

REDUCING THE GAPS BETWEEN PRESCRIPTION AND PRACTICE BY ANALYSIS AND SHARING OF EXPERIENCE

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Abstract

Two important aspects of the safety of chemical plants are the design of safe systems and the definition of procedures and prescriptions to run the different processes of the plant.

Along the life of the plant, technology and organizations change, people adapt their behavior to their perceptions and experience, but procedures and prescriptions often remain the sole reference. This tends to create a gap between prescription and practice.

This gap is difficult to assess during routine operations as everything runs smoothly, but when an incident occurs, it may become a risk factor because some people trust the procedures when identifying the problem and finding a solution, while the real state of the process may be inappropriate for these actions. We have studied this problem in a chemical plant near Grenoble (France), using an analysis method based on the formalization and sharing of individual experiences. It has been possible to identify the gaps between prescription and practice, to reinforce the dialog between stakeholders, and to reach a common acceptance of the prescriptions taking into account their initial justifications and some relevant suggestions proposed by operators.

Introduction

A chemical plant is characterized by the complexity and the diversity of its systems and processes, the multiplicity of the stakeholders (interns and subcontractors) and the variety of its products and activities. The risks related to each industrial activity are inherent to installations, products used, organization and processes. Procedures and prescriptions are relevant tools to control installations, complex systems and processes. They constitute the primary safety mechanism by providing a technical and procedural framework to guide the actors in their decisions and actions.

“Procedures will be applied by people at the good moment. They have requirements and expectations that result in part from their experience, formation, personality and from the technical and social tradition from where they come. From one system, one industry, one population to another, differences are big. Then, it is important to avoid the phenomenon of rejection, doubts and misunderstanding that can start from a wrong adaptation of procedures to the people to whom they are intended. It is difficult or even illusory to design procedures without the effective participation of the final

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users. The human factor has his requirements as regards the form and the content of the procedure". [Translated from Nicolet 1990]

Inside a plant, nothing is static; systems, people and organizations change with time, evolution of technology and accumulated experience, and it is important to harmonize the procedures to this changing environment.

"Procedures are not only understood like the use of instructions but also as the result and the creator of a complex interaction process whose stakes relate to the culture of the company and its evolution". [Translated from Minzoni-Deroche 1997]

This means that we have to assess what are the gaps between the prescription (procedures) and the real practice, and how to reach a consensus among stakeholders on the adaptation of the procedures, to reduce these gaps.

In this perspective, we have used a methodology based on the sharing of experiences [wybo 2001] that focuses on human and organizational factors.

The objective of this method is to highlight the know-how of stakeholders and to make them aware of the importance of a pro-active approach (participation, motivation) in the research of harmonization in the definition and evolution of procedures.

The «procedure of delegation»

A chemical plant is composed of different units: production, storage, maintenance, etc. These units need to be well maintained to avoid accidents and to keep the system safe. Consequently, it is necessary to check the components, products, and processes and to carry out the repairing task as soon as a problem has been identified.

In this context, the chemical plant in which the study has been made has designed a specific procedure called "procedure of delegation" that describes the prescriptions to apply on that site.

This procedure includes the request for works, the organization, the follow-up and the closing of a maintenance operation. The production and maintenance units are the primary stakeholders in this process. In many cases, a subcontractor is given a delegation to carry out the task.

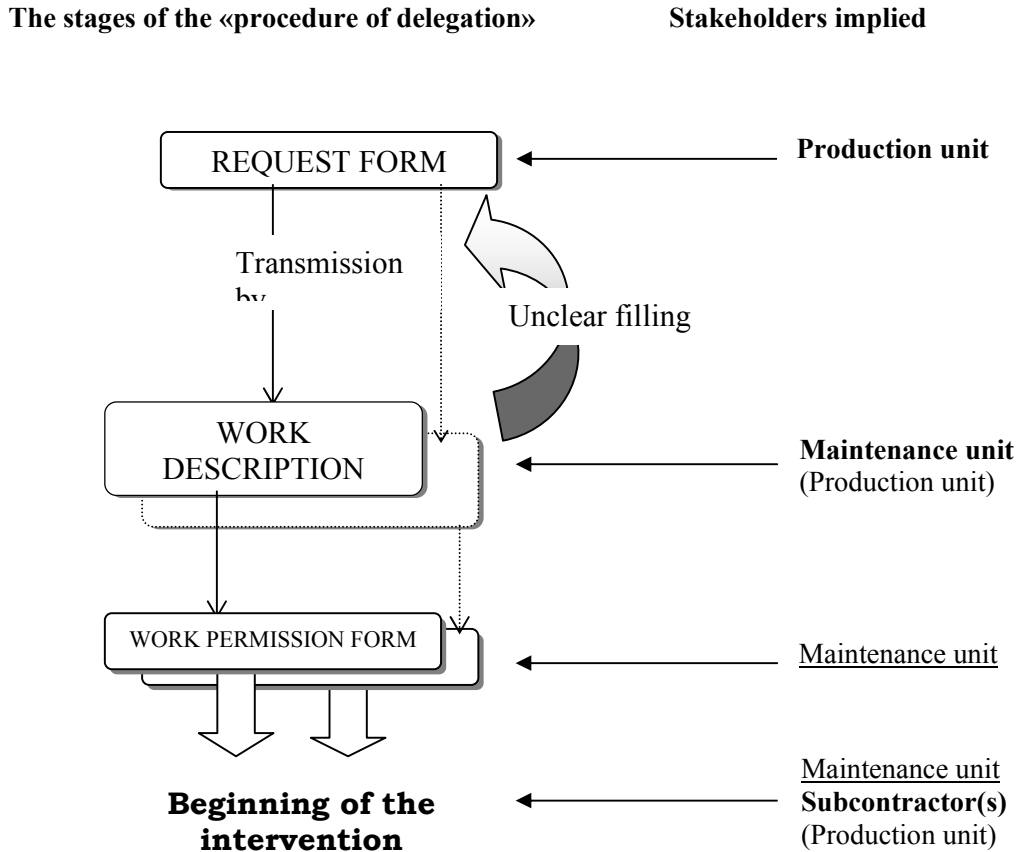
Three documents are used to organize this process:

- The request form, which is at the origin of the «procedure of delegation». A problem is identified by the production unit, which creates a request to solve the problem. This request form is transmitted for information to the maintenance unit. It is the first stage of the process.
- The work description form. The maintenance creates it after determining precisely the nature and the description of the works. Several forms can be issued from one request form.
- The work permission form that describes the work, the means to use, the existing risks, the protections and – if needed - the subcontractor company chosen to carry out the task. There is one work permission form for each work description form.

The figure 1 shows that several outsourcing companies may intervene in the procedure of delegation, which implies an increased number of stakeholders in the process. Although the procedure defines their roles, some gaps may appear between prescription and practice, caused by a lack of information, poor coordination and "dissonances" between stakeholders and ignorance of their specific constraints of parties.

The term "dissonance" (discord) corresponds to the differences of opinion, disagreements and tensions, which exist between two networks of stakeholders" and constitute risk factors. [Translated from Kervern 1998]

Figure 1: Main documents and stakeholders involved in the «procedure of delegation»



This point raises four central themes/questions:

Lack of co-operation between stakeholders

The outsourcing, the increasing number of stakeholders, and the use of new technology, lead to a decreasing flow of tacit exchanges of information and knowledge between stakeholders, in support to formal exchanges, represented by standardized forms, invitation to tender, contracts, etc. Each stakeholder thus remains trapped within his framework of work, the dialogue tends to be reduced, and a corporate safety culture is therefore more difficult to build.

The cooperation activities depend on framework's organizations and communication tools placed at the disposal of the agents to synchronize themselves mentally (construction of a shared representation) and temporally (in the action). [Translated from Amalberti^a 2001]

Perception of stakeholders

The procedure specifies what are the rules to follow at the time of the organization of a maintenance operation but it gives a freedom of interpretation with regards to the identification of problems, the estimation of the emergency level, the comprehension of the work to be done, the filling and circulation of documents.

The quality of technical documents...can be a factor of formidable complexity when it's wrongly written. [Translated from Amalberti^b 1991]

In these domains, malfunctions appear in the ways to achieve tasks. This creates gaps between the prescriptions (what is written in the documents), and the practice (what is understood from their contents).

Example: filling the request form. This task requires a clear identification of the problem and a good wording of the text in order to make the document well understood by the maintenance unit that has to organize the work. But sometimes, the document is not clear enough, which creates misunderstanding and delay in the procedure. This could be solved by organizing the dialogue between stakeholders.

Collective activities, where the actor's task depends on the results of other actors over whom he has no control, also constitute an example of the weakening of the prescription-event linkage. [Schlenker 1994]

There are also the transmission paths of documents, which are not always appropriate and so, relevant information may not be transmitted. This reveals a part of the ignorance of the stakeholders as regards to their respective constraints and difficulties.

The irreparable gap existing between prescription and practice result from the insuperable difficulty to lock up inside a total forecast, the whole situations that can be met when running a complex system. [Translated from Verot 1999]

But, even if it is not possible to prescribe everything inside a procedure, it is important to consider the professionalism and the behavior of people so that the documents are correctly filled out and their contents fit the needs of concerned people. This can be achieved in a framework of trust and mutual respect, by a strong knowledge of the work and by the competence of people.

The loss of knowledge

Knowledge management is the result of a corporate work and the sharing of information among all stakeholders involved in the process (from the operators up to the top management).

Knowledge management is about people and processes they use to share information and build knowledge. [Hanley 1999]

The aim is to favor the circulation of information between the different units, following a network approach more than a hierarchical one. But the major difficulty remains in the collection of information.

Knowledge creating depends on the tacit knowledge of individuals and groups, and on the knowledge links and alliance that they and the organization have developed internally and externally with other partners. [Choo 1998]

The stakeholders don't know inevitably the constraints and the difficulties of everyone because they don't have enough opportunities to discuss and share their experiences among them. Consequently, the information that could be exploited remains tacit and unknown by the organization.

Risks associated with the loss of knowledge

To achieve some very technical operations or in contact with dangerous fluids (like mercury), subcontractors need to have specific skills in the domain, and a precise follow-up of their activity must be ensured by the maintenance unit.

Nevertheless, these specific skills are not always checked, which can cause injuries to staff and damage to processes. For each task, stakeholders must be informed and trained to face the risks. Providing information about the risks related to the tasks cannot be avoided and checking the availability of this knowledge in the choice of subcontracting companies should be a priority.

People from the chemical plant and from the subcontractor company have to share their knowledge and experience, in order to develop organizational learning. This point is a matter for prevention activities inside the plant and for organizing the training of subcontractors.

Methodology: Formalization and sharing of individual experiences

Most of the times, the sharing of experience consists in collecting information concerning an accident from all stakeholders involved in a process or an organization. Generally, there is no more implication of people in the processing of this information, except from sanctions or changes in procedures. In order to reduce this frustration that reduces the willingness of people to comment incidents, our approach is to present to the stakeholders the importance of their participation, their perception and their competence in the management of incidents and other activities.

The aim of the method is to favor exchanges, group work and sharing of knowledge, implicating stakeholders in the analysis of the activity, in order to develop a corporate language and culture. This method, entitled “*the positive experience reflection method*” [Colardelle 2000], was designed to build the complete representation of the development of an incident, accident or crisis.

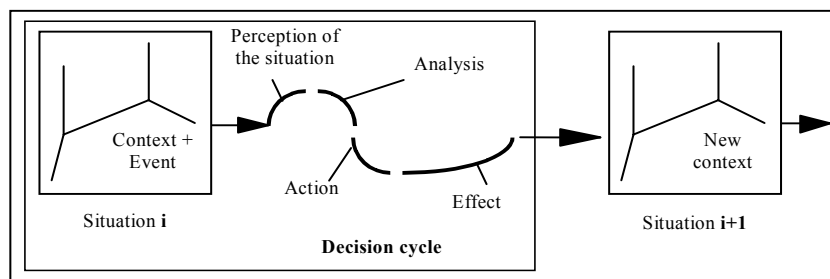
Experience reflection is a management method in which people having participated in the management of an action, analyze the development of the situation, learn lessons and apply decisions to avoid problems in the future. [Colardelle 2000]

This method has been adapted for application to the study of procedures. It is composed of three phases: collection of information, formalization of experience and sharing of knowledge.

Collection of information

The procedure of delegation includes many actors. The main objective of this phase is to identify the stakeholders directly concerned with the procedure of delegation and to collect their experience through anonymous interviews. This dialog provides a good understanding of their perception of the tasks and enlightens the difficulties and constraints of their work. Then discussion is focused on alternatives that they can propose to improve the procedure, and on their justifications for these improvements. This part of the interview gives access to their know-how, experience and tacit knowledge.

Figure 2: Decision cycle [Colardelle, 2000]



Formalization of experience

After the interviews, all the data collected must be merged and formalized, to obtain a clear and simple display of the dynamics of the application of the procedure, represented by a series of events and decision cycles (fig. 2).

Each cycle is formed of 4 phases:

- Situation: context and event,
- Analysis of the situation by the stakeholder,
- Action (done according to the analysis)
- Effects of the action.

The procedure of delegation is composed of different documents to fill out and to transmit to the relevant parties. The representation as decision cycles contributes to clarify the sender, the receiver and the contents of the document, at each step of the progress of the activity described by the procedure:

- The document
- The stakeholders
- The transmission paths of documents,
- Suggested alternatives to malfunctions and improvements

Once this clarification is made for each stakeholder, it is easier to show, understand and discuss about the gaps and the malfunctions that occurred.

Sharing of individual experiences

Once the whole procedure of delegation has been formalized as a series of decision cycles, our approach is to bring together all the actors interviewed and to present them the final document, during a “*mirror effect meeting*” [Colardelle 2000].

Each stakeholder is provided with a document that gives him a global view of the collective experience, collected through the individual interviews. The aim of this phase is to validate the knowledge resulting from the experience of the group, to make the stakeholders aware of the tasks and constraints met by every of them, to identify the gaps between practice and procedure and to try to reduce them.

During this meeting, all stakeholders have the opportunity to exchange, share and communicate on the different matters. The objective is to create a dynamics of learning, based on mutual respect and the use of a common language, in order to build a consensus between stakeholders and to share knowledge. The aim is to reach a collective appropriation of the procedure of delegation and to develop a safety culture inside the plant by organizing reflection on safety management issues.

It is necessary to discuss the technical finds, to organize a proceeding about advantages and disadvantages for adopting them, integrating them somehow in the tradition of the company or the job. [Translated from Dejours 1995]

Contributions of the sharing of experience in reducing the gaps

The method gives a detailed representation of the procedure. Thus, it is possible to improve the knowledge of the organizational, technical and human aspects of the procedure of delegation. Furthermore, this process highlights forces and weakness of the procedure, by describing real practices, identifying problems, and designing a more effective procedure, approved by all parties.

The role played by the representation of knowledge

The representation of experience as a set of decision cycles enables to reduce differences in opinions among parties. It gives access to the “intimacy” of a procedure, by the understanding of difficulties and specific constraints met by everyone, at each step of the application of the procedure.

Members of an organization must have a clear view of their role and responsibility in the operation...and must achieve a new culture which consists of finding valid information, making informed choices and checking the implementation of their decisions for recovering and reducing errors. [Translated from Moingeon 1995]

The knowledge gained from malfunctions is a source of improvement for the organization. This approach contributes to agree on a “collective truth” about the real application of procedures, which is more complete in terms of human and organizational aspects.

Promoting a group work

The federative aspect of the method enables to involve stakeholders and to modify their behavior thanks to a better comprehension of their constraints. Bringing together all the stakeholders and supporting the cross relations between the different units is a way to improve comprehension and knowledge of the real situations and to support progress in efficiency and safety.

It is essential to be able to observe and understand from inside, with the help of the stakeholders themselves, in which forms and which costs (psychological, sociological, political and economical), a whole organizational community (the whole stakeholders of a system), manage the obligation to complete the tasks successfully, very often difficult, in a good reliability. [Translated from Bourrier 2001]

During this study, we have observed that the stakeholders felt motivated to participate to the procedure and to belong to a group in which the objective is working better together. Group work gives a collective view and understanding that could not be perceived by only one person.

“A good management of information is a condition necessary for the organizational learning.”[Translated from Moingeon 1995]

Promote a consensus

The objective of this study is to study the best conditions to harmonize prescriptions and actions undertaken in the plant. Promoting a sharing of knowledge enables each stakeholder to know the whole procedure and to transmit his/her opinions and suggestions concerning the operations. The objective is to reach a consensus, an “objective truth” accepted by everybody, which recognizes and takes into account the individual achievements of stakeholders. This rewarding and pro-active approach demonstrates its efficiency in motivating stakeholders to participate and involving them in the search for performance improvements while respecting prescriptions.

Subcontractors training

The maintenance unit is aware of the importance of checking the specific skills of subcontractors, to train them to the tasks to be done and to face the risks of operations. Indeed, before starting a maintenance operation, the maintenance unit explains the work to be done to the management of the subcontractor company, which transmits this information to their staff. These explanations are given outside the context, which can create misunderstandings and loss of information. That is why the maintenance unit has to be careful about the training of subcontractors.

The application of this method has been perceived very positively because it succeeds to achieve two major objectives: design and apply an effective procedure approved by everybody, and reinforce the sharing of knowledge between stakeholders.

Conclusion

The sharing of experiences is a powerful tool as regards to the collection and analysis of information. This case study shows that the methodology used is operational to support comprehension and improve knowledge about the application of the procedure of delegation. It is perceived as:

- A working method which gives access to the dynamics of the procedure of delegation
- A means to identify and reduce the gaps between practice and prescription, as regard to comprehension and transmission of documents, identification and management of problems.
- A unifying element among the stakeholders: improvement of the cross relations between units, strengthening of cooperation among people
- A way to reach a consensus accepted by everybody, which values individual suggestions.
- A reinforcement of communications and sharing of knowledge among parties.
- A better training and supervision of subcontractor companies.

This study shows that procedures and prescriptions have to be adapted to the actions and decisions of the people who apply them, who are confronted with difficulties in their application, who suffer injuries and blame, but who also develop appropriate solutions. Learning from these experiences and sharing knowledge among stakeholders is a key aspect in keeping a balance between the need for a strong corporate memory and the development of outsourcing.

Procedures remain the primary mechanisms for maintaining the corporate memory work force. The loss of corporate memory can be devastating without comprehensive and accurate procedures and mature processes [Work group 1997]

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