Human Error Analysis

Introduction

Human Error Analysis (HEA) is an example of a structured way of identifying potential human failures (errors and rule violations) before they happen. It uses a set of guide words (see Annex 2) that can be used to help identify the sorts of errors and rule violations that could occur while a task is being performed.

The technique is time consuming and we recommend that it be applied only to those tasks that are safety-critical i.e. where getting it wrong could lead to serious consequences such as fatal or maiming injuries.

HEA can be used to support risk assessment for safety critical tasks and will help identify improvements that:

1. make it less likely that an error or rule violation will happen in the first place (i.e. make the system error-reducing); and

2. prevent the error or rule violation resulting in serious consequences (i.e. make the system error-tolerant).

How to carry out a human error analysis

Preparation

HEA requires a team approach and it is essential that the team should include a leader who is familiar with the technique. The team should also ideally include:

1. an experienced operator who is familiar with the task; and

2. people who can advise on technical matters such as additional guarding or alterations to control systems (e.g. you might wish to include a health and safety advisor, a team leader and an engineer or fitter).

Before you start, the task must be analysed and a step-by-step description prepared. The best way of doing this is to carry out a task analysis (e.g., hierarchical task analysis – an example of a completed task analysis is included at Annex 3).

Procedure

Use the table at Annex 1.

Taking each task step in turn:

1. Apply the guidewords listed in Annex 1 recording in the table the types of errors or violations that may occur. Ignore guidewords that do not apply to the task step.

2. Identify the potential consequences of each error or violation, and record these in the table.

3. Identify anything that will allow the operator to recover the error (i.e. identify the fact that an error has occurred and take remedial action). Record anything that will tell the operator they have made a mistake e.g. alarms, flashing lights etc; or that will prevent the error resulting in an accident e.g. guarding.

4. Identify any **additional** measures that will:

a. prevent the human error occurring in the first place; or
b. limit the consequences of the error; or
c. improve the chances of recovering from the error.

Bear in mind that these additional measures may include changes and improvements to hardware, control systems and provision of additional safety devices as well as to improvements to procedures, systems of work, communications, instructions and training.

An example of a completed Human Error Analysis is included at Annex 3.

Operation: **Analyst:** **Date:**

HUMAN FACTORS ANALYSIS OF CURRENT SITUATION				ADDITIONAL MEASURES NEEDED TO DEAL WITH HUMAN FACTORS ISSUES		NOTES
Task or task step (description)	**Likely human failure**	**Potential consequences of human failure**	**Existing human error control measures**	**To prevent the human failure**	**To reduce the consequences or improve the recovery potential**	**Comments, references, questions etc**

Annex 2

Classification of Human Errors

Planning errors

P1 Plan omitted in error
P2 Plan incorrect in error
P3 Plan omitted deliberately
P4 Plan incorrect deliberately

Action Errors

A1 Operation too long / short
A2 Operation mistimed
A3 Operation in wrong direction
A4 Operation too little / too much
A5 Operation too fast / too slow
A6 Misalign
A7 Right operation on wrong object
A8 Wrong operation on right object
A9 Operation omitted
A10 Operation incomplete
A11 Operation too early / late

Checking Errors

C1 Check omitted
C2 Check incomplete
C3 Right check on wrong object
C4 Wrong check on right object
C5 Check too early / late

Information Retrieval Errors

R1 Information not obtained
R2 Wrong information obtained
R3 Information retrieval incomplete
R4 Information incorrectly interpreted

Information Communication Errors

I1 Information not communicated
I2 Wrong information communicated
I3 Information communication incomplete
I4 Information communication unclear

Selection errors

S1 Selection omitted
S2 Wrong selection made