

## **Abstract :**

This article aims to maximize the protective layers by the dynamic risk assessment within the facility Chemical/Petrochemical. This assessment is based on two necessary parts (Labeau et al. Reliab Eng Syst Saf 68:219–254, [2000](#)): The first part concerns the deterministic analysis which is based on the modeling of a dynamic process to determine changes in process parameters, and the other part concerns the probabilistic analysis, which aims to evaluate accidents consequences by calculating the excess damage frequency during different scenarios. In this paper, we have taken, as an application case, accident scenarios at Bhopal (Malcolm Advances in Nuclear Science and Technology, [2002](#), 1–45) and by the exploitation of performances of thermo hydraulic “GasTemp” and probabilistic “SCAIS” codes, originally applied in nuclear industry, we could simulate the accidental sequences with the calculation of excess damage frequency.