

For background information on this series of publications, please see Briefing Note 1 - Introduction

**PROCEDURE:** written instruction describing how to carry out a job of work. May be on paper, include diagrams, flowcharts etc or be presented on a computer screen.

**SAFETY CRITICAL PROCEDURE:** describes a procedure for a task which, if carried out incorrectly or not at all could lead to serious plant damage, loss of containment, injury or fatality.

# safety critical procedures

## Case studies

1. A series of accidents, resulting in personal injuries (burns from an explosion; bruises and hypothermia from a fall overboard) and a fatality (electrocution) occurred during routine maintenance operations offshore.

In each case, proper and established company, industry, and/or Regulator procedures were not completely followed, which contributed significantly to the accidents. Recommendations were: review all procedures to confirm that they are still appropriate for current operations; reinforce these procedures; regularly review them; and disallow unapproved deviations.

Supervisors should 'walk-through' the procedure (go through it at the work site as if doing the job) to act as a fresh pair of eyes and detect and correct any problems found.

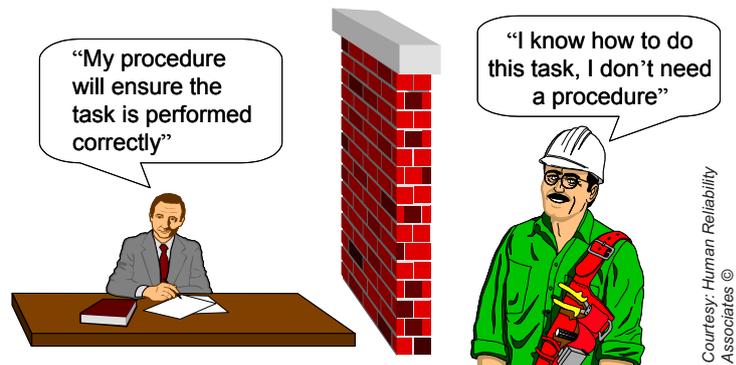
Source: [www.mms.gov/omn/pacific/offshore/safety/safetyalert12-May1994](http://www.mms.gov/omn/pacific/offshore/safety/safetyalert12-May1994)

2. An interlock system on a pig launcher could be defeated allowing valves to be operated out of sequence. The incident report states that: 'This latent defect came to light when the operational procedure was reviewed by a "fresh pair of eyes" and recommends: 'Where there is reliance on procedural control to supplement interlocks, this should be made clear in operating instructions and operator training, and consideration should be given to improving the interlocking arrangements. Operators should be encouraged to review and challenge the detail of routine operational procedures, with a view to identifying and eliminating latent risks and failure modes.'

Source: Step Change SADIE record number 163: [www.stepchangeinsafety.net](http://www.stepchangeinsafety.net)

3. A leading petroleum company introduced a useful supplement to procedures. Laminated cards that fit in the pocket indicate where the high risk areas are in different modules of the installation, and describe the hazards and the best protection against them.

Source: HSE inspector comment



## Has anyone who needs to use written procedures for a job found that:

1. Some jobs that should have a written procedure don't have one?
2. It's easier to do some jobs without the procedure?
3. Some procedures are out of date (or just out of step with how the job is actually done)?
4. The words or diagrams used in some procedures are: too small, too faint, complicated, too detailed or not detailed enough, or badly laid out?
5. There are often problems finding the right procedure?
6. The available procedures are often dirty or damaged?
7. It's very difficult to use emergency procedures in an actual emergency (judging by training or experience)?
8. If a list of tasks in a job had to be ticked off as each one is completed, this is sometimes skipped or the ticks filled in all at once?
9. Training in the use of procedures is poor (infrequent, not done at all or done badly)?
10. Procedures have been developed without any input from the user?

**If the answer to any of the above is 'yes', then you need to take action.**

## What can I do about it?

Documented procedures are required as part of the safety management system. If they are not easy to use or if there are other problems with them as described above, then it's likely that the system for producing procedures is at fault and needs to be overhauled.

Ask people, either face to face, or by giving out a question sheet, if they have experienced problems with procedures, especially procedures for critical operational, maintenance or emergency tasks. Find out if they answer 'yes' to any of the

questions 1 to 10 above. You can get further question ideas from reference 1.

- i. Find out especially if procedures are:
  - missing for important jobs
  - out of date
  - hard to understand or to find your way through
  - often not used.
- ii. Draw the information to the attention of company management.

## What should my company do about it?

There are some basic rules for the design and use of procedures. They should be:

- Easy to obtain when you need them (and it should be obvious when you do need one and which is the right one)
- Complete - contain just the right amount of information (including pictures and diagrams)
- Accurate and up to date (signed and dated to show who authorised them and when they need to be reviewed)
- Written based on a formal analysis of the task to be done - it is strongly recommended that the people who actually carry out those tasks should be involved in the analysis and writing process
- Tried out, where possible, on plant before being used 'live'
- Clear about 'what happens next' - if it tells you to do something (e.g. 'start pump NW16') it should then tell you what the effect will be ('pressure on gauge EB5 will begin to rise'), unless it's obvious
- Realistic - it should be feasible to carry out the actions in the procedure given the equipment, people and amount of time available
- Easy to 'navigate' - with a short description of the whole job at the front, a good contents page and index, flowcharts, and clear cross-references where needed in the main body of the procedure.



Courtesy: Human Reliability Associates ©

There are lots of guidelines also about language and layout of procedures. The most important are that procedures should:

- Use terms that the user will know
- Contain a glossary of terms and abbreviations (use abbreviations in full the first time they are used in any procedure)
- Use short sentences
- Write 'actively' (e.g. 'remove the access cover' rather than, 'the access cover should be removed')
- Be precise about actions (e.g. 'open valve XP1 half a turn only' rather than 'crack open valve XP1'. 'Hold the button down for 10 seconds' rather than, 'for a short time')
- Set out actions in the right order - e.g. 'isolate the 75kV supply. Carry out step 5', rather than, 'perform step 5 above after isolating the 75kV supply'

- Emphasise any hazards and precautions, PPE requirements and warnings with CAPITAL LETTERS, **bold text** or other highlighting
- Avoid negatives where possible (e.g. 'wait until the pipe has fully depressurised: then start drilling', rather than 'do not start drilling if the pipe has not been fully depressurised')
- If long, have aids for keeping track of which step you're at (tick boxes, markers etc)
- Avoid complicated or ambiguous language
- Avoid using different terms for the same thing.

Many of the above principles apply equally to: labels on equipment, wording on VDU screens, posters, signs and other types of written material.

## Management responsibility

Management should make sure they are familiar with modern standards for designing procedures and should actively encourage any initiatives to improve existing procedures. They should also regularly check that procedures are being used and be prepared to make changes if the procedures or related systems, such as training, are at fault.

### Useful reference information

1. *Improving compliance with safety critical procedures: Reducing industrial violations* Human Factors in Reliability Group HSE Books (1995) ISBN 0 7176 0970 7.
2. *Level 3 guidance for the assessment of COMAH safety reports - technical measures document: operating procedures* HSE-HID website: [www.hse.gov.uk/hid/land/comah/level3/index.htm](http://www.hse.gov.uk/hid/land/comah/level3/index.htm)
3. *Developing the right operating procedure: A guide to designing good manuals and job-aids.* SRDA-R1 ISBN 085 3563 594. SRD Association (1991).
4. *Designing instructional text* Hartley, J. Kogan Page (1981).
5. *Fundamentals of procedure writing* Zimmerman, C.M. and Campbell, J.J. Kogan Page (1988).
6. *Reducing error and influencing behaviour* HSE HSG48 2nd edition HSE Books (1999) ISBN 0 7176 2452 8.
7. *The guide to reducing human error in process operations* Human Factors in Reliability Group SRD Association (1992) ISBN 0 8535 6357 8.