

Retraining for manager in the frame of HP program: the case of Chinon NPP

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Introduction

Exploitation of nuclear power plants implies a high level of safety and of work activity reliability. The production division of EDF always tries to find organizational solutions in order to reinforce those lines (see for example : Le Bot, 2004 ; Fauquet, 2007, 2008). Since several years, a Human Performance Program has involved all the nuclear power plants of EDF, within one topic concerning the management in the field dealing with organizational problems.

The present paper exposes what is done on the NPP of Chinon to help the management to be effective in the field with this aim. It explains why this can be difficult and what kinds of changes it implies, and exposes the means which have been chosen, focusing on specific training sessions.

The industrial context and the Human Performance Program

Since several tens of years, studies have shown how much human contribution to safety of industrial facilities is important: safety can not be only supported by automatic protection and control systems and a comprehensive socio-organizational approach of work activities must be managed at every organization level (Llory *et al.*, 1988). Thus, organization and management of French nuclear power plants are involved in a Human Factor policy which evolves permanently with the main aim to enforce nuclear safety. The Human Performance Program is situated in this frame. It consists of several items among which one concerns the management in the field. A large benchmarking has been done (different countries, different industries) to identify especially: i) how can progress a safe industry by avoiding minor events? ii) what helps a worker to avoid minor events ?

Why being interested on those two points? Because event analysis shows that majors events which concern safety are always a combined contribution of several minor events (by event, it is necessary to understand a gap between realized work and expected task; any event detected leads to a treatment (Fauquet, 2004, 2006) and is assessed according to the INES scale; quasi entirety is classified at level 0: « no importance from the point of view of safety ».

Avoiding minor events is thus useful to reinforce nuclear safety as soon as they are identified: studies (Rasmussen *et al.*, 1994 ; Leplat, 2006) have shown that progress could be made in common work activities, those which are made very often, and lead the workers to be used to their job (more efficient) but also used to the risks (they could be in routine conditions and not see them). Benchmarking has shown that Anglo-Saxon industries are using some specific professional practices (they are also said Human Performance tools, or HP tools) to avoid such minor events (see for example Fauquet, 2009; Fauquet-Alekhine, 2010; Fauquet-Alekhine & Pehuet, 2010). The nuclear division of EDF has selected 6 of them to be applied during activities.

One of the problem is that those professional practices, if they are daily applied by a lot of Anglo-Saxon workers, are not part of the Latin culture, among which French industries, and of course, nuclear power plants. Furthermore, these HP tools seem to be more easily applied in a given industrial environment, according to a given kind of management culture. On French nuclear power plants, since several tens of years, the management was involved in the field mainly for verification, control, and evaluation. The risk that was identified by the nuclear division of EDF was that, in such a context, the HP tools could become a mean to overcome organizational defects rather than make the activities more reliable.

It has been decided to help the management to change its work in the field. To deal with daily organizational defects and help the teams in working situation, a corrective action program has been launched to manage minor events and their treatment, and a management program has been engaged on all the NPP of EDF.

The management program in the Human Performance Program

First, the management is involved in an initial training session which spreads out over several months in three steps.

The first step is an informative session of two hours, during which the head manager of each department will brief his managers about the aim and the needs concerning the manager in the field within the Human

Performance Program. This is the time for the head manager to make his staff understanding the gain expected by a new way for the management to be in the field: not only for verification, control, and evaluation, but also to deal with daily organizational defects.

The second step is a training period in the field, in order to help the manager to adapt his practice and attitude if necessary.

The third step is a meeting with others managers, to share about difficulties and solutions compared to what is expected.

Then, there must be a permanent motivation of the management to reach the goal. This is done by:

- the head management which reminds the expectations concerning the management in the field,
- the event analysis used to remind the meaning and purpose of the “management in the field” expectations,
- the view through some indicators,
- a feedback through the analysis of what they do,
- the training or retraining support used to remind the meaning and purpose of the “management in the field” expectations, to remind the expectations themselves, to help the manager to be in the field, and also to remind what is expected from the workers concerning the use of HP tools because.

This permanent motivation has very soon been identified as a necessity, because a manager who is used to been in the field mainly for verification, control, and evaluation, is quickly going back to old habits.

The management program and the specific training and retraining support

On the NPP of Chinon, we have built by time some specific pedagogical exercises concerning the management.

Two full scale simulators are used to help them practicing the HP tools, and them to observe them in the field.

Two simulators, a software piloting simulator and a pocket maintenance mock-up facility, are used in rooms for the same purpose.

Additional specific exercises are used to help the manager in the field :

- Exercise for a Simple construction for HP tools,
- Exercise for a Complex construction for HP tools,
- Exercise for a Team activity with 2 kinds of management.

Exercise for a Simple construction for HP tools

This exercise needs 30 minutes, including discussions in debriefing.

The pedagogical aim is to hold the manager to see how small organizational details can spoil the efforts of workers in the reliability of activities.

Managers are asked to work in groups of 2 to 3 persons. Each team receives an operating mode, and a set of 7 to 10 wooden pieces. In 10 minutes, they must build together a 7 pieces frame. The operating mode is the same for every team except the title.

At the end of the 10 minutes, some of them are exposing something which looks like a tractor, and the others have something which looks like a modern art construction.

We then explain to all of them that the operating modes where the same, except one detail. They exchange the operating modes and usually can not see the difference: every body focuses on the lines of the operating mode, forgetting the title. The demonstration is done: managers, as workers, forget to watch what will give them the meaning of the work activity (the title) as soon as they think that they know what is the document about.

The pedagogical objective is to lead them to understand that one of the management tasks for Human Performance is to make the operating mode effective and reliable, for the workers to apply HP tools in good conditions. This must become a general conclusion: they must watch the organizational defects for the HP tools to be effective.

Exercise for a Complex construction for HP tools

This exercise needs 1h30 to 2h, including 1h to 1h30 for discussions in debriefing.

The pedagogical aim is to help the manager to feel the organizational difficulty to apply HP tools and to know how to observe HP tools.

The staff of a department is gathered in a room in which they must build the first circle of Stonehenge, picking up in a set of wooden pieces some of them, according to an operating mode.

The operating mode does not exist as a whole: everyone will receive one instruction, and the information will have to be analyzed together before application (pre job briefing and time breaks). To conduct this analysis, a leader is design (usually, we chose the boss of the team). Four of them will be observers, but they keep information each that will have to be transmitted to another person. This implies that four other persons will have to ask this information (reliable communication). Four other managers can each read information kept on a paper: for each one, this paper is kept in another room; they can go there and read it, but must leave there the

paper to bring back information in the main room (self-control and reliable communication). To build the circle, one piece is part of another construction: no mistake must be done about the selection of this piece, because in case of mistake, this piece is lost (time break and peer check).
The number of persons can be change for the purpose of the need.

At the end of the 30 minutes, the observers have a lot to say. The debriefing of the session help the managers to understand by the feelings and the acts:

- the gain produced by the HP tools,
- the complexity of acting with pertinent and effective HP tools,
- HP tools are not always easy to observe, even if applied,
- the observation of organizational defects (including the management of the team) and the clear identification of what is a main defect, and what is a minor defect,
- the necessity of discussing solutions with the workers concerned by organizational defects.

The session debriefing is conducted like the simulator training session (Fauquet, 2008; Fauquet & Frémaux, 2008; Fauquet-Alekhine & Pehuet, 2010), or like the event analysis (Fauquet, 2006).

Exercise for a Team activity with 2 kinds of management

This exercise needs 2h, including discussions in debriefing.

The pedagogical aim is to help the manager to feel and to understand what produce the manager's attitude on the team, make an analysis of his own attitude in the field and of the one of the department management in the field, and think about what can be change.

The first hour is an exercise and its debriefing.

Managers are asked to work in groups of 2 to 3 persons, in different rooms (no contact). Each team receives an oral operating order, a set of materials (one pencil, one board on a paper, a draft paper, a pocket calculator, a set of 10 invoices). In a quarter of an hour, they must write on the board paper, on each line of the board (one line for one invoice) :

- the name of the society paid,
- the things provided,
- the amount of taxes,
- the total amount of the invoice.

The final aim of the exercise is to calculate the total amount of taxes and the total amount of the invoices, and compared them.

Several problems occur :

- the pencil does not work,
- the pocket calculator has no batteries,
- some invoices do not show explicitly the amount of taxes which must be calculate,
- some invoices include different taxes rate due to the things provided, which implies some specific calculation, and some adaptation of rules to fill the paper board (the manager's help will be needed).

To lead the teams, there are two managers, M1 and M2, who are trainers in fact. M1 is fully concerned by organizational problems. M2 is mainly concerned by the respect of prescription and rules. These managers are outside the rooms where is working the teams, but can be called as soon as it is needed.

Of course, because of the problems listed above, the team will ask help for material and for the work understanding.

When M1 (organization) comes, he always brings soon a solution, or a suggestion, while M2 takes time to come, then to produce the solution or give the information. And every time M2 comes, it makes some remarks concerning the job: everything must be written exactly in the blocks of the board, the name of workers on the form must be the surname followed by the first letter of the first name, the invoices must be recorded on the paper in alphabetic order (which is useless), and so on.

The debriefing of the session helps the managers to feel and understand what they produce in the field: the general comments are as follows:

- for M1 (organization) team, the task is not interesting but can be done,
- for M2 (prescription) team, the task is boring, the manager does not help, and soon, he was not welcome.

The "workers' attitude" adopted by the managers during the exercise is always:

- for M1 (organization) team: they are pleased to see the manager ; "we work all together : the team includes the manager",
- for M2 (prescription) team: "at first, try to do our best, then, when manager coming, he can speak...we laugh after".

The debriefing concludes that people work for a result, a company, and a man (the boss). The manager's attitude in the field contributes to built workers' behavior and results. The demonstration of what is gained with a management concerned by the organization in another way than verification, control, and evaluation, is done.

The second hour consists, for each manager, in thinking about their own way to be in the field according to what has been said and discussed during the previous hour.

The managers are asked to explain how they see themselves in the field, and what they can hear from the team about their presence in the field. They discuss about what they would like to do according to what is expected of their head management. The discussion usually concerns paradoxical injunctions: the head management seems to ask them to be in the field for the detection and the treatment of organizational effects, but at the same time, ask them to feel some indicators concerning verification and control. They try to know how to deal with job meetings, consuming a lot of time. Managers explain their need of training, because of their old habits which engage them to be in the field for controls. It appears clearly that we have a work to do, from an organizational standpoint, in order to bring more coherence between on one hand, the expectations of the head management and the job meetings for which the management is required, and on the other hand, the management in the field for the organizational defects.

Conclusion

The French nuclear power plants of EDF are involved in a Human Performance Program which aim is to reinforce the safety of nuclear exploitation. Among the means used to reach this goal, the management in the field to deal with organizational defects is a main one.

Efforts must be done, from an organizational standpoint, and for the head management expectations, in order to help the managers in the field. Among those efforts, we have the training of the management, a permanent involvement through self-analysis done periodically, and a training supports renewed, sometimes by the means of out-context situations to help people to think the situation disconnected from the usual constrains felt in the daily job.

While the Human Performance Program is proceeding, some significant progress has already been observed on the exploitation of nuclear reactors of the French company EDF. But it needs time...

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