

SAMS - Sharing Awareness Moves Safety

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Maintenance, preserving well-established status, and changes, which constitute the basis for innovation and improvement, are the daily business of all employees responsible for process plants. As indicated in various legal and technical standards, the relevant methods to ensure both occupational safety and process safety are hazard analysis and risk assessment.

In practice, the accident rate of maintenance work is still a major focus point. Besides the human tragedy involved with these accidents, the financial loss due to business interruption and image loss may jeopardize the future of hitherto successful companies. Moreover, managers in charge at the time of the accidents could face prosecution. Therefore, safety, with its social, legal and economical aspects must be an integral part of any overall business optimization strategy.

To improve safety during maintenance works, the German Social Accident Insurance Institution for the Raw Materials and Chemical Industry (Berufsgenossenschaft Rohstoffe und chemische Industrie, BG RCI) has developed safety briefing sets, which enable superiors to share their knowledge about safe working to their subordinates and colleagues, for example within an awareness campaign.



Figure 1: use hot work permissions



Figure 2: tell what has to be done where and when

1. Basic root causes of accidents during maintenance works

Before carrying out any work in a plant, hazards arising from the chemicals, the equipment, the tools, and auxiliaries must be identified. Examples:

- Electricity
- Hot or cold surfaces
- Hazardous materials: toxic, corrosive, asphyxiant, flammable, explosive
- Uncontrolled movement of mechanical parts due to unexpected start of drives or due to the release of potential energy (gravity, loaded springs, kinetic energy, compressed gas)

For maintenance works, the identification of these hazards and the recommended countermeasures are usually written down in a kind of formal checklist, the so called work permit. Although identification of hazards is necessary and essential, it is only one part of safe work. Both hazards and measures have to be brought into workers' mind. One of the basic root causes that applies to many smaller and bigger accidents during maintenance work is inadequate communication of knowledge and emergency planning:

- when performing the work without taking these hazards into account or without observing safety standards
- when applying a work permit system with incomplete information on all personnel affected
- when operating with a deficient safety management system containing insufficient alarm and emergency plans.

This often happens, because people's thoughts and actions are generally short-term oriented and optimistic. In general, people do not expect to be involved in an accident. "Accidents happen to others, not to me, because I take care!" As most of us think like this, prevention is not inherently ingrained in our minds. Many serious accidents could have been prevented if appropriate precaution had been taken. Unfortunately, our experience has shown just the opposite. Considering the large number of unsafe actions and unsafe situations we are daily faced with, the number of resulting accidents is rather small. We unconsciously learn from this that unsafe behavior has, in general, no negative consequences, and we underestimate the risks. This experience makes us careless. We simply neglect the fact that an accident could happen. Furthermore, we tend to overestimate our capability to control a situation. We believe that we can take corrective action in case of an incipient deviation. However, objects falling from tilting piles on pallets, the spray of hot steam or explosions are always faster!

While underestimating the risks and overestimating their own capability, many people believe that the requirements of accident prevention are inordinate. This must be taken into consideration when taking measures to foster motivation for safe behavior. It is not sufficient to tell simply the employees what is hazardous. In addition, they must be trained to identify hazards themselves. Therefore, they must also be able to recognize typical errors and pitfalls in assessing risks. Although one can understand people might perceive safety rules as being overly conservative, there must be a clear commitment on the part of management to enforce these rules. The underlying reasons for the rules should be discussed and explained in order to raise acceptance. The negative, even catastrophic, effect of unsafe behavior for each individual must be made clear. In this respect, case histories of victims of accidents that occurred in similar plants are more effective than elaborate theoretical presentations.

Education and training of safety rules should always take this human factor into account.



Figure 3: take care about safe surroundings

2. The German Social Accident Insurance Institution for the Raw Materials and Chemical Industry

Institutions for statutory accident insurance and prevention are part of the German social network. The statutory duty is to prevent occupational accidents, occupational diseases and work-related health risks.

The German Social Accident Insurance Institution for the raw materials and chemical industry (BG RCI) was established on 1 January 2010. It was created by merging the partner institutions for statutory accident insurance and prevention for mining, the chemical industry, leather industry, paper making, quarrying and sugar. BG RCI covers almost 36,000 companies with a good 1.2 million insured employees. In 2011, BG RCI paid benefits amounting to more than EUR 1 billion.

In Germany, there are nine institutions for statutory accident insurance and prevention, providing comprehensive assistance to companies in all occupational safety matters, train insured employees, investigate causes of accidents and test technical equipment. They provide insured employees with comprehensive and expert support following an occupational accident or disease. They take all measures necessary to ensure medical, social or occupational rehabilitation for insured employees. They also provide financial compensation. As philosophy is "Prevention before rehabilitation – rehabilitation before pension", a lot of effort is taken to reduce the number of accidents.



Figure 4: use the right safety equipment

3. Brief safety instruction sets

The safety briefing sets cover different themes of occupational health and safety. On the first five slides, relevant aspects are illustrated with funny but instructional pictures, showing the correct way of action. One of the briefing sets about safety for maintenance works, for example, filling out hot work permissions before starting work (figure 1), briefing what has to be done where and when (figure 2), taking care about the safe surroundings of the workplace (figure 3), working safe using the right safety equipment (figure 4) and informing the right people when work has been finished (figure 5). Using these slides, the instructor can explain what is important for safety at work, discuss experience and knowledge with a group of workers and last not least sharpen their awareness for unsafe procedures.

At the end of this lesson, there is a picture full of action (figure 6). Unsafe situations have to be pointed out and explained by the trainees. So it is possible, to get a feedback of the lessons learned.

The next pages contain a lot of background information to each of the five pictures, for example legal or technical requirements as well as accident reports, so that the trainer may even improve his own knowledge. There are also hints given to the wrong actions in the last picture.



Figure 5: inform when work has been finished



Figure 6: point out and explain the wrong actions

The safety briefing sets are available as printouts as well as powerpoint-presentations. They may be used within awareness campaigns in the companies, meeting their and our aim to improve safety performance at a challenging job.

References

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