What is the HRA Calculator?

The EPRI HRA Calculator® is a software tool designed to facilitate a standardized approach to human reliability analysis (HRA). Wide varieties of methodologies are used for HRA in probabilistic risk assessment (PRA). The results from these differing methodologies can vary considerably when comparing results between similar plants, or even when comparing the actions within the same plant that are evaluated by different analysts.

Objectives

The HRA/PRA Tools User Group facilitates standardization of the HRA process through development of the HRA Calculator and modeling guidelines. The primary objective of HRA/PRA Tools User Group is to assist the industry in converging on common HRA methods to enable different analysts to obtain comparable results with similar inputs. Specifically:

- Allow HRA models to produce consistent, realistic results through development of a software tool,
- Provide the capability to electronically interface HRA results through the EPRI R&R Workstation for input to PRA Tools (CAFTA, WinNUPRA, Riskman, etc.), and
- Achieve a common industry approach that will assure 'high marks' in an Industry Peer Review, consistent with the ASME/ANS PRA Standard.

Benefits

Membership in the HRA/PRA Tools User’s Group provides the following benefits:

- **Software – HRA Calculator**
  - Software updates during period of membership
  - Satisfies HRA criteria of the ASME/ANS PRA Standard; provides a checklist of the technical elements of an HRA.
  - Automated reports document the analysis.
  - Traceable analysis facilitates review.
- **Training and Support**
  - Training available on HRA Calculator twice a year
  - User technical support via e-mail and phone
  - Access to HRA Knowledgebase
- **Methods**
  - Application guidance for current methods
  - Research on new HRA methods (e.g., External Events HRA, Fire HRA, etc.)
- **Other**
  - Participation in the direction of the software specifications and other research priorities
  - Interaction with other members and exchange of experience
**HRA Calculator Modules & Methods**

The EPRI *HRA Calculator* includes modules for pre-initiator, post-initiator and dependency analysis. The pre-initiator module can encapsulate the procedure review and historical events review through which pre-initiator human failure events (HFEs) are identified. For the quantification of pre-initiator HFEs, the user can select ASEP or THERP.

The post-initiator module functions on the basis that each post-initiator HFE comprises a cognitive error and an execution error. The cognitive error can be analyzed using the EPRI CBDTM and HCR/ORE, THERP or SPAR-H methods. The execution error is analyzed using THERP. The user can analyze an HFE using any or all of the applicable methods.

The dependency analysis module identifies combinations of HFEs in cutsets from WinNUPRA or CAFTA, and Riskman sequence data that can be imported directly. The user can specify to analyze combinations of pre-initiators, post-initiators or both pre and post-initiators. The HFE combinations and associated cutsets can be sorted in order of importance to focus the analysis and optimize resources. Basic dependency rules are applied to the HFE combinations to calculate conditional and joint human error probabilities (HEPs).

**Interface with other Software**

The EPRI *HRA Calculator* is designed to electronically interface with the Risk & Reliability workstation (CAFTA), WinNUPRA and parts of Riskman. Interfaces with other PSA software can be developed, as required by users. Generic software interfaces are also provided through the exporting of data to comma separated (CSV) text files, MS Excel, and MS Word.

**Who uses the EPRI HRA Calculator?**

The EPRI *HRA Calculator* is used by members of the EPRI HRA/PRA Tools Users Group, which includes most US utilities, the US NRC, and various international utilities. Other organizations include vendors and consultants.

**Pricing Information**

License of the EPRI *HRA Calculator* requires membership in the HRA/PRA Tools User’s Group, which is included as part of the base EPRI membership. For non-EPRI members, HRA User Group membership can be purchased separately.

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