

HSE Human Factors Briefing Note No. 8

Safety-Critical Communications

Briefing Note 1 – ‘Introducing Human Factors’ explains the background to these Briefing Notes.

Many different types of communication, spoken and written, can be safety critical in the workplace. These include: general communications in the form of safety information, communications between team members or between different teams during operations or maintenance work, and emergency communications.

Case studies

‘The lower half of an aqueous ammonia tank was replaced as part of a maintenance task. When the tank was test filled, it began to over pressurise and the feed line to the tank was found to be leaking. Filling was halted. A maintenance crew repaired the feed line and checked the pressure relief line. The attempt to fill the tank was not reported to the shift supervisor. He recorded in his logbook that the tank was empty. It actually contained 50 to 150 litres of aqueous ammonia.

The supervisor of the next shift issued a permit for mechanics to disconnect pipework from the tank as part of the maintenance operation. It is believed that the ammonia-air mixture in the tank was ignited by grinding operations nearby. The tank exploded with the top of the tank being projected 60 metres. Fortunately, no one was injured but there was considerable plant damage.’

Source: MARS Database Report 497

Originally, 3 field operators working locally operated a chemical manufacturing (batch processing) plant. This was changed to two operators, one in a control room, one on plant – they alternated between these roles. They found that communications between operators increased. Previously, operators would carry out their work without telling anyone else. One problem, though, was the increased use of radios, which were often unreliable. They introduced a text device whereby the control room operator could send messages to the field operator who could then accept or reject the task and send this information back to the control room. This strengthened communications between them.

Source: HSE Report – Ref. 1

Miscommunication between a tanker driver and personnel at a water treatment plant resulted in sodium chlorite and phosphoric acid being mixed in a vessel at the site. The driver and plant manager did not communicate accurately and the sodium chlorite was delivered into the wrong tank. A large gas cloud formed and local residents had to evacuate the area.

Source: US Chemical Safety and Hazard Investigation Board. <http://www.csb.gov>



HSE concerns

Effective communication is important in all organisations when a task and its associated responsibilities are handed over to another person or work team. Critical times when good communication must be assured include: at shift changeover, between shift and day workers, between different functions of an organisation within a shift (e.g. operations and maintenance) and during process upsets and emergencies.

Although the importance of reliable communication may be recognised, guidance for personnel on how to communicate effectively may be lacking.

Communications in our company are good because:

- Managers and supervisors regularly discuss safety with us face to face ☐
- Formal safety information: posters, memos, newsletters, talks and presentations are usually:
 - clear and easy to understand ☐
 - short and to-the-point ☐
 - regularly updated ☐
- Jobs are paced so we have time to communicate properly ☐
- Communications equipment – such as radios, intercoms, PA, internal email – are good quality ☐
- Speech communications are generally not swamped by noise in the workplace ☐
- We have a rule of making sure that safety-critical information has been received and understood ☐
- We are good at shift handovers:
 - there's always enough time for shift handover ☐
 - oncoming and outgoing shifts discuss plant status face to face ☐
 - shifts keep and hand over good written records ☐
- The company has good systems of communication during unusual situations or emergencies ☐
- Different groups – operations and maintenance staff, employees and contractors – communicate well with each other ☐

Learning more about communications

Safety critical communications

As a starting point for examining your company's communications, you should consider the different methods that companies use to communicate safety information and how communications could affect safety.

General safety communications – notices, warning signs, posters, memos, 'non-verbal' communications – e.g. gestures, hand signals, the manager visiting the workplace – all communicate a message about the company's safety culture. PA system messages, communication with outside groups e.g. to pass on and to receive information on lessons learned; communication of actions taken after accidents, audits and risk assessments, responsibilities in job descriptions

Safety meetings and the records of those meetings distributed afterwards




Job-specific communications – before the job – ‘toolbox talks’, written instructions/procedures especially information on job hazards, safety precautions needed. Discussions within teams and between teams (e.g. between team members working on the same job; between operations and maintenance teams, when handing over work from one shift to another)

Informal communications – general discussion and interaction – where these include safety issues

Emergency communications – alarms, PA messages, briefings, communication with emergency services

Communications are basically ‘messages’. A message has to be: Created, Sent and then Received. There could be problems at any of these stages which may mean that the intended message receiver fails to take the right action. The box below describes some underlying reasons why there could be problems and the table below describes some specific problems and suggests possible remedies.

General causes of communication problems: making assumptions (e.g. about what the receiver already knows); distractions, time pressure, lack of experience, skill or practice (e.g. when someone has been away from work for a long time), poor culture (e.g. lack of attention to communications issues), unusual conditions (e.g. a long campaign of planned maintenance), poor equipment or means of sending messages.

Communication Stage	Possible Communication Fault	Remedies
Create the Message 	<ul style="list-style-type: none"> Message is incorrect: <ul style="list-style-type: none"> - incomplete or missing information - contains the wrong information - is badly worded or presented (e.g. is ambiguous) Too much information given 	<ul style="list-style-type: none"> A second person checks the message Make sure message sender is competent – give communication training if necessary Have rules for presentation and content of messages
Send 	<ul style="list-style-type: none"> Fail to send message or send too late, message gets lost Use the wrong means of sending the message (a memo or note where a conversation would be better) Send to wrong person 	<ul style="list-style-type: none"> Make sure sender and receiver know when information is needed Have procedures specifying how information (especially safety-critical information) should be presented Feedback – sender to check that the person receiving message needs the information
Receive 	<ul style="list-style-type: none"> Fail to receive Receive too late Receive in a unusable state Partially received (message obscured e.g. by noise or damaged, or receiver does not retrieve all the information) Fail to understand 	<ul style="list-style-type: none"> Feedback – sender to always ensure that information is received and understood; receiver to send an acknowledgement Receiver to prompt sender for required information Have system for resending or reformatting messages

References

1. HSE (2002) Human factors aspects of remote operation in process plants. Contract Research Report 432/2002
2. HSE (1996) Effective Shift Handover. OTO 96 003
3. HSE (2000). HSG65, ‘Successful Health and Safety Management’. ISBN 0 7176 1276 7