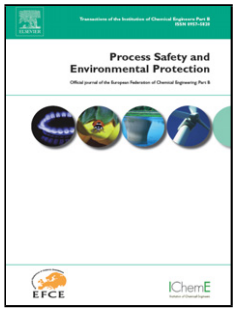

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Major Accident Modelling Using Spare Data

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Abstract: In the field of risk and reliability analysis, the information available to acquire probabilities is usually insufficient (i.e. scarce, little). Utilizing a variety of information sources introduces many uncertainties associated with risk estimation. This is an obstacle in the prediction of major accidents which have significant consequences for human life and the environment, in addition to incurring financial losses. In order to get reasonable results and to support decision making in a cost effective manner, there is a need to aggregate the relevant data from different regions, operational conditions and different sectors (e.g. chemical, nuclear or mining). In this paper, a methodology is developed considering Hierarchical Bayesian Analysis (HBA) as a robust technique for event frequency estimation. Here, HBA is able to treat source-to-source uncertainty among the aggregated data for each event and provide a precise value for the parameter of interest (e.g. failure rate, probability or time to failure). The estimated event's parameter is reintegrated via probabilistic modeling techniques such as Bowtie analysis to estimate the probability of major accidents. The application of the proposed methodology to risk analysis is illustrated using a case study of an offshore major