

Safety Corner

What is Individual Risk?

The risk of an accident sequence leading to an adverse consequence, such as fatalities within a defined exposed group of people, is the product of the number of fatalities and the likelihood of reaching such consequence.

Assessment of the likelihood includes consideration of the occurrence frequency of the initiating event, the probability of failures of safety barriers safeguarding the population from the consequence, the probability of states and events that can alter the outcome of the accident sequence, and the uncertainties associated with the risk analysis. This risk is also known as the collective risk of the accident sequence as it accounts for the number of expected fatalities collectively within the population.

By contrast, the averaged risk to a person within the population is called the individual risk, which is the collective risk divided by the size of the exposed group. Individual risk is also defined as the incremental risk that an individual within an exposed group may be expected to sustain a given level of harm from the realisation of a specified hazard. Application of this definition is commonly used to set the risk acceptability of a system with collective risk being used to show whether the system risk is acceptable.

As an example, a decision maker has decided that an individual risk level lower than 1.0×10^{-5} fatalities per year per person is considered acceptable for a new hazardous installation to operate near an existing community of 100,000 people. A risk assessment would then be conducted to assess the collective risk due to postulated accidents related to the installation. The risk would be considered acceptable if the collective risk is assessed to be less than one fatality per year, which is 1.0×10^{-5} fatalities per year per person \times 100,000 persons. In a full scope risk assessment, decision maker must also consider the societal risk, which reflects the likelihood of accidents involving multiple fatalities, and the uncertainties associated with the assessment.

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