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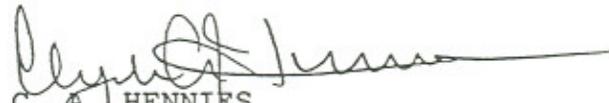
26 March 1991

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Application of Hazard Management

1. System safety risk management is a relatively new concept within Army system acquisitions. Development of the mechanics and criteria to capitalize on this concept for the overall benefit to the Army is a dynamic process and requires "real time" communication among all concerned with its application. In that regard, the purpose of this memorandum is to provide Army materiel acquisition managers and safety personnel information regarding criteria for management of hazards.
2. "Residual Risk Criteria Definition and Hazard Management Criteria" (enclosure 1) addresses the definition of residual hazard, and provides guidance regarding hazard identification, and hazard closeout on the Hazard Tracking List. Enclosure 2 is a graphic representation of a "hazard life cycle" depicting the total hazard management process.
3. The criteria and definition discussed in these enclosures will be included in the upcoming revision to DA PAM 385-16 and AR 385-16.
4. Questions or comments regarding this action should be directed to Dr. James E. Hicks or Mr. Billy H. Adams, CSSC-SE, AV 558-3943.

2 Encls

  
C. A. HENNIES  
Brigadier General, GS  
Director of Army Safety

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## Residual Risk Criteria Definition and Hazard Management Criteria

System safety risk management is a relatively new concept within Army system acquisitions. Development of the mechanics and criteria to capitalize on this concept for the overall benefit to the Army is a dynamic process and requires "real time" communication among all concerned with its application. To ensure a common understanding of the latest information in this area, the following addresses the definition of residual hazard, information on "how a hazard is born," and guidance regarding hazard closure recommendations and hazard closeout on the hazard tracking system. Enclosure 2 provides a graphic representation of a "hazard life cycle" depicting the total hazard management process as discussed below.

**Definition.** Because residual hazard is a term used extensively in system safety documentation and risk management discussions with acquisition managers and associated agencies, it is necessary to ensure a consistent understanding throughout the system safety and acquisition community. Therefore, the following definition, developed by the Department of the Army System Safety Coordination Panel-Technical Subpanel, is provided.

**Residual Hazard.** Hazards which cannot be eliminated by design shall be considered residual hazards unless the managing activity (MA) agrees that the design meets or exceeds all applicable consensus and/or military design standards (or is verified through testing, where standards do not exist) and that the environment in which it will operate is consistent with that envisioned by the design. For example, any pressure vessel presents a hazard; however, if it has been designed to meet or exceed ASME, AMSI, and MIL-STD-1522, and it is used in an environment appropriate to these standards, then it will not be considered a residual hazard.

**Identification.** A system safety hazard is identified or "born" for a system in a variety of ways. At first, it may be identified as a potential hazard because the exact system configuration and operational factors may not be sufficiently known to identify it as definitely applicable to the system. The sources of these potential or real hazards might be lessons learned, hazards analyses, accident experience, technology base development data, operational experience, or information from nonmilitary usage of similar technology. These hazards include any issues which have the potential to result in materiel losses or injury (both accidental or certain health) to any personnel. In any case, once a real or potential hazard is identified, it is handled and treated

*Encl 1*

as a real hazard during the system safety activities to manage the system safety hazards. It will be formally considered, tracked, reviewed, and closed out only when actions described below for hazard closeout are formally completed.

**Hazard Closeout.** The system safety working group (SSWG) plays the key role in making recommendations to the Program Manager on specific hazard/risk issues and initiating the coordinating process for risk decisions. Questions pertaining to when is it appropriate to initiate a hazard closure recommendation and officially close a hazard on a Hazard Tracking List (HTL) have become issues during many recent SSWG meetings. Four methods or approaches exist for recommending a hazard close-out: not applicable to the system, design, procedures, and risk management. The criteria for those approaches as presented below are intended for use in determining the appropriateness/timeliness for submitting a hazard closure recommendation and subsequent closeout on the HTL.

a. Not Applicable to the System. The goal of this approach is to identify those potential hazards which are not applicable to the system in the acquisition process. Closeout by this method requires a thorough evaluation of the hazard relative to the system design and the planned or potential usage in the operational, training, maintenance, storage, transportation, or disposal environment.

b. Design Approach. The goal of this approach is to implement design changes that would result in the elimination of the hazard or minimization and control of any residual hazards.

- (1) Identification/definition of the root cause of the hazard.
- (2) A design eliminating or controlling that root cause.
- (3) Successful completion of an adequate test program to verify fix (w/favorable results).
- (4) Approved funding for fix.
- (5) Adequate action plan for installation of design fix on fleet.
  - (a) Production and retrofit
  - (b) Follow-up plan for monitoring corrective action implementation status

(6) Follow-up plan for reliability of fix in operational environment.

c. Procedures Approach. The goal of this approach is the identification and implementation of procedures that reduce the probability of the hazard and the acceptance of any residual risk.

(1) Identification/definition of the root cause of the hazard.

(2) Development of procedures that would reduce the probability of the hazard.

(3) Successful completion of an adequate test program to verify the procedures.

(4) Identification of the residual risk associated the procedural fix. (Procedural fixes generally reduce the probability but do not eliminate the hazard entirely and do not affect the hazard severity.)

(5) Development and coordination of a system safety risk assessment (SSRA) for the residual risk.

(6) Decision by the appropriate decision authority to accept the residual risk.

(7) Publication of the procedures in the appropriate manuals, etc.

(8) Follow-up plan to verify anticipated/assigned hazard severity/probability and adequacy of the fix.

d. Risk Management Approach. The goal of this approach is the acceptance of the risk associated with a hazard that has not been controlled, by the appropriate decision authority.

(1) Identification/definition of the root cause of a residual hazard.

(2) The conduct of studies to identify potential design options, if available, to eliminate the hazard and the associated program cost.

(3) Appropriate rationale for not eliminating the hazard.

(4) Identification of the residual risk associated with the hazard.

(5) Development and coordination of a SSRA for the hazard.

(6) Decision by the appropriate decision authority to accept the residual risk associated with the hazard.

(7) Follow-up plan to verify anticipated/assigned hazard severity/probability.

e. Official Closure. A hazard may be officially closed out on the HTL only when the above criteria have been met including the addressing of the residual risk. The closure of a hazard does not eliminate the requirement to retain the hazard in the HTL. The hazard and its disposition should always be retained to provide future program visibility and an audit trail of the actions. Also, the SSWG has the responsibility of conducting periodic reviews of the closed out actions, including implementation status and mishap data to determine if further action is required.

Life-Cycle of a Hazard

