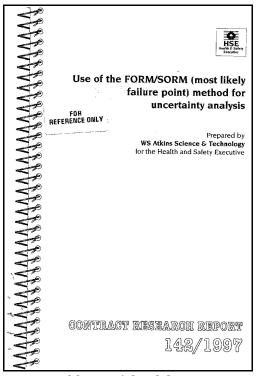

Код: 10469

Use of the FORM/SORm (most likely failure point) method for uncertainy analysis

Издательство WS Atkins Sclence & Technology

115 стр; формат: 30 x 21 см; библиографический список: 20 единиц.

The FORM/SORM method (alternatively referred to here as the most likely failure point method) has been used to perform uncertainty analysis for a range of hazard consequence calculations, namely: chlorine release (toxic dose); BLEVE fireball (thermal dose); BLEVE blast (overpressure) and VCE blast (overpressure).

Realistic semi-empirical models, such as those which would be employed in a practical hazard/risk analysis, were used in all cases.

The method was used to calculate the probability P_f that the estimate of hazard consequence, calculated on the basis of best-estimate data to be below an appropriate safety limit, would actually exceed that limit when data uncertainties are taken into account.

In each case, the method produced its estimate of P_f within roughly 10N-20N evaluations of the consequence model, where N is the number of input data items represented as uncertain. Values of P_f were within 10%-20% of values obtained using a benchmark Monte-Carlo calculation, which was much less efficient.

Numerical experiments were carried out to investigate the accuracy of the sensitivity estimates produced by the method, ie the sensitivity of P_f to a change in median value of each variable, the sensitivity of P_f to a change in standard deviation of each variable and the effect on P_f of replacing uncertain variables by fixed values.

The estimates were shown to be accurate within a factor of about 2. This was concluded to be more than adequate for the purposes of screening out unimportant variables and of identifying areas where calculated values of P_f (which in many cases can be identified with risk) could be reduced by improved data accuracy.

A preliminary investigation was carried out into the representation of quantities used to characterise weather conditions (wind speed, wind direction and Pasquill stability category) by continuous distributions rather than the discrete distributions of conventional quantified risk analysis. For the chlorine release calculations, the method correctly identified that calm conditions, though relatively rare, can strongly influence risk because of the high doses they give rise to.

This report and the work it describes were funded by the Health and Safety Executive. Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.

Ключевые слова:

Содержание.