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Generalized Safety Equation: A Concept

A proposed concept, based on a simple and straightforward mathematical probability model, attempts to provide a means of defining the relationship between safety and reliability, as well as measuring personnel safety and evaluating equipment safety.

The probability function P(x) is defined as the total probability that a specific safety category, x, will not sustain injury or damage in excess of a defined degree. The confidence placed in P(x) is directly related to the thoroughness with which the hazards are identified and the effects on the safety category are analyzed. When the desired numerical value of P(x) cannot be achieved solely through reliability, a safety system must be incorporated. However, the safety system need not prevent injury or damage from all known hazards. It is sufficient that injury or damage be prevented only for enough hazards to achieve the desired P(x) value.

Using this technique, safety systems can be hypothesized to cope with any single risk or combination of risks. The cost and effectiveness of alternate hypothetical safety systems can be estimated and used as a basis for the final system design. However, effectiveness equations should include all categories of interest. For example, if a product's safety system is effective for the public, it will invariably be beneficial to the safety of public property; conversely, a system which prevents equipment damage generally contributes to the safety of operating personnel.

Note:

Requests for further information may be directed to:

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No patent action is contemplated by NASA.

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Category 06