

SAFETY FEEDBACK – THE REAL THING

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The paper presents a research done by INCDPM together with USH regarding the possibilities to use safety feedback in order to improve the own activity but also to develop the risk management skills of the enterprises and analyses the possibility to use the safety feedback as a lagging key Performance Indicator.

INTRODUCTION

The activity of The Romanian National Research Institute for Occupational Safety) covers a more than 50 years period. Opened in 1951 as an occupational safety research institute, our institute was the main engine for occupational and process safety development in Romania. Such activities are within our scope.

In order to improve our activity we need to measure the level of our activity and discern if we still deliver customer value. Using global figures the evidence favours our level of safety activity, together with the activity of our colleagues from the Labour Inspection. From a maximum of 24.000 registered accidents in 1978 today are registered yearly 6.000-7.000. However, this accident registration process is biased by many factors:

- under Romanian law a lot of accidents (for example the home accidents or the traffic accidents) are not registered;
- only registered accidents that needed more than 3 days of hospitalisation;
- incidents and near-misses are not registered;
- a lot of enterprises are more eager to understand with the victim than to report the accident;
- sometimes the chiefs of regional departments of Labour Inspection may not be reporting all the accidents;

The enterprise develops a direct feedback regarding safety (NLR-CR-2003-316, 2003). It could see that its actions were right, the safety is improved, this reflected by the reduction of near-misses, accidents and incidents. The problem is if the enterprise has a corporate memory-reflected in records regarding these events, and could make comparisons for certain time periods (J.T. Reason, 1990).

Our institute gets an indirect feedback from our clients. If some problems are not solved there are supplementary requests, also if there are more people to be trained.

More than often this indirect feedback is not received by our institute. A satisfied enterprise is calling again just when it has other safety problems. An unsatisfied enterprise is looking for other safety service providers.

In this respect, we have developed a research to **see, understand and analyze** our safety activity as reflected by the enterprise feedback.

In performing this research we saw that a quantified enterprise safety feedback, involving its actions and also the help get from others in this respect could be a Key Performance Indicator, especially for Small and Medium Enterprises (SME).

The paper presents the most interesting results of our research.

Figure 1 shows this direct and indirect feedback.

THE NEED FOR FEEDBACK

Feedback could be considered as an activator (Daniels 1995). From the enterprise point of view, its own feedback could be an activator for better safety management. This leads at the base level of workplace to:

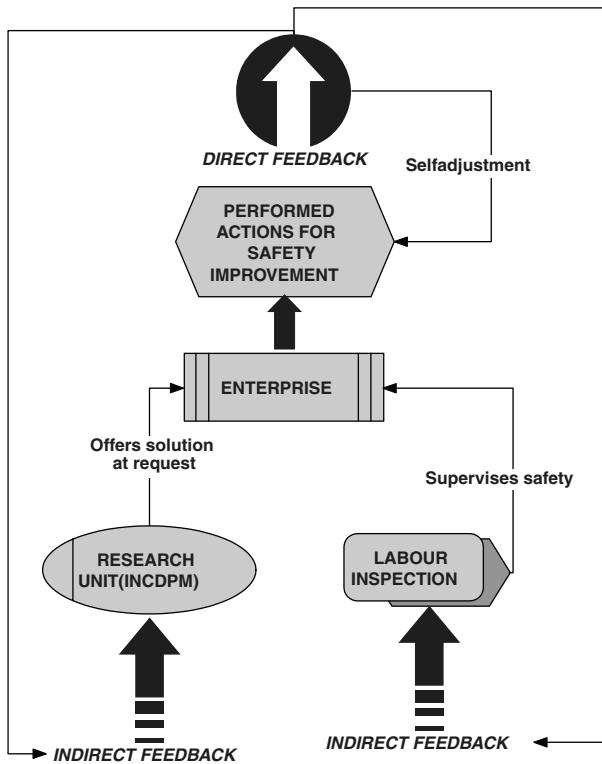
- improving behaviour—through better training and understanding of the risk context;
- improving workplace—through better equipment and better work environment.

From the research point of view the feedback is both **a consequence** and **an activator** for every safety services provider.

Feedback from more than 10.000 clients (starting with the year 2000), especially from SME has been collected in order to perform this research.

The requested feedback could offer us informations about:

- **Accountability and responsibility.** Are we main players on the safety domain, colaterals or simply by standers?
- **Trending.** On a global safety image-concerning safety services in Romania, are we going up-with more and better services- or down?
- on what **targets to focus.** Were any domains with a significant accidentogen trend that must be specially targeted?
- **Resource allocation.** Is the Romanian economy asking for more of our services?
- **Improvement plans.** The feedback could show us the areas of our activity which must be updated taking into account the latest trends on the market.
- **Performance Indicators.** Could safety feedback be considered as a key performance indicator?



DIRECT AND INDIRECT SAFETY FEEDBACK THROUGH SAFETY ACTIVITIES OF THE ENTERPRISE

Figure 1. Direct and indirect safety feedbacks

Figure 2 shows these aspects.
The need for safety feedback:

- has clearly stated goals;
- for the enterprise- to express what was already done and by the desire to improve its safety and to reduce costs with safety mitigation;
- for the research institute- to improve the quality of its performance and to contribute to safety improvement. We have also tried to pattern match the obtained feedback into a semi-quantitative KPI. A lot of learning indicators could not be reported by SME because the majority of them have no (registered) accidents, have no lost days and so on. However, the feel of safety at workplace could be given feedback – from the management and also from the employees – and could be quantified. Safety feedback shows in essence the willingness of the management of the enterprise to come along with the problems regarding safety and health at work, to solve them or to find solutions to reduce them such as ALARP;
- is continuous or repetitive;
- for the enterprise continuous improvement in safety feedback is achieved by the reduction of undesired events;
- for the research unit to give a positive image its activities;
- developed into a KPI.

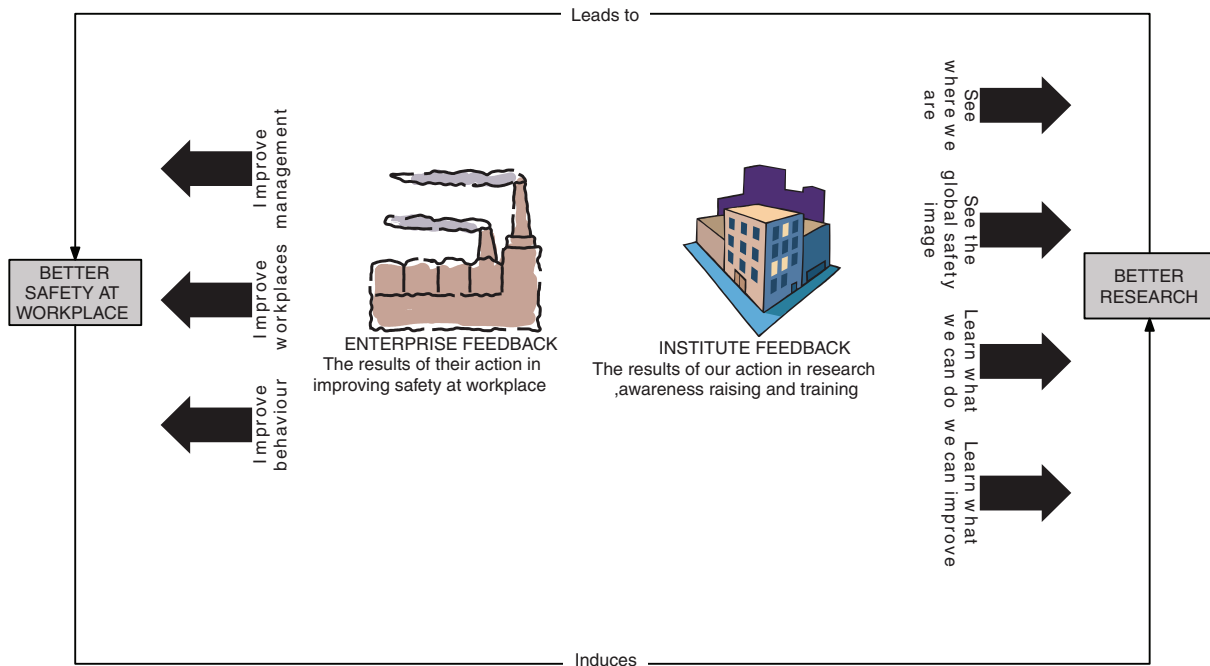


Figure 2. Enterprise and research institute safety feedback

DESCRIPTION OF THE RESEARCH

In performing this research we have established our main goals:

- **to obtain objective safety feedback from enterprises within Romanian economy** (concerning our clients) including:
 - enterprise performance in safety- the enterprise received our advice/services (or that of other safety service units) and needs to implement it, check their results and their performance periodically. This shows the commitment of the enterprise to a safety management culture.
 - our performance- as safety advisers and delivers of safety services (risk assessment, development of safety culture inside enterprises, training, etc.) needs to be audited; this was the main goal at the startup of the research;
- **to process this feedback** in order to see:
 - how we performed on the safety field – what kind of player are we considering ourselves regarding the safety problems of the Romanian economy;
 - what is the global safety trend in our economy-trend expressed through the willingness of enterprise management to solve their safety problems;
 - how are individual enterprises performing with regard to the safety field;
- **to establish a KPI for safety feedback** – KPI that should be evaluated over a realistic time period. The KPI should be given by the enterprises voluntarily, in order to be used (by the joint efforts of the Labour Inspection and our institute) to improve their safety standard. This indicator could serve as a benchmark for a global safety situation within a specific economic domain – e.g. construction industry.
- **to make change plans in order to improve our activity** taking into account the received safety feedback and to become as adaptive as possible to the market requests;
- **to raise risk awareness and develop a global safety culture** from safety feedback.
- **to facilitate the process of safety feedback** – taking into account that there are more than 60% of enterprises, especially SME that are not visible on the safety global image. They are not asking for help, they are not reporting accidents. If the Labour Inspection is not going to perform a check-up at their facility they could go year after year with more than substandard safety at the workplace; minor accidents are solved internally, by the employee generally – happy that he/she has a place to work. In our research we used structural modelling – to create a model of the safety feedback – considering a source of safety improvement – the institute – and a lot of beneficiaries – the enterprises – from this model we developed our feedback analysis methodology, based essentially on feedback collection. This feedback was cross-checked, where statistic data was available, with such data.

THE MODEL

Our model consists of a social network of enterprises in an economic activity – or agents, each agent having (corporate) safety memory. This individual memory is a simple local picture of done our institution activity with respect to the enterprise safety, with a priority of relative interest in each enterprise regarding safety. The agents share safety through feedback with other agents and modify their memory when they get new information (good or worse) about other agents. Based on this memory they also build new social connections to get better access to agents (safety experiences) they find interesting.

The strong coupling between the agents' beliefs regarding safety improvement (or not) in their enterprise, the workplace context, and their positions in the dynamic network structure has interesting consequences.

Figure 3 presents a snapshot of this model.

The red nodes and links are enterprises (management) with negative feedback who believe that their safety was not improved through the actions of support (research, training, safety culture development) which the institute performed.

The blue nodes and links are enterprises (management) with positive feedback who believe that their safety was definitely improved by the institute actions.

The grey nodes are enterprises which provided no feedback or which were not influenced anyway by the activities of our institute.

Modelling the feedback indicated bias by other feedback – as when an enterprise is sure that has succeeded in safety by applying a method that was certified as valuable by another enterprise. This was demonstrated in reality, especially for SME with scarce sources of information.

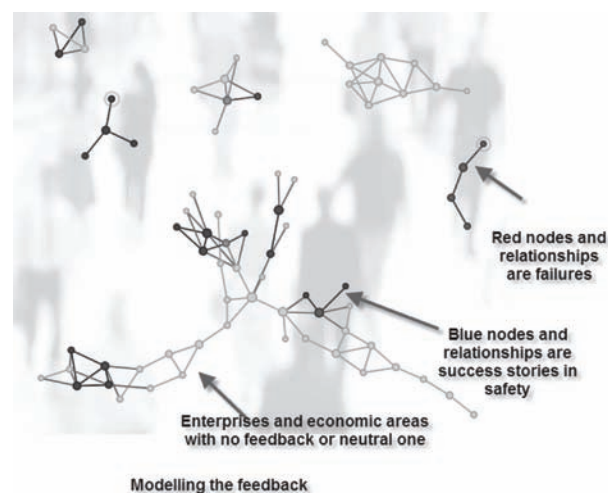


Figure 3. The safety feedback model

THE INTERNAL FEEDBACK STUDY

The study of the direct safety feedback generated by the activity of our institute followed two main directions:

- the main research activity, oriented towards finding new safety solutions, especially regarding risk management;
- the complementary training and formation activity and other auxiliary activities; we would exemplify here just with the first point.

FEEDBACK ANALYSIS REGARDING THE MAIN RESEARCH ACTIVITY

Our main research activity was focused in the last years less on specific technical solutions (as the Romanian market has opened, the technical solutions were acquired from the

developed countries and not researched here). For the enterprise which acquires such a solution this could be a good thing initially, solving immediately a specific safety problem. However on mid and long term the possibilities of further development and upgrade are limited with existing resources. If the safety problem is extended at the whole facility, it implies also other activities this could be more costly for the enterprise).

Our main focus in the research activity was oriented towards integrated risk management solutions.

On the basis of our own and foreign experience we have tried to set up open, modular structures for risk management in order to enhance understanding and communication of risk issues internally, to provide clear direction and demonstrate senior management support. Generally there is a distinct

Table 1.

Please assess the following items on a 0 (worst) to 5 (best) scale, taking into account the following aspects:

- efficiency of risk assessment;
- cost of risk assessment;
- easiness of risk assessment;

No	Item	0	1	2	3	4	5	Commentaries
1	There were risks that were not identified when using the system?							
2.	There were risks that were not correctly evaluated (probability and severity) when using the system?							
3.	There were incidents occurring from unknown causes during the implementation and usage of the assessment system?							
.....							
	On a 0 to 5 scale please evaluate the added safety by the help of our (or other) institution							
	On a 0 to 5 scale please evaluate the actual risk level in your institution taking into account the occurrence level of unexpected events in the last five years, events that have perturbed the normal activity							

difference of approach in Romanian enterprises between management and the employees. This difference in approach could be blamed on past political structures during which the management was ineffective and inefficient. We tried to cover this difference of approach in order to:

- improve responsible management;
- develop safety practices in the employee group together with the ability to cooperate efficiently with the management.

In the study of the results of our main research activity we separated the risk assessment part from the managerial decision towards reducing risks. The feedback givers were asked to evaluate on a 0(worst) . . . 5(best) scale a list of activity related items, taking into account the context of their work on a period of time.

Some examples for the first category are presented in the Table 1.

RESULTS OF THE INTERNAL SAFETY FEEDBACK STUDY

During the years our institute changed from a punctual technical local solutions provider, in the 1980 to a global, risk management solutions provider now. In one way this change is good for our clients – as they have a more diversified technical solutions market in order to choose from and also for us as we got a global safety image and not punctual ones. However, we found that our activity in the benefit of the enterprises could be more fruitful if we could act as a go-between the enterprise and technical solutions providers.

Our risk management systems implemented in the enterprise helped the enterprise to be compliant with the national safety law and also with other European and international provisions. However, especially for small and medium enterprises such systems must be provided with a user friendly interface at the understanding level of the users. Sometimes they do not understand or are confused by what the system asks from them. So, they need to communicate and understand the system; moreover they need to understand the results obtained from the system as their safety depends on the understanding of such results.

The graphs 4–5 show some aspects resulted from data processing.

Figure 4 shows the feedback regarding the risk assessment systems as a whole.

About 21% of the enterprises reported that our implemented risk assessment systems are under performing. Generally, such enterprises were from the services branch or were very specialized ones, with risks that could not be identified very precisely with the existing systems. About 16% of them were considering the system as usable – but not in need of improvement. More than 60% of the enterprises considered our management systems as excellent. Figure 5 presents the situation of non-identified risks by the system-every non-identified risk being considered as a failure of the system.

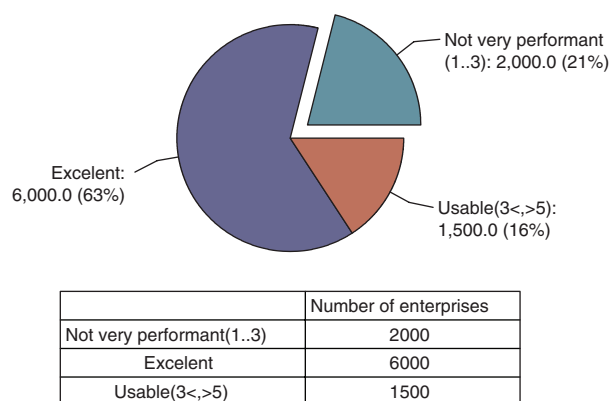


Figure 4. The general feedback regarding the developed and implemented risk assessment systems

SAFETY FEEDBACK AS A KEY PERFORMANCE INDICATOR

Safety feedback could be considered as a mixed indicator. It is necessary because it shows the activity performed by the management of the facility in order to improve safety at workplace. It is a leading indicator because it shows the trend in unpredicted events occurrence.

Working with 0 . . . 5 Likert scales as the most suitable for an immediate assessment we could simplify the safety feedback as an average of safety management, safety training (we take into consideration also informal training performed by the worker outside the managerial system) and unexpected events trend.

So, we could write that

$$Sf = \lim(Sm + St + Uet)/3[1]$$

where:

Sm = safety management;

St = safety training;

Uet = unexpected events trend;

Each one of these elements could be then further decomposed as low as necessary for the safety analysis.

Safety management feedback for example could be decomposed by the following main elements:

- Risk awareness;
- Safety active measures;
- Safety readiness.

Risk awareness could also be considered the average of the management risk awareness and the worker risk awareness (Richard Banks, 2009). It is preferably to include workers risk awareness as they are the ones which know exactly the situation at the workplace. Managers have risk awareness data generally not directly but through foremen, line managers and so on. Unsolved problems known by the worker need to be brought to the attention of the manager.

Table 2. Safety awareness feedback scale

0	1	2	3	4	5
Not a clue regarding risks at the workplace	Vague risk knowledge	General risk knowledge but not specific to the economic activity or workplace risks	Specific risk knowledge but not awareness. Risks are happening to others	Good risk knowledge but medium awareness	Complete risk awareness

Table 3. Safety active measures

0	1	2	3	4	5
There are no safety active measures in place	There are some organizational measures implemented. They are not sufficient	All the organizational measures are implemented and functional. There are no technical measures	There are some technical measures implemented for immediate risks	There are organizational and technical measures implemented for the most important risks	All the risks are eliminated or mitigated through active measures

Table 4. The training coefficient

K_{et}	Description
1	All the persons responsible for safety at workplace or in the enterprise were trained outside last year
0,5	More than 50% of persons responsible for safety at workplace or in the enterprise were trained outside last year
0	No person responsible for safety at workplace or in the enterprise was trained outside last year

So we could consider an awareness scale, for both categories, like the one in the Table 2.

Safety active measures are performed by the management in order to eliminate/reduce the risks. A Likert scale for Safety active measures feedback is presented in Table 3.

Safety training feedback involves not just the managerial controlled training but also the informal training

acquired by the worker at the workplace (W.H. Starbuck-ed, 2005).

So we could consider a formula like:

$$St = k_{et} * Std[2]$$

where k_{et} is a ponderation coefficient presented in Table 4.

St represents the general safety training and Std represents here the direct safety training, evaluated also on a Likert scale that is shown in Table 5.

Safety readiness feedback (S. Geller, 1996) represents the state of preparedness for emergency situations or unpredicted events. Table 6 shows the value for this scale.

Essentially, by questioning the enterprises, especially SME we found that if we offer a coherent methodology for the Safety Feedback Indicator (SFI) the enterprises are keen to adopt it and use it for reporting to the Labour Inspection and also for benchmarking. It could be extremely usefull for SME with no visible leaning indicators and it

Table 5. Direct safety training feedback

0	1	2	3	4	5
No worker trained internally or externally in safety last year	10% of the enterprise workers trained internally, externally or self-trained in safety last year	30% of the enterprise workers trained internally, externally or self-trained in safety last year	50% of the enterprise workers trained internally, externally or self-trained in safety last year	75% of the enterprise workers trained internally, externally or self-trained in safety last year	100% of the enterprise workers trained internally, externally or self-trained in safety last year

Table 6. State of preparedness feedback

0	1	2	3	4	5
No emergency plans, no drills, no first help service	Elementary first help kit existing	Emergency plans developed but not implemented	Emergency plans implemented at line manager level	Emergency plans implemented at the base level. Drills performed just with safety people	Emergency plans implemented at the base level. Continuous drills with anybody

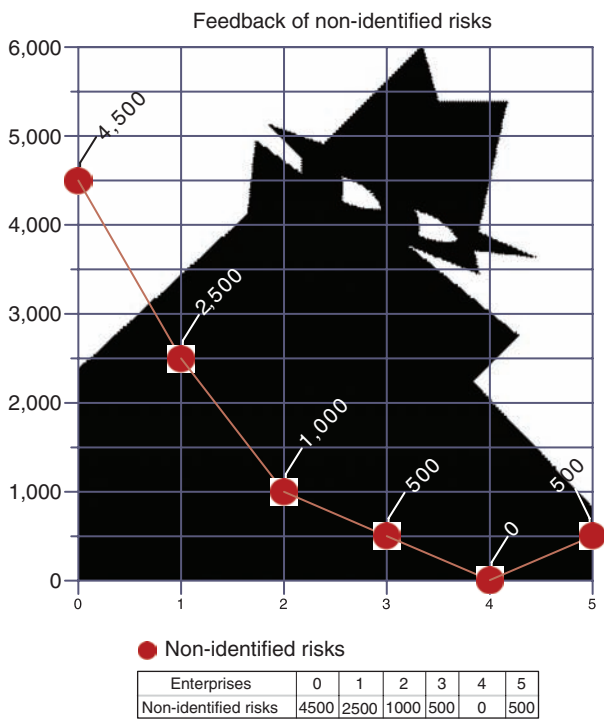


Figure 5. Non-identified risks (0 means that all the possible risks were considered identified by the enterprise)

could show at the level of Labour Inspection the global safety state.

CONCLUSION

Our research gave us a number of different conclusions. The activity performed by our institute and by our partners, especially the Labour Inspection was seen as positive by most of the responders. There is, however a gray zone of about 20% which could not be reached. This zone has no declared occupational incidents or accidents but we could tell nothing about the safety at the workplace here.

About the same percentage did not consult us and contacted Labour Inspection just to take their safety authorization.

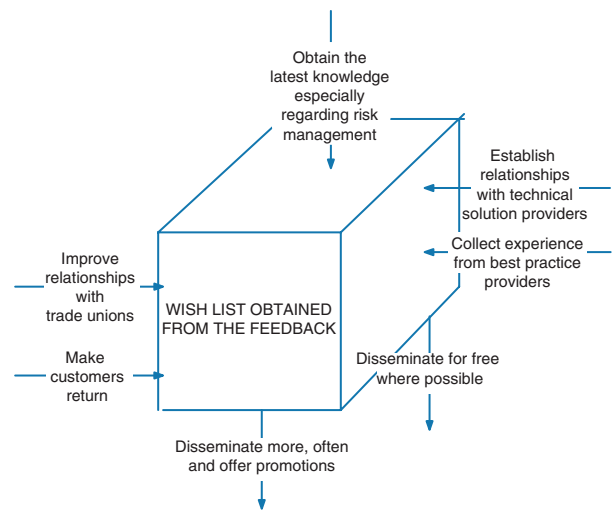


Figure 6. “The cube of improvement”

Globally, Romania is on an ascendent trend regarding safety, thanks to the implementation of EU laws regarding safety and also thanks to the opening to the knowledge from the developed countries.

Regarding our activity we found, unsurprisingly, a long list of To Do activities. These activities were summed in the “Cube of improvement”, cube shown in the Figure 6.

We have established a three year plan in which we hope to improve our performance from this wish list.

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