

Health, Safety and Environmental Management in Petroleum and offshore Engineering

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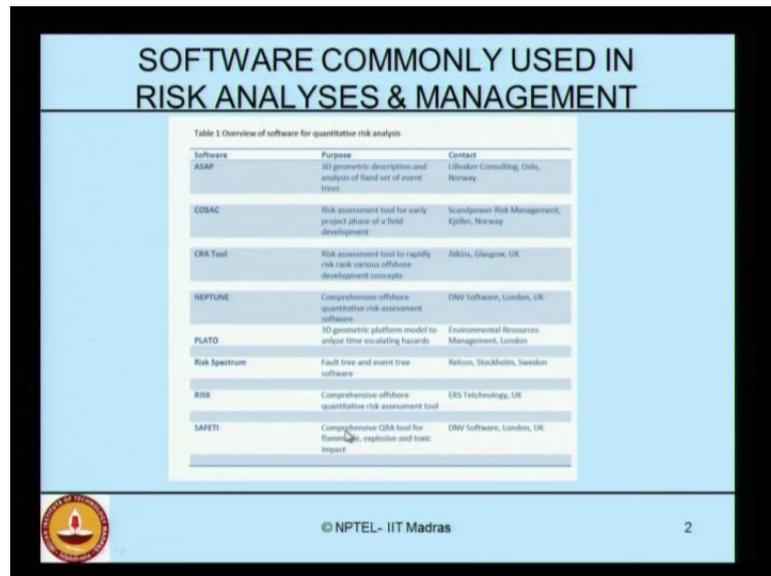
Module No. # 04

Lecture No. # 04

Software used in HSE – an over view

In module 4 - in lecture 4, we will discuss about important software that have been used in HSE. We will look at the very brief overview or different kind of software being used for health safety and environmental management.

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The slide displays a table titled "Table 1 Overview of software for quantitative risk analysis". The table lists various software tools, their purposes, and the contact information for their developers. The software listed includes ASAP, COSAC, CRA Tool, NEPTUNE, PLATO, Risk Spectrum, RISE, and SAFETI.

Software	Purpose	Contact
ASAP	3D geometric description and analysis of fixed set of event trees	Ullsaker Consulting, Oslo, Norway
COSAC	Risk assessment tool for early project phase of a field development	Scandpower Risk Management, Kjeller, Norway
CRA Tool	Risk assessment tool to rapidly rank various offshore development concepts	Atkins, Glasgow, UK
NEPTUNE	Comprehensive offshore quantitative risk assessment software	DNV Software, London, UK
PLATO	3D geometric platform model to analyze time escalating hazards	Environmental Resources Management, London
Risk Spectrum	Fault tree and event tree software	Reticon, Stockholm, Sweden
RISE	Comprehensive offshore quantitative risk assessment tool	ERS Technology, UK
SAFETI	Comprehensive QRA tool for flammable, explosive and toxic impact	DNV Software, London, UK

Let us look at the software that is commonly used in risk analysis and management. In the category of software being used for risk analysis and management, let us talk about the list of software that has being used for quantitative risk analysis which we call as QRA. Ladies and gentlemen, risk is associated with the probabilistic tool; you can always associate the probability of occurrence of any risk with the specific number. So, when we talk about any kind of risk assessment on a mathematical model; you will realize that software is mandatory to understand and to rigorous mathematical analysis

based on probability theory. Some of the software what we list here are very important and interesting, and above all they are very easy to make you to understand, how to perform a QRA.

ASAP is one software which talks about 3D geometric description and analysis of fixed set of event trees. In this software, you must first identify different fixed set of event trees and then within the set of event trees associated for a given problem, you can do a detail geometric analysis for the event trees. It is given by Lilleaker consulting, Oslo, Norway. The second software in the list is COSAC, which can do risk assessment for early project phase of a field development. This is prepared by scan power risk management Kjeller, Norway. The third on the list is CRA tool, which basically is developed by Atkins, Glasgow, United Kingdom. It can do risk assessment to rapidly rank the risk of various offshore development concepts. So, this can be very powerful tool to do a QRA on the development stage.

NEPTUNE and PLATO are very interesting software being used for comprehensive offshore QRA. One can do on risk assessment; other can do on geometric platform modeling itself. NEPTUNE is developed by DNV software London, UK; whereas, PLATO is developed by environmental resource management London. You can also use what we call risk spectrum, which can do a detail FTA and ETA for a given problem developed by Relcon, Sweden. For doing a prospective risk analysis, you can use either risk or SAFETI, SAFETI is developed by DNV, UK; whereas, risk is developed by ERS technology, UK. Both of them are comprehensive offshore QRA tools, which is being used one difference between SAFETI compare to risk is that SAFETI can also give you a exposure to flammable, explosive and toxic impact on a comprehensive QRA.

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SOFTWARE COMMONLY USED IN RISK ANALYSES & MANAGEMENT

Table 2 Overview of software for scenario and probability risk analysis

Software	Purpose	Contact
BlowFAM	Evaluation of Blow out risk during specific well operations	Scanpower, Kjeller, Norway
COLLIDE	Analysis of collision risk between vessels and platforms	Safetec Nordic, Trondheim, Norway
LEAK	Calculation of frequency of leaks at an installation	DNV software, London, UK
CARA-Fault Tree	Fault tree analysis and construction	Safetec Nordic, Trondheim, Norway

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If you look at the software in the scenario used for probabilistic risk analysis; the risk analysis can also be done on a probabilistic mode. If you look for the software on the probability risk analysis then here are the software which are commonly used BlowFAM, COLLIDE, LEAK and CARA-Fault tree. BlowFAM developed by scan power Norway is used essentially for evaluation of blowout risk during specific well operations. COLLIDE developed by Safetec, Norway, is used for analyzing collision risk between the vessels and the platform is a very interesting area of application of risk analysis. LEAK developed by DNV, London, is used for calculating frequency of leaks at any installation of your choice. CARA-Fault tree thus detail fault tree analysis and construction developed by Safetec, Norway.

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Table 3 Overview of QRA software for consequence analysis

Software	Purpose	Contact
FIREX	Empirical prediction of main fire characteristics and response	Century Dynamics, Horseham, UK
FLACS	Explosion simulation	Scandpower Risk Management, Kjeller, Norway

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If we look at the QRA software for consequence analysis alone, then you have got FIREX and FLACS in position. FIREX developed by Century Dynamics, UK deals with empirical prediction of main fire characteristics and the response; whereas, FLACS is used for explosion simulation which is developed by Scandpower risk management, Norway.

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Table 4 Overview of Qualitative risk analysis

Software	Purpose	Contact
PHA-Pro	Hazard recording and reporting tool, FMEA, What-If/Check list etc	DNV Software, London, UK
Sabaton	FMEA and FMECA	Safetec Nordic, Trondheim, Norway

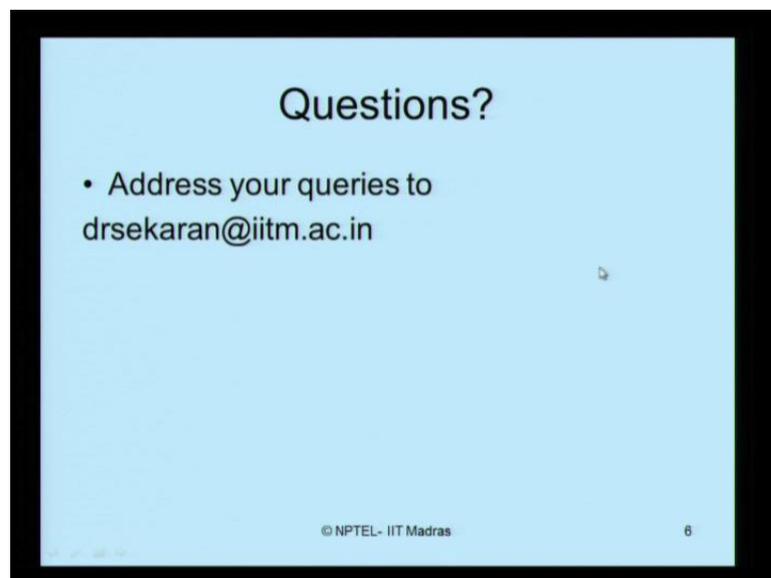
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Lastly, if you look at the overview of qualitative risk analysis, so far we have been talking about the quantitative risk analysis. If you look at the qualitative risk analysis

then most commonly used software is, what we call as a PHA-Pro developed by DNV, UK. Basically, it deals with hazard recording and reporting tool, FMEA, WHAT-If and checklist analysis etcetera. FMEA and FMECA developed by Safetec, Norway; it can also be used through Sabaton.

Ladies and gentlemen, the list of the software what we discussed here are only examples of classified software, in the recent past for academic teaching. Other than this nevertheless there are capable software available in the market, which are being used in house by many design organizations, for computing risk analysis and management in oil and gas industry.

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If you have any questions on module 4 on all the lectures, kindly address your queries to my email id, I will be happy to reply you back when and where you have any confusion.

Thank you.