HAZARD IDENTIFICATION

Introduction

The requirement to formally identify and assess hazards, identify control and protection features and demonstrate their suitability forms the basis of any safety justification. This concept originated in the nuclear industry and became incorporated in Health and Safety legislation via the Nuclear Installations Act (1965). It is also embedded in subsequent Health and Safety legislation, including:

- Health and Safety at Work Act (1974).
- Ionising Radiation Regulations (1999).
- Radiation (Emergency Preparedness and Public Information) Regulations (2001).
- Control of Substances Hazardous to Health Regulations (2002).
- Management of Health and Safety at Work Regulations (1999).

The Hazard Identification (*HAZID*) process is an integral part of the overall safety case and provides a 'front-end' analysis technique to inform the design and/or safety engineer of the range of design basis events against which the facility should be designed. This is best achieved using a structured method of identifying fault based hazards in each area, which may range from a compare and contrast against the existing safety case assumptions to full HAZOPs. The first step in the HAZID process is to use a comprehensive, systematic and auditable method ensuring that the findings are recorded for future reference. More specifically, it enables a comprehensive set of Postulated Initiating Events (*PIE*) to be identified, which are subsequently grouped as part of the development of the Fault Schedule.

It is important to recognise that a PIE is an event identified during the HAZID process as being capable of leading to an Anticipated Operational Occurrence (*AOO*) or other, less frequent accident conditions. It is not an accident in itself, but the event that initiates a sequence that leads to an operational occurrence, a design basis accident or a severe accident, depending on additional failures that occur. It is defined at the point at which protective safety measures would be required to operate i.e. Safety Mechanisms, Devices and Circuits (*SMDCs*).

The following activities are identified as essential in the execution of the HAZID process:

- The scope must be carefully defined.
- The safety case boundaries and interfaces must be carefully defined.
- Appropriate HAZID techniques must be identified and applied.
- Other stakeholder involvement must be established if used as a tool for the identification of conventional hazards (i.e. non-nuclear / radiological faults and hazards).
- Suitably Qualified and Experienced Personnel (*SQEP*) must be identified to participate in the study process.
- Appropriate documentation must be prepared in advance of the HAZID for circulation by the study secretary.

It is a fundamental principle that, to ensure an effective HAZID process is undertaken, the persons involved are specialists in their particular field. This includes persons who are familiar with the design and operation of the facility or the proposed design and/or modification. This is instrumental in gaining confidence that the HAZID is complete and therefore assured as an appropriate input into the safety case. Furthermore, the persons involved in the study teams shall be SQEP in the particular HAZID technique(s), though the level of SQEP required varies for each of the techniques (dependent upon the significance).

Additional Information & Guidance

- Nuclear Installations Act, 1965.
- HSE, Health and Safety at Work Act (HSWA), 1974.
- Ionising Radiation Regulations, 1999.
- HSE, Radiation (Emergency Preparedness and Public Information) Regulations (REPPIR), 2019.
- HSE, Control of Substances Hazardous to Health Regulations, 2002.
- HSE, The Management of Health and Safety at Work Regulations, 1999.
- http://www.hse.gov.uk/risk/identify-the-hazards.htm
- https://www-pub.iaea.org › MTCD › Publications
- https://www.icheme.org