

September 2000

## ***"Reducing Error and Influencing Behaviour" – presented by Trevor Shaw, HSE Human Factors Unit, Bootle.***

Trevor started his talk by referring to a simple car accident which might be caused by any, or all, of three elements – **Forgetfulness, Error** or a **Slip**. If the accident was caused by the driver failing to assess the speed of an oncoming vehicle – that was likely to be an **Error**. If **Impatience** was the cause, however, this was likely to be a **violation** if it was routine – but might have been an error if it was **Exceptional**. Similarly, exceeding speed limits could either be a routine violation or an exceptional error. Failing to use a mirror could be a slip and so could failing to position the vehicle in the correct lane. Trevor added that about **80%** of accidents were due to **'human error'**, with different figures in different industry sectors, and that the figure was rising as equipment reliability improved.

**David Simkin** asked if reading ability had anything to do with the various causations. **Trevor** replied that the **level** of reading ability was critical in avoiding these errors.

**Peter Evans of Commercial and General Norwich Union** stated that this sometimes covered up by colleagues and the effect could be very much underestimated. He added that monitoring the effectiveness of measures was very difficult and time consuming. Trevor agreed, but said that it was a matter of addressing a very broad sweep of issues and prioritising the actions.

Peter added that very often insufficient training was a prime cause, with poor design of machines aggravating the situation. Trevor replied that there would be added pressure from purchasers for designs that would conform to regulations. **Harry Jakeman** added that equipment from EU sources were far worse than UK manufacturers' and pointed out that there was a great need for more **'Plain English'**

Trevor went on to say the traditional approach to accidents was to emphasise individual responsibility and 'blame'. The attractions of this are that:-

- The onus for change is placed on the individual
- The moral responsibility is lifted from the employer or manager
- Financial responsibility for changing or improving the workplace or conditions is minimised

The alternative is to use the 'Human Factors' approach which refer to the **'environmental, organisational and job factors, together with human and individual characteristics which influence human behaviour at work in a way which can affect health and safety'**

Some **‘Human Risk Factors’** are:-

- Man-machine interface design
- Alertness assurance Competence
- Automation of processes
- Violations of procedure and safety culture
- Decision making under stress
- Fitness for Work
- Manual Handling an ULDs
- Violence at Work

Trevor referred to the HSG 48, Reducing error and influencing behaviour which gave useful guidance to managers and safety professionals on how to apply this approach, with a set of case studies where human factors problems had been solved successfully.

The key to getting started was to focus on four key areas:

- Risk assessments
- Incident investigation
- Design and procurement
- Other aspects
  - Shiftwork and fatigue
  - Shift communications
  - influencing safe behaviour
  - health and safety culture.

Crucial elements in the risk assessments are:-

- Who does this activity?
- Exactly what tasks/actions do they do?
- What tools or equipment are needed?
- What decisions are made?
- What information is needed to do the task?
- From where does this information come?  
(people/paper/computers/displays)
- How is the task learned and competence assessed?
- How often is the activity carried out?
- Where is the task carried out?
- What is the working environment like? (temperature, noise , lighting)
- Are there time constraints on the job?
- What can go wrong? Where is there potential to make errors?
- How can failures be detected and corrected?
- What health and safety consequences can result? (think about immediate and long term effects.

The second element of Incident Investigation is a critical learning tool which should reflect all the factors contained in human factor approach. The salient stages are:-

- The incident occurs and is reported.
- Describe What happened; Where it happened; When it occurred (Not just time/date but after what other action or task)
- Fully describe critical events, such as How?
- Identify all the Root Causes by looking carefully at the influences of the Job/Individual characteristics and the Organisation.
- Devise and implement controls
- Monitor effectiveness

In addressing the third element of the human factors approach we need to look carefully at the way we design the workplace to fit the individual and purchase the correct equipment to match the ergonomic needs. The ergonomic design needs to look at the anatomical, physiological and psychological aspects of the tasks to ensure that:-

- The work area and equipment fits the size of the person doing the job
- The person is able to operate the equipment without undue fatigue.
- The equipment fits the mental capabilities of the operator and all alarms and operating controls and indications have adequate impact on the operator. Consider coding by texture, colour, shape or size. They should also be placed in the right position and be compatible with adjacent controls or indicators.
- Written procedures must be clear and unambiguous to the operator. Avoid stereotypes when composing the text.

When addressing the influences on human behaviour Trevor said that the following need to be actively managed:-

- Fatigue and shift work
- Communication
- Risk perception / risk taking behaviour
- Health and safety culture of the organisation
  - Commitment
  - Competence
  - Control
  - Co-operation

Trevor concluded by saying that the learning points from their studies of the human factors approach could be summed up in this key message:-

- Everyone can make errors, no matter how small, how well trained or how well motivated they are. Sometimes we are SET UP, by a system, to fail. The challenge is to develop 'error tolerant' systems and to prevent errors from occurring.

- Failures arising from people, other than those directly involved in operational or maintenance activities, are important. Managers' and Designers' failures may lie hidden until they are triggered at some time in the future.
- There are two main types of human failure; errors and violations. Controls will be more effective if the types are identified and addressed separately.
- Reducing human error involves far more than taking disciplinary action against an individual. There are a range of measures which are more effective controls, including design of the job and equipment, procedures and training.
- Paying attention to individual attitudes and motivations, design features of the job and the organisation will help to reduce violations.

And the most important principle of all, he concluded, was:-

**'Human Factors is not like a coat of paint  
- you can't add it on at the end of your design'**

## *Members' Questions*

**Mary Thomas of Health Issues** enquired if guidance was available in different languages. **The Secretary** replied that he was aware that certain free leaflets were available in Welsh, Gujarati, Punjabi, Hindi, Urdu, Bengali, Turkish and Vietnamese. (The HSE also operate a translation service available on 0114 289 2326.)

**Mike Wilkinson of Marsh UK** commented that EC power presses were not well provided with guards and yet appeared to have an acceptable accident record. **Peter Evans** added that in his experience the main cause of violations was poor monitoring and control by managers.

**Phil Gaul of F.G.F.** said that he had experienced bad operator attitude - "We know best" - "We don't need a rule book". This was a severe obstacle to accident prevention and resulted in an over-confident view of their abilities to work safely. Trevor replied that was always a need to achieve 'Risk Balancing' by retaining a degree of risk in any task in order to keep people aware. He cited the experience on the roads when the introduction of seat belts reduced driver deaths, but resulted in an increase in cyclist and pedestrian casualties because drivers felt personally safer and drove more dangerously.

As there were no more questions, the Chairman thanked Trevor for a most informative presentation and asked the members to thank him in the traditional manner.