MIL-STD-882E:
Hazard Tracking System Requirements and Options

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Agenda

▸ Policy

▸ MIL-STD-882E

   – Requires Hazard Documentation and Tracking

   – Closed-loop Hazard Tracking System – Required Data Elements

   – Optional Task 106 Hazard Tracking System - Minimum Data Elements

   – Optional Task 108 Hazardous Materials Mgt. Plan - Minimum Data Elements HAZMAT Tracking and Reporting

   – Optional Task 210 Environmental Hazard Analysis - Minimum Data Elements for HAZMATs and Pollutant Generation

▸ Summary

Policy: DoD Instruction 5000.02, E12.6

▶ The Program Manager (PM) must

– Use the methodology in MIL-STD-882D (now E), "DoD Standard Practice System Safety"

– Identify ESOH risks and their status

– Describe the **method for tracking hazards** throughout the life cycle of the system

– Identify hazardous materials, wastes, and pollutants (discharges/emissions/noise) associated with the system

MIL-STD-882E: Requires Hazard Documentation and Tracking

Eight Mandatory Elements of the System Safety Process in Section 4

1. **Document** the system safety approach

2. Identify and **document** hazards

3. Assess and **document** risk

4. Identify and **document** risk mitigation measures

5. Reduce risk

6. Verify, validate, and **document** risk reduction

7. Accept risk and **document**

8. Manage life cycle risk

MIL-STD-882E: Closed-loop Hazard Tracking System – Required Data Elements

Element 1- Document the System Safety Approach

▶ Document hazards with a closed-loop Hazard Tracking System (HTS)

▶ The HTS will include, as a minimum, the following data elements:

1. Identified hazards
2. Associated mishaps *(potential and actual)*
3. Risk assessments *(initial, target(s), and event(s))*
4. Identified risk mitigation measures
5. Selected mitigation measures
6. Hazard status
7. Verification of risk reductions
8. Risk acceptances *(at the appropriate level)*

▶ Both the Contractor and Government shall have access to the HTS with appropriate controls on data management

▶ The Government shall receive and retain "government purpose rights" of all the data recorded in the HTS and any other items (i.e., studies, analyses, test data, notes or similar data) generated in the performance of the contract with respect to the HTS

MIL-STD-882E: Optional Task 106 Hazard Tracking System - Minimum Data Elements

Same as Section 4

1. Identified hazard
2. Associated mishaps
3a. Initial risk assessment code
3b. Target risk assessment code(s)
3c. Event risk assessment code(s)
4. Identified risk mitigation measures
5. Selected risk mitigation measures
6. Hazard status
7. Verification of risk reduction and validation method
8. Record of risk acceptance(s)

Additional from Task 106

9. System
10. Subsystem (if applicable)
11. Applicability (version specific hardware designs or software releases)
12. Requirements references
13. System mode
14. Causal factor
15. Effects
16. Action person(s) and organizational element
17. Hazard management log
18. **Hazardous Material data elements as specified by the Government**

MIL-STD-882E: Optional Task 108 Hazardous Materials Mgt. Plan - Minimum Data Elements for HAZMAT Tracking and Reporting

1. HAZMAT item or substance name

2. HAZMAT Category (prohibited, restricted, or tracked)

3. Special Material Content Code (SMCC) as designated in DoD 4100.39-M, Volume 10

4. Location of HAZMAT within the system

5. Quantity of HAZMAT within the system with traceability, as applicable, to version specific hardware designs

6. Application, process, or activity whereby quantities of HAZMAT are embedded in the system, or used during operations, and support of the system

7. Reasonably anticipated HAZMAT (whether categorized or not) generated during the system's life-cycle (e.g., installation, Government test and evaluation, normal use, and maintenance or repair of the system)

8. Reasonably anticipated HAZMAT (whether categorized or not) generated during mishap occurrence

9. Special HAZMAT control, training, handling measures, and Personal Protective Equipment (PPE) needed, including provision of required Material Safety Data Sheets (MSDSs)

These HAZMAT-related data elements are in addition to the minimum data elements in Section 4

MIL-STD-882E: Optional Task 210 Environmental Hazard Analysis - Minimum Data Elements for HAZMATs and Pollutant Generation

▸ If hazards are associated with Hazardous Materials (HAZMAT), the following minimum data elements will be tracked and reported:

– Same as those required by Optional Task 108 Hazardous Materials Management Plan (see slide 6)

▸ If hazards are associated with pollutant (including noise) generation, the following additional pollutant data elements should be included in the HTS along with the HAZMAT data elements:

1. Identification of the specific pollutants associated with system operations and maintenance activities

2. Sources of emission for each pollutant

3. Quantity and magnitude or rate of pollution generated during normal operation and maintenance as specified by the program office

4. Special emission control, training, handling measures, and personal protective equipment needed

These HAZMAT and Pollutant related data elements are in addition to the minimum data elements in Section 4

HTS Considerations

▸ Two things that must be clearly defined at the start of a program:

 – Both the Contractor and Government shall have access to the HTS with appropriate controls on data management

 – The Government shall receive and retain "government purpose rights" of all the data recorded in the HTS and any other items (i.e., studies, analyses, test data, notes or similar data) generated in the performance of the contract with respect to the HTS

▸ Whatever HTS tool is used, it must be flexible and expandable in order to accommodate:

 – Multiple Event risks and risk acceptances (DT, OT, fielding, etc.)

 – Potential for multiple Target risks (in response to funding changes, mitigation measure effectiveness, lessons learned, etc.)

 – HAZMATs, Hazardous Wastes, Pollutants

 – Use throughout the life cycle

▸ Data from the HTS must be included in the Programmatic Environment, Safety, and Occupational Health Evaluation (PESHE) document

Summary

▸ MIL-STD-882E

  – Requires a closed-loop Hazard Tracking System with required data elements identified in Section 4

  – Includes optional tasks, each with additional data elements

    • 106 Hazard Tracking System

    • 108 Hazardous Materials Management Plan

    • 210 Environmental Hazard Analysis

▸ System use, complexity, and potential for high consequence mishaps, along with budget and contractor capabilities, will ultimately drive selection of optional tasks

Next presentation covers placing 882E and optional tasks on contract

Questions?

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882E Table I: Severity Categories

		SEVERITY CATEGORIES		

Description	Severity Category	Mishap Result Criteria
Catastrophic	1	Could result in one or more of the following: death, permanent total disability, irreversible significant environmental impact, or monetary loss exceeding $10M.
Critical	2	Could result in one or more of the following: permanent partial disability, injuries or occupational illness that may result in hospitalization of at least three personnel, reversible significant environmental impact, or monetary loss exceeding $1M but less than $10M.
Marginal	3	Could result in one or more of the following: injury or occupational illness resulting in one or more lost week days, reversible moderate environmental impact, or monetary loss exceeding $100K but less than $1M.
Negligible	4	Could result in one or more of the following: injury or occupational illness resulting in less than 1 lost week day, minimal environmental impact, or monetary loss less than $100K.

Increased dollar value on losses logarithmically to account for today's program dollars
Removed "that violates law or regulation" from descriptions of environmental damage

882E Table II: Probability Levels

PROBABILITY LEVELS			
Description	**Level**	**Specific Individual Item**	**Fleet or Inventory**
Frequent	A	Likely to occur often in the life of an item.	Continuously experienced.
Probable	B	Will occur several times in the life of an item.	Will occur frequently.
Occasional	C	Likely to occur sometime in the life on an item.	Will occur several times.
Remote	D	Unlikely, but possible to occur in the life of an item.	Unlikely, but can reasonably be expected to occur.
Improbable	E	So unlikely, it can be assumed occurrence may not be experienced in the life of an item.	Unlikely to occur, but possible.
Eliminated	F	Incapable of occurence. This level is used when potential hazards are identified and later eliminated.	Incapable of occurence. This level is used when potential hazards are identified and later eliminated.

Added a sixth Description/Level – Eliminated "F"

Removed quantitative numbering schema, now strictly qualitative in Section 4

Appendix A has example of quantitative derived from 882D

882E Table III: Risk Assessment Matrix

RISK ASSESSMENT MATRIX				
SEVERITY / PROBABILITY	Catastrophic (1)	Critical (2)	Marginal (3)	Negligible (4)
Frequent (A)	High	High	Serious	Medium
Probable (B)	High	High	Serious	Medium
Occasional (C)	High	Serious	Medium	Low
Remote (D)	Serious	Medium	Medium	Low
Improbable (E)	Medium	Medium	Medium	Low
Eliminated (F)	Eliminated			

Added matrix depicting risk levels (H,S,M,L), eliminated risk assessment values (1-20), added Risk Assessment Code (RAC) (e.g. 1A, 3C)

A Best Practice for Identified Hazards

▸ More detail is better – use a <u>Hazard Description</u>

▸ Includes three items:

> **Hazard** – (Source) A real or potential condition that could lead to an unplanned event or series of events (i.e. mishap) resulting in death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment.
>
> **Causal Factor** – (Mechanism) One or several mechanisms that trigger the hazard that may result in a mishap.
>
> **Mishap** – (Outcome) An event or series of events resulting in unintentional death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment. For the purposes of this Standard, the term "mishap" includes negative environmental impacts from planned events.

Hazard Description Examples:
- *Laceration (outcome) from unprotected skin exposure (mechanism) to a sharp edge (source)*
- *Ship damage (outcome) from collision with foreign object (mechanism) due to degraded vision (source)*

Advanced HTS Database Data Element List

Hazard Identifiers
- Hazard Number
- Hazard Type
- Common Hazard Code
- System Mode
- Source
- System/Sub-system
- Applicability
- Requirements references
- Action Person(s) and Organization
- Hazard
- Causal Factor
- Mishap
- Hazard Status
- Hazard Management Log

Risk Mitigation(s)
- Identified Risk Mitigation(s)
- Selected Risk Mitigation(s)
- Estimated Completion Date
- Verification and Validation Method

Risk Assessments
- Initial Severity
- Initial Probability
- Initial RAC
- Initial Risk Level

- Target Severity
- Target Probability
- Target RAC
- Target Risk Level

- Event Severity
- Event Probability
- Event RAC
- Event Risk Level

- Current Severity
- Current Probability
- Current RAC
- Current Risk Level

Record of Risk Acceptances
- Risk Acceptance Authority
- User Representative Concurrence Authority
- Date
- Event
- Location

- **Hazardous Material Data Elements as specified (Optional Task 106 or 210) see slide 6 &7**

- **Pollutant Generation data elements as specified (Optional Task 210) see slide 8**