

IGEM/G/7
Communication 1655

Risk assessment techniques



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SECTION 1 : INTRODUCTION

- 1.1 This Standard supersedes IGE/SR/24, Communication 1655, which is obsolete.
- 1.2 This Standard has been drafted by an Institution of Gas Engineers and Managers (IGEM) Panel, appointed by IGEM's Gas Transmission and Distribution Committee, and has been approved by IGEM's Technical Co-ordinating Committee on behalf of the Council of IGEM.
- 1.3 Risk assessment is the assessment of health, safety and environmental aspects of a particular plant, process or activity (or part thereof) carried out using an established or specified format. Some assessments are specific requirements of health and safety legislation, for example the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR), while others are carried out in order to assist in the management of safety and in discharging general legal responsibilities.

Note: Risk is defined as:

Likelihood of a specified undesired event occurring within a specified period or in specified circumstances, expressed as a frequency (rate of occurrence) or as a probability depending on the circumstances (see IGE/G/4).

- 1.4 This Standard covers the techniques used in risk assessment. The requirements provided are laid out in a general format. Specific problems may need more detailed treatment and the Standard provides the basis on which detailed procedures, appropriate to the circumstances, can be written.
- 1.5 It is widely accepted that the majority of accidents in industry are in some measure attributable to human as well as technical factors in the sense that actions by people initiated or contributed to the accidents, or people might have acted better to avert them.

It is therefore necessary to give proper consideration to the management of these human factors and the control of risk. To assist in this, it is recommended that due cognisance should be taken of HSG48 and HSG65.

- 1.6 The primary responsibility for compliance with legal duties rests with the employer. The fact that certain employees, for example "responsible engineers", are allowed to exercise their professional judgement does not allow employers to abrogate these primary responsibilities. Employers must:
- have done everything to ensure, so far as is reasonably practicable, that there are no better protective measures that can be taken other than relying on the exercise of professional judgement by "responsible engineers"
 - have done everything to ensure, so far as is reasonably practicable, that "responsible engineers" have the skills, training, experience and personal qualities necessary for the proper exercise of professional judgement
 - have systems and procedures in place to ensure that the exercise of professional judgement by "responsible engineers" is subject to appropriate monitoring and review
 - not require "responsible engineers" to undertake tasks which would necessitate the exercise of professional judgement that is not within their competence. There should be written procedures defining the extent to which "responsible engineers" can exercise their professional judgement. When "responsible engineers" are asked to undertake tasks which deviate from this they should refer the matter for higher review.

- 1.7 This Standard makes use of the terms “should”, “shall” and “must” when prescribing particular requirements. Notwithstanding Sub-Section 1.8:
- the term “should” prescribes a procedure which, it is intended, will be complied with unless, after prior consideration, deviation is considered to be acceptable
 - the term “shall” prescribes a procedure which, it is intended, will be complied with in full and without deviation
 - the term “must” identifies a requirement by law in Great Britain (GB) at the time of publication

Such terms may have different meanings when used in legislation, or Health and Safety Executive (HSE) Approved Code of Practice (ACoPs) or guidance, and reference needs to be made to such statutory legislation or official guidance for information on legal obligations.

- 1.8 Notwithstanding Sub-Section 1.7, this Standard does not attempt to make the use of any method or specification obligatory against the judgement of the responsible engineer. Where new and better techniques are developed and proved, they are to be adopted without waiting for modification to the Standard. Amendments will be issued when necessary and their publication will be announced in the Journal of IGEM and elsewhere as appropriate.

- 1.9 Requests for interpretation of this Standard in relation to matters within its scope, but not precisely covered by the current text, are to be addressed in writing to Technical Services, The Institution of Gas Engineers and Managers, IGEM House, High Street, Kegworth, Derbyshire, DE74 2DA or by e-mail to technical@igem.org.uk and will be submitted to the relevant Committee for consideration and advice, but in the context that the final responsibility is that of the engineer concerned. If any advice is given by or on behalf of IGEM, this does not relieve the responsible engineer of any of his or her obligations.

- 1.10 This Standard was published in March 2016.

SECTION 2 : SCOPE

2.1 This Standard covers hazard identification and includes assessing the consequences of failure along with risk assessment techniques in general and specifically addresses their application in the Natural Gas (NG) and Liquefied Petroleum Gas (LPG) gas industries.

2.2 This Standard covers aspects of risk assessments related to health, safety and the environment.

Note: Specific environmental risk assessment techniques are not detailed in this document, but the philosophy may be applied.

2.3 This Standard covers activities on systems associated with on-shore storage, transmission, distribution and utilisation of NG and LPG throughout their life cycle; that is design, construction, commissioning, operation, maintenance, decommissioning and demolition.

Note: The principles may be applied to off-shore plant and equipment but specific requirements, for example escape and evacuation plans, are not covered.

2.4 This Standard embraces:

- hazards from assets
- management of the risks, including;
 - risk management
 - risk assessment.
- risk assessment techniques, including;
 - hazard identification
 - risk analysis
 - calculation of the risk
 - risk evaluation.
- applying risk assessment techniques in;
 - design
 - construction
 - commissioning
 - operation
 - decommissioning
 - demolition.
- causes of failure, protective measures and consequences of failure by asset types
- monitoring and review, including;
 - process safety key performance indicators (KPI)(s)
 - safety audits
 - technical surveys
 - risk registers
 - investigating accidents and incidents
 - acting on lessons learnt.

2.5 This Standard provides general rather than detailed requirements, gives an indication of who might be expected to carry out assessments and provides information for engineers and managers on where more detailed guidance can be found.

Note: Although the principles of controlling both safety, health and environmental risks are the same, their application often requires a different approach because of the nature of those risks. In particular, the identification of "safety" hazards often will necessitate the input of different specialist expertise compared to "health and environmental" hazards.

2.6 Pressures quoted are gauge pressures unless otherwise stated.

2.7 Italicised text is informative and does not represent formal requirements.

2.8 Appendices are informative and do not represent formal requirements unless specifically referenced in the main sections via the prescriptive terms "should", "shall", or "must".