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Continual Quantitative Risk Assessment

What is Continual Quantitative Risk Assessment (CQRA)?

A chemical process is a complex and dynamic system such that the real-time safety level of the system or plant is not invariable but changes continually. CQRA is a quantitative risk assessment strategy integrated with continuously updated reliability or availability information to estimate the real-time safety level of the system or plant. Through this technology, we can not only study the system or plant risk in history, but also monitor the present risk level, and predict future risk levels. In doing this, CQRA is applied as an ongoing model to guide implementation and continual updating of safety program components, such as risk-based and cost-effective monitoring, testing, maintenance, reliability assessment, component replacement timing, shutdown times, and timing of other operational decisions, such as selection of minimal reliability criteria during maintenance shutdowns.

Advantages of CQRA

- Mitigates hazards at earlier stages.
- Aids maintenance scheduling.
- Avoids emergent overhauls.
- Develops inspection policy.
- Is performed more automatically.
- Provides a cost-effective foundation on which to base operational decisions.

If you don't continually update your risk assessment results, they will be like books collecting dust on the shelf.

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Mathematical models have been developed to update the QRA result using current reliability and availability data. The CQRA update takes into account the criticality information of importance of a component on the overall risk. Meanwhile, an update assists in selection of the most cost-effective components based on the real life dynamics of component performance deterioration within the system and monitored using this approach. The monitoring can be a combination of automatic data acquisition and manual monitoring. Monte Carlo Simulation algorithms can be used for the uncertainty analysis, and help to analyze the most significant-effective components for safety-level decisions.

For more information, please visit our web page at: <http://process-safety.tamu.edu>