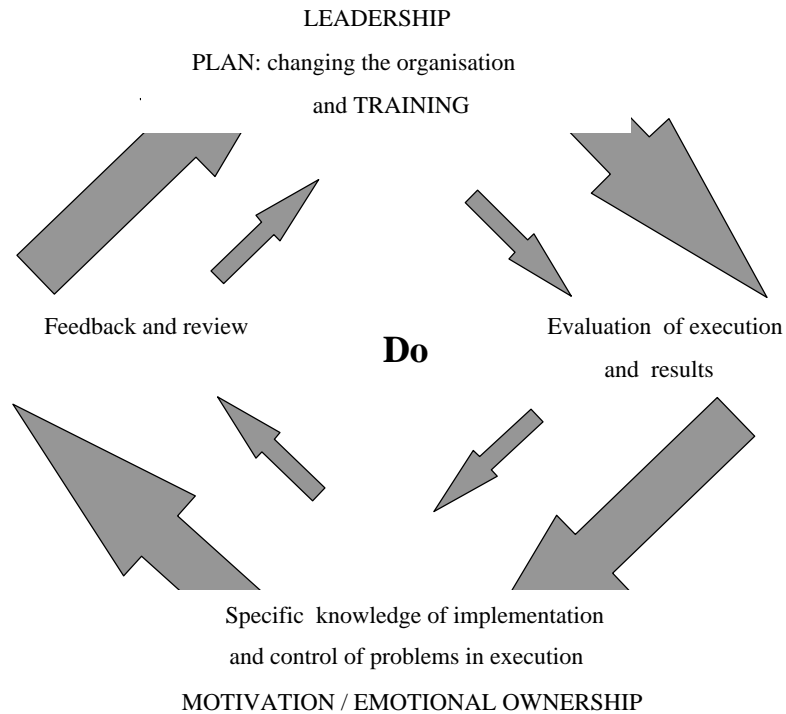
EXECUTION OF ACTIVITIES - **DO**

Ultimately success (in this case related to the control of accidents/incidents) can only be secured if the necessary activities are done in the right way. This requires the necessary discipline to do the required work and to keep on doing it. In particular this requires discipline from top-management to provide enthusiastic leadership and support to important activities. It is of great importance that these activities are being carried out as a mutual effort of management, staff and employees to obtain the desired results.

Best, and lasting, results can only be obtained through a combination of top-down and bottom-up involvement, during preparatory stages but certainly also where it concerns the way activities are being carried out.

Best results can be obtained through an approach which combines top-down activity with bottom-up involvement (figure 3). Not top-down alone, as has been so often the case in the past, or a one-sided bottom-up movement as we have also seen since the sixties, but a wanted combination of the two can provide the proper basis for a lasting success.

Top-Down



Bottom-Up

FIGURE 3

The top-down approach following top-management's accepted leadership role and providing direction to the program by indicating which activities are expected to be carried out in the organization and which training will be provided.

Top-down also the support for the execution of the work to be done. By making important items, truly important. By implanting in the organization a system for (self-)measurement of what is being done and (self-)evaluation in comparison with criteria set. By providing feedback and commending people and workgroups whenever possible. By making sure that undesired situations are being corrected in order of priority. By asking about performance and progress at relevant meetings. By being pro-active rather than re-active. And above all: by example whenever possible and appropriate. By action, not just by words!

Bottom-up approach by involving people at the lower end of the organization in problem-solving within their area of operation. Using the expertise which is available in relation with the work to be done.

Involvement of employees and lower management levels in activities such as:

- design of installations and workplace
- identification of workplace hazards
- identification of "critical" tasks, analysis of those and the establishment of task procedures or work practices
- periodic review and up-dating and/or improvement of existing procedures
- conducting planned inspections in their own department
- analysis of accidents and incidents
- establishment of rules and regulations
- selection of protective equipment

Considering this bottom-up involvement one has to realize that this does not come by itself. Bottom-up involvement should be brought into the organization by top-down activity, establishing effective two-way communication channels. In fact, top-management must want bottom-up involvement to make it truly effective for lasting success. In this, adequate (prompt, correct, positive) management response is necessary to problems and/or solutions and suggestions originating from lower levels of the organizational hierarchy.

It is of great importance that the three supporting activities (plan, train, do) are developed in balance with each other. There must be a balance between the activities which are wanted by the organization, the training which is provided and the execution of the activities in practice.

Safety management - a road to success - THE PROCESS

A practical approach to safety management will at least include the following steps, after a decision has been taken by top-management "to do something about it" (see also figure 4).

1. Top Manager Leadership

Improvement - positive change - can only result from top-management leadership. In fact the greatest guarantee for success lays with the Director himself, through his personal leadership, commitment and actions.

Step 1 will clarify for the Director that personal leadership at the top, transformed into commitment and actions, is a must to obtain the desired success.

Purpose of this step is to make sure that the individual leadership, commitment and support is given by the senior executive of the unit being considered. (The "unit" here would most likely be a site or location.)

2. Top Management Team leadership

The improvement process must be carried by the entire management team, from senior management to supervisory level. All levels are important but the involvement of the group which directly reports to the Director is critical. This is the first level where strategy and policy are being transferred into the Management System for further detailing and implementation at lower levels in the organization.

Purpose of this step is to make sure that the individual leadership, commitment and support is given by all members of the Management team. (The "Management team", as meant here, consist of the Managers directly reporting to the senior executive.)

3. Project Improvement Team (PIT)

Coordination at the top of the organization provides for the high level power source that is required to get the improvement process started and on its way to success. This is the management team that will set the strategy and steer the process. This team will lead and support, decide on main actions to be taken, evaluate progress and stimulate the entire organization to the desired level of excellence. Here the management team can be pro-active to identify, evaluate and control to-morrows problems. An important function of the MIT is also to periodically review Management System implementation in relation to expected result and to stimulate the process of continuous improvement.

Purpose of this step is to make sure that leadership and coordination for the overall improvement process is structured at senior Management level.

4. Internal Expertise

In-house coordination and expertise must be available to assist management in the improvement process. This house expertise should preferably consist of several persons to allow for the necessary continuity. This in-house expertise is necessary in all stages of the process.

Purpose of this step is to make sure that in-house expertise is provided to coordinate the development and implementation of the Management system(s) to be set up as part of the improvement process.

5. Written Plan communicated

Leadership needs to be transmitted into demonstrated commitment if it is to "pull and push" the organization in the desired direction. There is no better way than letting everybody in the organization know what the plans are, what activities can be expected to be introduced and when: Leadership becomes tangible when put on paper and shared with everyone involved, from top to bottom. Leadership transferred into commitment is necessary in order to obtain the desired goal(s).

Purpose of this step is to assure demonstrated senior Management leadership and commitment by communicating to everyone in the organization through which process (including the process steps) the improvement will be obtained.

6. Opinion Survey

To further demonstrate the commitment and the desire to make things work, an opinion survey is a tremendous tool to find out how other people in the organization - at all levels - feel about the related aspects in the plant. Normally such a survey will be carried out at senior (top and middle) management, supervisory and operator level. It is a strong indication that management wants to hear how other think and feel. If well done, it helps to "loosen up" the organization, to lessen the resistance to change at a later stage of the process and provides further information about areas which may need special attention.

Purpose of this step is to collect subjective/objective information about the actual situation/culture as related to the improvement process. To also "loosen" up the organization for the improvement process to come.

7. Base-line Assessment

No improvement process can really start before an organization determines where it is. This means an evaluation of the present level of management activity; an "audit". Such an evaluation will provide a picture of the management activities taking place. This will provide the management team with a clear view of the strength and development needs and is a valuable tool to select specific activities for the first action plan.

Purpose of this step is to obtain a good picture of the present situation as related to the Management system(s) involved.

8. Selection of Activities

The base-line audit will provide management with a good picture of where they are, the next step is to select specific activities for inclusion into the Management System. This is "what" needs to be done. These activities will most likely be part of the first action plan.

Such activities may include: emergency preparedness, planned inspections, accident investigation, group and personal communications and task analysis, but also engineering controls, purchasing of goods and services and selection and placement of personnel.

Purpose of this step is the selection of activities (or system "elements") to be part of the first action plan (the beginning of the development of the Management system), based on perceived effectiveness and on "visibility" of these elements.

9. Management Introduction Training

At this step the philosophy, concepts, models etc. are conveyed to all management, including supervision. These management "introductions" are not intended to generate any specific action. Proper information of all people in leadership positions is of vital importance for the success of the following steps in the program. These sessions are intended also to bring the necessary leadership further down the organization. Such leadership is very much needed at the level "point of control manager" (normally the "supervisor"). These sessions are also an excellent vehicle to demonstrate the leadership and commitment through senior management participation and to eliminate any major concerns at management and supervisor levels.

Purpose of this step is to make sure that all Management, supervision and relevant staff are aware of the improvement process, knows the terminology, models, concepts, etc. To "put the noses in the same direction". (This introduction is not intended to generate any specific activity. See 13 for that.)

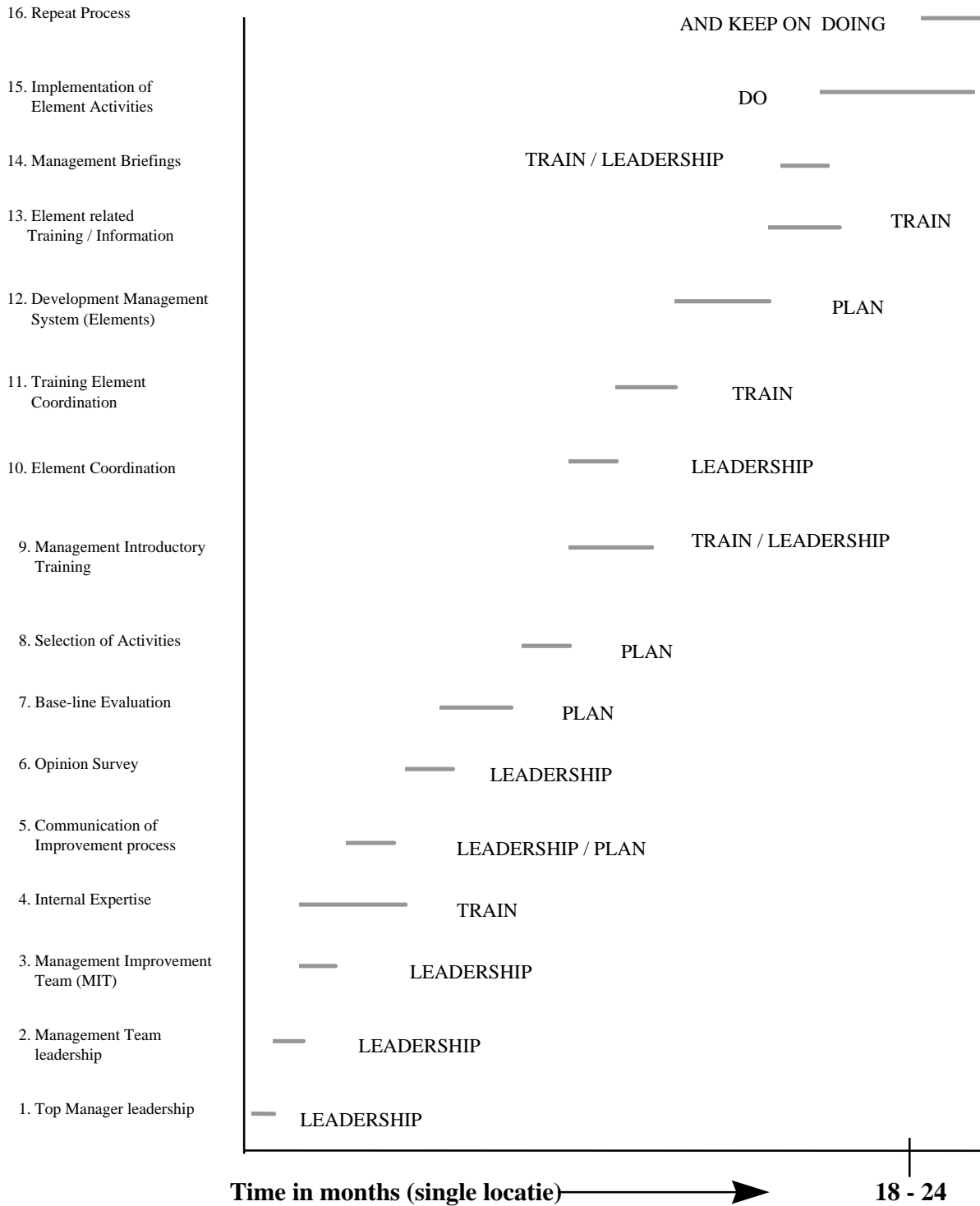


FIGURE 7

10. Activity Coordination Team(s)

Once the specific activities are selected (step 8), these need to be further detailed to become meaningful for implementation. This would normally take place in a "Element Coordination Team (ECT)" consisting of middle managers taking personal responsibility for development of one or two elements. As many levels in the organization as practical should be included to assist the element leader. This will "guarantee" ownership and involvement throughout the organization and facilitate implementation at a later stage. In fact the detailing of those activities can be accomplished through a "cascading team" set-up, including worker participation where relevant, under the coordination of a "MIT" and directed by the MIT (Management Improvement Team)

Purpose of this step is to establish coordination for development of Manager system elements as well as for the implementation thereof. Preferably this would include teams rather than individuals.

11. Activity Coordination Team(s) Training

This is vital training for a vital team. This Coordination Team will be the authority when it comes to setting up the Management System and this in turn will be the reference for the improvement process. If things go wrong here, they go wrong all the way.

Good knowledge of what is expected of this team is essential and a lot of unnecessary work can be avoided if these people are properly trained. The team members will learn what is expected of them, what they help to set up and coordinate. They will act as focal points in the detailing of the selected activities for which they have been given special responsibility.

Purpose of this step is to assure training of the individuals or team(s) involved in element coordination (development and successful implementation).

12. System Activities Development

Here is where the basis is laid for doing the selected right things in the right way. Clear performance standards - supported by appropriate guidelines - must be set up for the selected specific activities. For example: how inspections should be done, how to go about task analysis, how to investigate accidents, etc. After answering the "what and why" done during step 6, this details the "how, whom and when".

While all steps are important in the overall process, this step is vital as it forms the basis for success which can only come from doing the right things in the right way. This is where the Management System gets meaning and will act as a reference for implementation, after the approval of the Management Improvement Team (MIT)

Purpose of this step is the development of Management system elements (ref. 8) by the element coordination teams until approval by the Management Improvement Team (MIT) has been obtained.

13. Practical Activity Training

After detailed guidelines have been set up for implementation of specific activities (as established during step 8), relevant persons must be provided with the necessary skill training. This would mainly include supervision, middle management and specialist staff.

This training is essential and should only be given after step 12 has been concluded. This will then create the best position for proper implementation: motivated and knowledgeable people ready to carry out the work that is requested of them through the Management System.

Purpose of this step is to assure proper training for execution of the element activities (ref. 8 and 12).

14. Management Briefings

To properly carry out their leadership and support function, senior management must know what the critical points are to evaluate the progress made. Asking the right questions about planned progress stimulates activity as it shows where management puts the priority. It focuses attention on result related factors.

Purpose of this step is the briefing of (higher) Management levels on the critical aspects of the management/coaching, etc. of the execution of the Management System elements concerned. (ref. 8 and 12).

15. Carrying out Element Activities

This is where people go to work in accordance with Management System standards and guidelines set. This is where it all comes together. Here and only here is where practice is turned into success, all the other steps are there to provide the best opportunity for this step to become successful.

Here is where policy turns into commitment ultimately affecting behavior and attitude, creating a new company culture. If it fails here, everything else has been futile but if done properly, success is imminent. Here is where leadership by example gets meaning.

Evaluation of activities and their results are vital in this part of the process as well as the continuous improvement that comes from that.

Purpose of this step is to carry out the activities as intended by the element description (ref. 8 and 12).

16. Extend Project

No Management System can be built and made operationally effective through issuing one action plan. And no performance can be kept at a high level without periodic evaluation.

This is why step 16 includes repeating a number - not all - of the previous steps to bring the performance of the Management System up to the desired level. Once it is there, periodic evaluations need to take place to secure continuous improvement of already implemented activities.

Purpose of this step is the extension of Management system to include further elements through relevant steps indicated above.

Safety management - MEASURING AND DIRECTING

Measuring is very important when it comes to getting towards objectives, also in safety management. Without proper measurement of input and output, lasting success is not possible. The measurement determines where the attention goes. If measurement is on shop-floor level, attention is drawn to the workers and their direct environment. Measurement of management work gets the attention for organizational and management aspects and for the "management system".

Even in present day practice, safety measurement is almost exclusively devoted to workflow items, even within most of the large multi-national companies. While this is a historic fact, modern safety thinking tells us that the attention should go to the management system. Therefore measurement on a management level is required to get the management attention required and to effectively manage the basic and underlying causes of accidents and other undesired events, to manage some of the basics of organizational performance. Some of the more progressive organizations have been experiencing this type of safety measurement during the last couple of years and more are following those leaders in safety management.

Safety can be measured in three phases of the sequence given in figure 1:

- measurement of CONSEQUENCES, accidents and incidents, the seriousness of the events as well as the frequencies. Normally expressed per number of hours or days worked, but variations are possible to present the actual losses in a different manner. Such as accidents per 1000 km driven, per 100 units of production, etc. They can also be expressed in financial terms as loss per unit of production, etc. While consequences could include injuries as well as damage losses, practice indicates that this measurement is normally limited to the relatively small group of accidents known as "Lost Time Accidents".

Measurement of consequences is, and will remain, important to determine the effects of input activity. These are result related measurements or "R-criteria". Since it is mainly workers who are included in those measurements, attention is almost exclusively drawn to the shop-floor.

- measurement of DIRECT CAUSES. Measurement of unsafe or "sub-standard" acts and conditions. This measurement involves the observation of behavior (acts) and conditions and determining if deviations from established standards exist. This measurement also provides an indication about the effectiveness of the management system directed at prevention.

This measurement too, draws attention mainly to the workflow since the observations are almost always directed at worker behavior and shop-floor (hardware) conditions.

- measurement of CONTROL. This measurement includes the evaluation of organizational activity, of structured efforts to prevent undesired events and limit the possible consequences. This evaluation or "safety audit" takes place against a pre-determined set of criteria for the various (control) activities. This evaluation is the way to obtain attention for the management level. Safety audit "systems" are used to carry out these management system evaluations.

One of the most developed safety audit systems is the International Safety Rating System[®] which enables management to evaluate and highlight the available control activities and improve those, in a step-by-step manner, until the desired level of performance has been reached. This measurement system includes those activities which are considered important as well as the criteria for these activities which will bring success in the area of safety and loss control.

Within safety management these three measurements (see figure 5) should all be used to obtain lasting results. An important part of our attention, however, should be directed at the measurement of control, related to the management system. That is where management can solve underlying problems and direct the organization on its way to success in safety.

Safety management is also a matter of measuring and directing. Directing the organization on its way to success. In principle two ways of directing or management are considered here:

- re-active management. The traditional way of safety management: something goes wrong (an accident) and measures are taken. Fire-fighting!

This way of management or directing is related to the traditional way of safety measurement (measurement of consequences: lost time accident frequencies) and is part of the traditional way of safety thinking.

This way of safety management cannot provide lasting success since it is always after the fact because an undesired event is required to trigger action and improvement. Organizations are never static and there is a constant change within the organization as well as in the outside world. What has happened in the past can never provide an adequate basis for what will happen in the future. Moreover, accident investigations normally stop at the unsafe acts and conditions and do not address the real causes which are situated in the "management system".

- pro-active management. The most desired way of directing a company, before undesired events occur. However, also one of the more difficult ways of directing since one has to establish what people really do to prevent accidents, incidents, etc. This requires knowledge and insight into the management system, it requires effort and time. It is here that the management system is subject to analysis and it is here where a large part of management's attention should be instead of being continuously involved with "fighting fires".

Safety management in particular is based on pro-active management techniques and on using safety auditing as one important instrument to measure, establish and maintain an adequate management control system. The re-active approach, based on accident/incident analysis then is the tool to further perfect the management system in those cases where it failed to prevent.

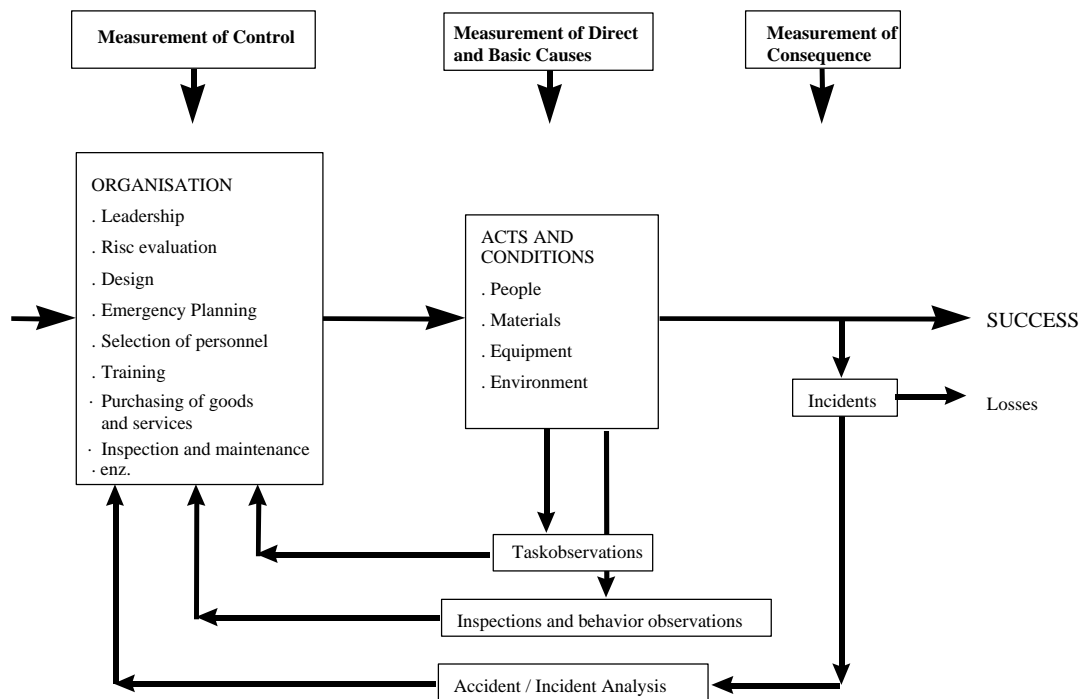


FIGURE 5

Safety Management - PERSIST IN BASIC PRINCIPLES

In complex situations often the best thing one can do is to go back to the basics and find the answers.

Safety management is complex in the execution of the many details one can encounter in practice. But it is based on relatively few simple principles: know what has to be done, set criteria for minimum performance and do it, do it and keep on doing it. Until results have been obtained: the level of safety performance desired by management for the organization for which they are responsible. Discipline and persistence on the side of management are of essential importance.

Success in safety management is only there for those who believe in the end-results. For those who persist in reaching the desired goals. Managers are very human indeed in looking for the miracles which would "do it all" and provide results without effort. Unfortunately this is not the way it is - there are no "quick-fixes and no panacea. Too much time is often lost looking for new promising management techniques and it would be far better to keep the main objectives in-sight and believe in the application of the simple approach offered here.

Safety management - THE TOOL - The International Safety Rating System[®]

A safety audit is an investigation in an organization in which an evaluation is made of what that organization is doing to control accidents/incidents, to prevent undesired events from happening and to limit the consequences in case the event would still take place. Safety audits are carried out using safety audit "systems".

Safety audit systems, one way or the other, contain questionnaires which lead us through the organization concerned. At the end they are intended to provide us with the strong and weak points of the structured safety and loss control management activities. A good audit tool enables to make relations between the various safety/loss control activities included and therefore one can indeed speak of a safety audit system rather than just a "questionnaire".

Based on the results from the audit, suggestions can be made to improve the control activities and thus the safety management system of the organization. Such suggestions actually form an integral part of a good audit system and follow more or less "automatically" from the audit results and -report.

The audit process needs to be repeated on a periodic basis to:

- obtain the desired level of safety performance. This can be assured through a process in which audits, improvement suggestions, training and execution of related actionplans are combined until the desired level has been reached.
- maintain the desired level once this has been reached.

One of the most comprehensive audit systems today is the International Safety Rating System[®] (ISRS). This system will be described briefly hereafter.

The basis of the ISRS was laid in the late sixties, early seventies, in the USA, more particular within one of the largest American insurance companies - INA. This, and later improvement of the ISRS after 1987 was done under the leadership of Frank E. Bird, Jr. and founder of the International Loss Control Institute (ILCI).

The ISRS involves 20 elements (see figure 6) as part of the "core" safety/loss control audit system. The 20 elements include about 120 "sub-elements" which are further detailed into more than 600 criteria in the form of questions. The questions are provided with value factors through which it is possible to provide a percentage rating for safety activity in comparison with the relevant element in the ISRS.

Although the ISRS as a whole is a comprehensive program, in fact it consists of 10 audit systems which are all integrated and vary from a questionnaire containing less than 90 questions in the most simple form to about 620 in the most comprehensive version. The ISRS therefore can be used within smaller companies as well as large companies, within organizations with a starting safety program as well as in those with a more evolved program. And in low risk occupancies as well as in high risk occupancies. The ISRS also allows adaptation towards the particular needs of an organization by translating ISRS criteria into guidelines for practical application within the location or organization concerned. Finally the ISRS can be used as an external reference to build the management system of an organization over a period of time.

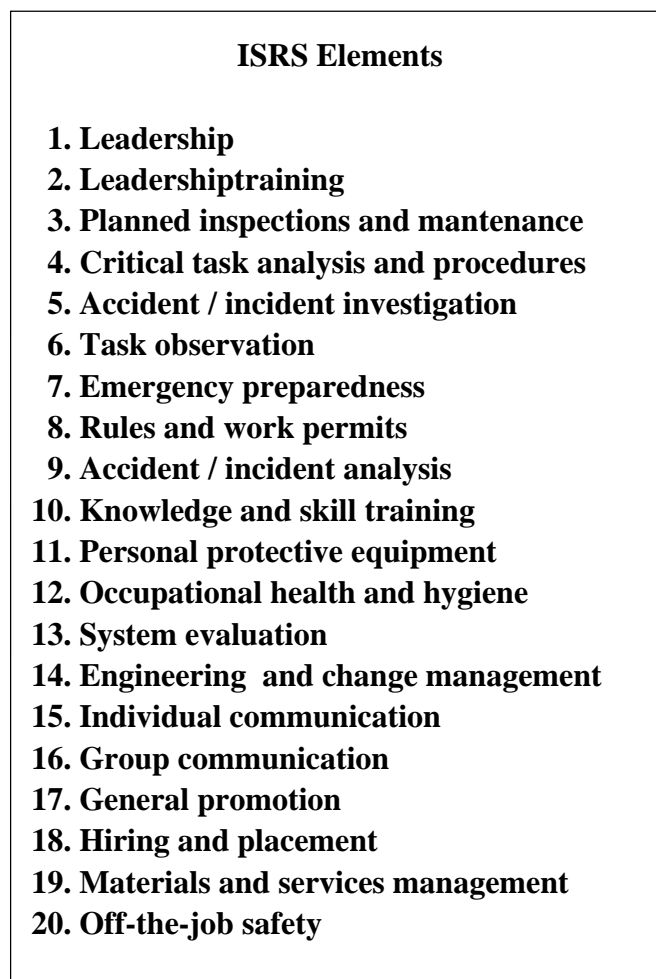


FIGURE 6

The process of the safety audit

The safety audit process is briefly described below and based on experiences gained with the ISRS.

In principle, the audit process contains the following steps ³:

- A. Introduction(s)
 - B. Interviews and verification
 - C. Initial report
 - D. Final report
 - E. Presentation on findings
- A. A safety audit normally starts with a series of INTRODUCTIONS, to inform people what will happen and what is expected of them. The introduction also conveys the "why" and "how" of the audit and the background of the auditing process as part of an improvement process.

Depending on the size of the organization several introductions may take place. It is suggested that at least the following groups shall be part of this:

1. introduction to Senior management.

This introduction follows the top-down approach. Senior management should be informed first about the safety audit process and should be given the chance to support the process further down the organization. This way senior management can demonstrate their leadership by supporting the audit as part of the desired change process.

2. introduction to Safety Committee(s) and/or Workscouncil.

This introduction serves to inform these committees about the how and why and relates the audit process to the safety improvement process and the relevant legislation.

³ The audit process described here is based on experience gained in several European countries, in particular in The Netherlands. The process may be somewhat different on certain points in other parts of the world.

3 introduction to Interviewees.

This introduction is intended to inform the persons selected to take part in the next step of the auditing process about their role in it. This introduction could be in conjunction with the senior management introduction (if the organization is relatively small) but normally is separately done since some more detailed explanation is required here. This introduction is normally 2 - 4 weeks after the senior management introduction and interviewees are given the audit questionnaires prior to the meeting.

The role of the interviewees is:

- to answer the relevant questions of the audit elements assigned to them
- to collect documentation and other evidence for verification during the audit interviews, whenever a positive answer is being given and to support that the related activity is indeed taking place. In fact a "pre-audit" is carried out to prepare for the formal external audit.

B. the INTERVIEWS

The interviews normally take place between 4 to 8 weeks after the introduction to the interviewees. This allows them to properly carry out the "pre-audit" for preparation and also to provide time for the organization to carry out a "Physical Conditions Evaluation" which will be verified during the audit interview period.

The interviews will be carried out by an experienced auditor ("Accredited Safety Auditor") using the ISRS questionnaires. As soon as a question is answered affirmatively, the auditor will request evidence to verify that this is acceptable for audit purposes.

C. After the interviews have been carried out, an INITIAL REPORT will be made by the auditor, containing:

- short introduction concerning the audit process carried out
- summary of findings, conclusions and suggestions for improvement
- graphical and mathematical summary of audit results,
- element reports containing:
 - brief listing of criteria considered and the related scoring
 - brief description of element contents and importance
 - short description of the main items found during the audit to support further development of the element activity concerned
 - listing of the main suggestions for further improvement in the element concerned

- the filled out audit questionnaires supplying the auditor's evaluation and brief comments where necessary. This document provides further information about the present state of the organization's safety and loss control program, as compared with the criteria used in the ISRS.

The initial report is made to allow possible changes based on comments by the audited company. Changes will be made if documented evidence can be provided to sustain this.

- D. The FINAL REPORT will be made allowing changes if provided within a limited time period after the initial report. If no further comments are made the initial report will automatically become the final report. Experience has learned that very little adaptations are normally required to be made from initial to final report.
- E. The PRESENTATION of the final report will conclude the auditing process. This presentation will be made for senior management.

During the presentation a short resume is given of the auditing process and the "why" of it and the most important findings are presented. A major part of the presentation is directed at the possible next step: the improvement process.

While making suggestions, one has to consider that suggestions directed at improvement of the management system will be directed at the long term objectives of the organization. While this is absolutely necessary for lasting success, the need for short term results should not be forgotten. Suggestions for short term results will address particular problem areas found during the physical tour of the location being audited and will normally be directed at the "direct causes" (through "inspections" and "behavior observation") or be based on analysis of accidents/incidents. "Short term" actions would also include training of relevant management personnel.

International Safety Rating System - BASIS FOR RECOGNITION

The ISRS can be used as a reference in the consulting/improvement process. It can also be used to obtain recognition in the form of a certificate.

The safety audit using the ISRS provides, as a result, a comparison with the criteria used in the International Safety Rating System.

A good audit system such as the ISRS provides quantified measurement in the 20 elements and results are expressed in percentages. This is important for communication purposes, in particular to related (senior) management. Once activities are measured in numbers, additional knowledge is gained, objectivity is improved and the attention (of management) is obtained.

The results of an ISRS audit can be expressed as indicated in figure 7, where a percentage rating per element is shown by the length of the arrows.

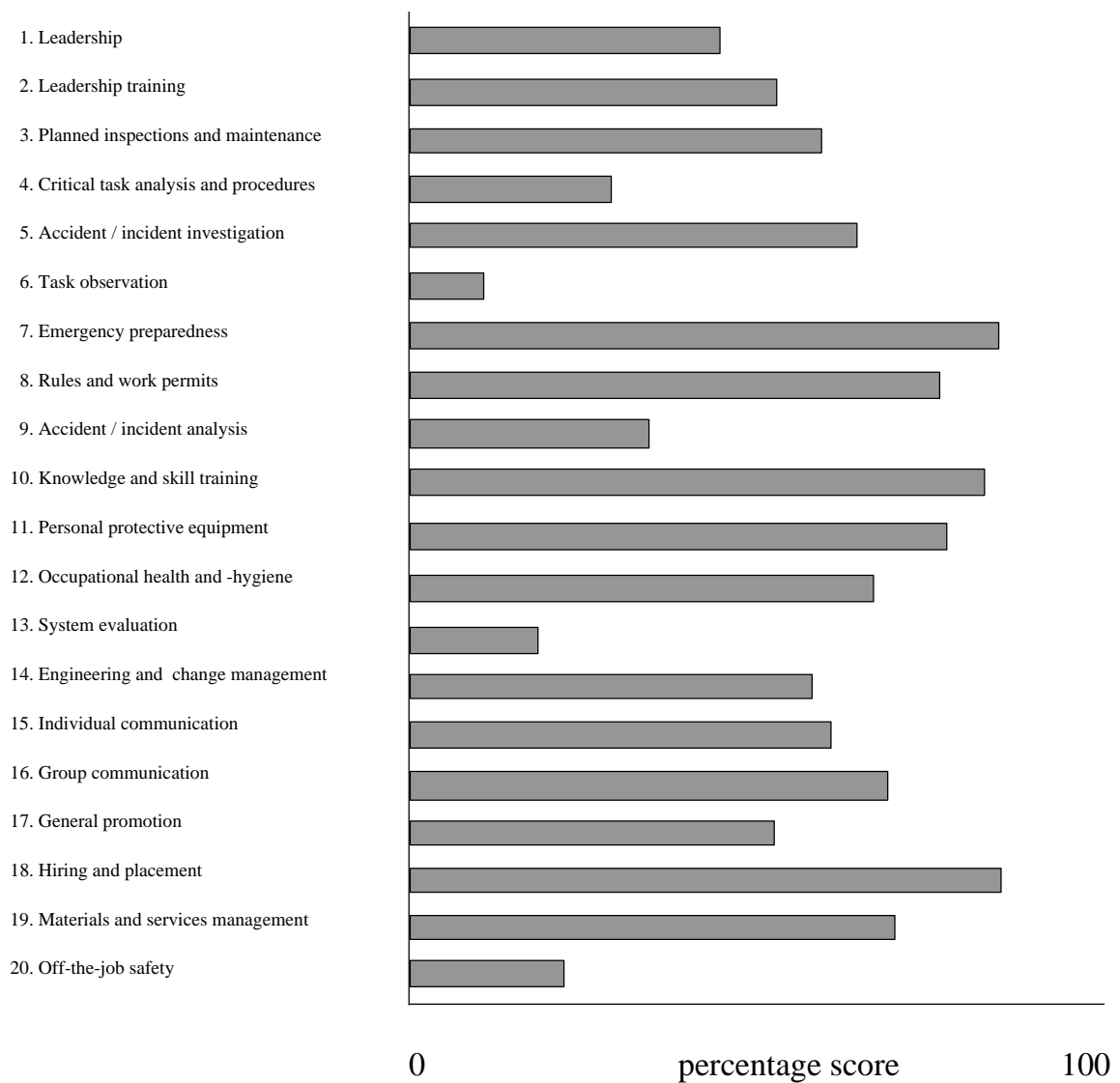


FIGURE 7

The percentage rating can be used as a basis to obtain recognition in the form of a certificate and this recognition can be obtained on any of 10 different levels, depending on the development of the organization's safety and loss control program. Such recognition offers certain advantages:

- it provides further guidance to program development as it gives 10 "milestones" for goal-setting. A company can move from level 1 to level 3 to level 5 and so on - the ISRS questions will guide the actionplans to be set up.
- it provides a possibility for "Positive Risk Communication" and allows organizations to show what they are doing to control their risks, accidents and losses. This communication can be internal, towards employees or "head-office" as well as external to the authorities, to insurance companies, neighbors, the public in general, etc.

A recognition as based on the ISRS provides stimulation for management action and it puts the emphasis where it should be: on "management" and "management system", rather than the traditional (loss time accident) measurement which places so much attention on workers and the working environment.

CONCLUSIONS

In summary it can be said that the main purpose of safety management is to obtain results in the area of safety/loss control. Four key-words are on the fore-front of safety management understanding and practice:

- the safety management PHILOSOPHY as provided in the 5-phase "Loss Causation Model".
- the safety management CONCEPT as provided in the three-legged platform: "Plan - Train - Do" standing on a firm "Leadership" basis
- the safety management PROCESS - the 16 step process to improve safety management systems and their operational effectiveness.
- the safety management TOOL - the International Safety Rating System[®].

While the PHILOSOPHY is important for understanding, TOOL and CONCEPT are essential for practical application of safety management, to build the management system as a driving force behind the safety management PROCESS and to provide for the required organizational improvement.

The International Safety Rating System[®] is the tool to allow safety management in practice. Important to it's use are:

- the quality (knowledge and experience) of the persons carrying out the audit and taking part in the related consulting/improvement process

- the intention of the persons involved to use the ISRS and positively work with the results that come out of the audit. Very important is the intention of senior management not just to see the ISRS as a tool for recognition but, rather, as an aid to improve their system to manage.

The goal of modern safety legislation is to encourage management- worker involvement in safety and to reduce accidents and risks. The ISRS is an important tool to reach these goals.

The ISRS can be a very important tool in the improvement of safety, the increasing of the level of risk awareness and organizational improvement in general. The ISRS enables a step-by-step adaptation of the organization, provides direction for training of people and for the execution of desired and necessary activities to obtain results. As such the ISRS is a tool in a change process for better results.

Through periodic audits, the ISRS is an excellent tool to maintain a desired level of safety care. It is the "external" reference so often required to keep the (internal) management systems at their best.

The ISRS can contribute to a better understanding and insight into safety aspects, in particular on (senior) management levels. It brings a lot of light to a subject which is rather obscure to many. To allow for this, it is of utmost importance that auditors and consultants (but this is also true for their management counterparts) working with the ISRS have a basic understanding of management concepts and processes.

The ISRS can be a means to obtain recognition for performance and can play a very important role in communication with authorities and society (PR-C instead of PR-F: Positive Risk Communication instead of the Free Public Relation one gets in case a major accident takes place).

The ISRS is directed at the control of undesired events and, because of this, can be the backbone of a process to improve organizational quality and control of unnecessary costs.

Risk Management is the control of risks (and the financing thereof). Proper control of risks can only come from an organization with the desired level of risk awareness. The ISRS is a tool to build risk awareness in an organization through a step-by-step improvement process. It is a means to integrate risk management into an organization and to increase the risk awareness of people by involving them in risk control activities and decision-making concerning risks.

The ISRS enables us to provide structure to an organization by improving the management system, with results that are far beyond traditional safety. Once the structure exists, other management techniques, tools and training activities can more easily find their place. This assists to get optimum results from money invested in consultants, organizational models, training programs, etc.

The ISRS is directed at the improvement of the management system of an organization and the control of undesired events and losses. It should have its place in every organization that wants to make serious business out of the control of risks and losses. In particular in those organizations representing specific (high) risks to the environment, society, employees, management and shareholders.

The ISRS is an important addition to the various ways safety is being measured. Where the traditional way of measuring safety (through lost time accident frequencies) often does not generate incentives to further improve safety, the ISRS does provide new perspective to safer organizations and processes in a safer and maturing society. The traditional way of safety measurement will necessarily stay with us to measure results. This traditional (re-active) measurement has served us for many decennia - our modern organizations, however, require a different, pro-active, form of management in line with some of the basic functions of management: looking ahead to cope with the problems of to-morrow.