Health Hazards and HSI Considerations for Joint Capabilities Integration and Development (JCIDS) Process

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At the conclusion of the course students will be able to:

1. Gain a deeper appreciation of how an understanding of the HSI Domains (such as Health Hazard Assessment) can improve the JCIDS document development process.

2. Understand how Health Hazard Assessment fits into Human-Systems Integration, and the greater Materiel Systems Development Process and Acquisition Lifecycle.

3. Identify the Health Hazard (HH) categories as they apply to the Capability Developer and System Development during normal system use.

4. Select or craft “HH and HSI - Improved” capability document language appropriate for a specific materiel solution.

5. Integrate HH considerations into the requirements process of the Acquisition Life Cycle.
**HSI Program Mission:** Optimize total system performance, reduce life cycle costs, and minimize risk of soldier loss or injury by ensuring a systematic consideration of the impact of materiel design on Soldiers throughout the system development process.

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**DEEP DIVE - Health Hazard Assessment**

- **System Safety Engineering**
- **Human Factors Engineering**
- **Training**
- **Personnel**
- **Manpower**
- **Soldier Survivability**
Example: How different HSI Domains might look at a new High Mobility Multipurpose Wheeled Vehicle (HMMWV) door

- **Manpower**: Is more than one person required to operate the door?
- **Personnel**: Can the driver of the HMMWV operate the door with current skill set?
- **Training**: Is new door so complex it will require advanced aptitude and/or a new training program?
- **Human Factors Engineering**: Does “operating the door” accomplish what it was designed to do (e.g. see through the window)?
- **System Safety**: Is the door so heavy it *accidentally* shuts on its own and without warning, potentially injuring personnel?
- **Health Hazards**: Is the door *designed correctly* so that personnel can open it (once or repeatedly) without potentially causing injury *under normal working conditions*?
- **Soldier Survivability**: Will the new door protect personnel from an attack?
APHC Organizational Structure

U.S. Army Public Health Center (APHC)
Mr. John Resta

Deputy
COL Jennifer McDannald

Clinical Public Health and Epidemiology
Veterinary Services & Public Health Sanitation
Health Promotion & Wellness
Toxicology

Occupational Health Sciences
Environmental Health Sciences & Engineering
Laboratory Sciences
Business Operations

Public Health Communications
HHA Proponent & Regulations


- **HHA Reports are used and required by**:  
  - The Program Manager (PM) fielding the Materiel System.
  - The HSI / MANPRINT community.
  - Safety Releases and Safety Confirmations in the T&E Community.

- **Governing Regulations**:  
  - DODI 5000.02, Operation of the Defense Acquisition System.
  - AR 40-5, Preventive Medicine.
  - **AR 40-10, Health Hazard Assessment Program in Support of the Army Acquisition Process**.
  - AR 40-60, Army Medical Materiel Acquisition Policy.
  - AR 70-1, Army Acquisition Policy.
  - AR 385-10, The Army Safety Program
  - AR 700-142, Type Classification, Materiel Release, Fielding, and Transfer.

- **HHA Program has been operational since 1982.**

- **HHA Reports are kept for 30 years.**
**Primary Objective of HHA Report:** to assess and communicate potential **Occupational Health Risk** of a **Materiel System** to the Materiel Developer (PM) in order to **eliminate** or **control** the **Hazards**.

**Process of the HHA Report:**

1. *Understand Design* and *Normal-Use Scenario* of **Materiel System**,  
2. *Identify* potential occupational **Health Hazards**,  
3. *Test* and measure the normal extent of these hazards,  
4. *Assess* T&E data against **Medical Criteria** using a **Medical Model**,  
5. *Determine Risk* of a **Credible Medical Outcome** under **Normal Operating Conditions**,  
Types of Materiel that we look at:

- weapon platforms
- small arms and crew served weapons
- ammunition
- artillery and mortars
- shoulder fired weapons
- Army aircraft and boats
- munitions and explosives
- clothing and equipment
- Army missiles
- training devices
- electronics and sensors
- other materiel systems
Health Hazard Assessment Reports do not address…

- System Safety Engineering
- Human Factors Engineering
- Soldier Survivability
- Environmental Issues
- System Performance/Effectiveness
- Other Services or National Guard
- System of System HH issues
• Provides Materiel Developers (MATDEVs) and Capability Developers (CAPDEVs) an estimate of the Occupational Health (OH) **Risk associated with “normal use”**.

• **Not** intended to provide an all-inclusive medical assessment or USAMEDD approval to use an item.

• **Mishaps, accidents, or equipment failures** resulting in injuries, although sometimes health-related, **do not** fall within the scope of HHA (Safety).

• At the present, HHA is one of **32 Required Documents** needed for full materiel release (AR 700-142).

• **Urgent Materiel Releases (UMR) and Rapid (or Streamlined) Acquisitions** should receive HHA input and/or review.
Projects: What are we doing?

Health Hazard Assessment Reports

Number

Fiscal Year

Fy82  Fy83  Fy84  Fy85  Fy86  Fy87  Fy88  Fy89  Fy90  Fy91  Fy92  Fy93  Fy94  Fy95  Fy96  Fy97  Fy98  Fy99  Fy00  Fy01  Fy02  Fy03  Fy04  Fy05  Fy06  Fy07  Fy08  Fy09  Fy10  Fy11  Fy12  Fy13  Fy14  Fy15  Fy16  Fy17  Fy18

18  23  46  43  63  70  66  66  63  70  89  86  106  116  108  85  82  82  78  89  128  141  139  146  155  126  94  90  96  92  83  66  55  50  78
Typical HSI / HHA Challenges and Trends

- Early Involvement (CAPDEV is the only person that has a real possibility of making a difference):
  - Otherwise only “admin controls and PPE.”
  - Test and Evaluation Planning and Data Requirements.
  - PM requesting HHA too late.
- Understanding System Design and Normal Use Scenario.
- Test and Evaluation Data Incorrect Format.
- Test and Evaluation Data Incomplete or Not Collected
- Calculating Probability:
  - Probability of Exposure/Mishap/Occurrence.
  - Probability of Credible Medical Outcome.
- “Total System” Activities “related” to Normal Use (maintenance, transport, personnel, training, etc.)
- Medical Models inadequate or nonexistent.
- Post-Fielding Assessments.
- Acceptance of Risk
  - Risk vs. Capability Tradeoff
  - De-Conflicting Differing Risks for Same Hazards from differing domains.
- “System of Systems”
- SOCOM – 8 more PEOs!
- Joint Service Items and Requirements.
- Rapid Fielding Items.
- Funding?
- Less hazards, but more dangerous items (e.g. autonomous and unmanned systems).
- Field Offices and Embedding?
Process:

1. **Select standard HH language** appropriate for an ICD and CPD

2. **Identify specific potential health hazards** inherent in your system

3. Select additional specific **HH language based on hazards** identified in step 2

4. Add the specific language selected in step 3 to the standard language identified in step 2

5. Brief your HH-Improved capability document solution (ICD and CPD)
Initial Capability Document

• ICD - Concise and condensed input. ICD real estate is at a premium; therefore, a brief concise statement has a better chance of inclusion in the document.

• Place the following example of an acceptable HH ICD statement in paragraph 6 or 7 of the ICD:
  
  - “Eliminate or mitigate health risks to ensure mission readiness, maximize operational suitability, and minimize total ownership cost of the solution so operators and maintainers can safely test, train, use, and dispose of the solution across its lifecycle in full compliance with appropriate US and host nation laws and regulations.”
  
  - Include “AR 40-10, Health Hazard Assessment Program in Support of the Army Materiel Acquisition Decision Process” in the reference section, Appendix B.

• Why? Places the needed traceability hooks for inclusion in CDD and CPD.
Why do we want HH language in the CDD and CPD?

From the JCIDS Manual: The content of the CDD is critical to development of the:

- **Systems Engineering Plan** (SEP), which documents technical performance measures necessary to achieve the KPPs, KSAs, and APAs.

- **Test and Evaluation Master Plan** (TEMP), which establishes parameters, criteria, and desired test and evaluation (T&E) strategy, and will be further refined during the EMD phase of acquisition and updated as necessary to support developmental and operational T&E.

- Ensures potential occupational health hazards are considered *early* in design process and the T&E strategy development
Capability Development Document

• The **CDD is built on the ICD** and is the next step in the JCIDS process.

• The Draft **CDD** must be prepared for **Milestone A** and finalized for **Milestone B**

• The **CDD contains:**
  – Key Performance Parameters (KPP) (HH unlikely),
  – Key System Attributes (KSA),
  – Other System Attributes,
  – Objective / Threshold Values

• HH considerations most likely found in **Section 16, “Other System Attributes”**

• **See handout for standard language.** The CDD is more specific than the ICD. Make HH input consistent with the degree of specificity. If specific hazard categories can be identified, refer to your compliance criteria for inclusion in the CDD
HH Considerations in Requirements Process

**Capability Production Document**

- The **CPD is built on the CDD** and is the next step in the JCIDS process.
- The **CPD** is a required document for **Milestone C**.
- HH considerations are most likely found in **Section 15, “Other System Attributes”**
  - The HH input in the CPD should **build on the previous HH language** used in the CDD and provide increasing specificity and detail.
  - For example, if a new chemical is being introduced into the Army inventory, ensure language is included that specifically names the new chemical and calls out a requirement for a **Toxicity Clearance**.
  - Based on any **recent T&E efforts during the EMD phase of development**, include any additional known specifics when compared with the CDD, for example, the CDD may have identified ionizing radiation as a tank muzzle reference source; however subsequent designs have eliminated it; therefore it can be eliminated from the CPD.
- Otherwise CPD language is very similar to CDD language.
<table>
<thead>
<tr>
<th>HAZARD PROBABILITY</th>
<th>Specific Individual Item</th>
<th>Fleet or Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequent</td>
<td>Likely to occur often in the life of an item (example: $P_o \geq 10^{-5}$).</td>
<td></td>
</tr>
<tr>
<td>Probable</td>
<td>Will occur several times in the life of an item (example: $10^{-2} \leq P_o &lt; 10^{-5}$).</td>
<td></td>
</tr>
<tr>
<td>Occasional</td>
<td>Likely to occur sometime in the life of an item (example: $10^{-3} \leq P_o &lt; 10^{-2}$).</td>
<td></td>
</tr>
<tr>
<td>Remote</td>
<td>Unlikely, but possible to occur in the life of an item (example: $10^{-4} \leq P_o &lt; 10^{-3}$).</td>
<td></td>
</tr>
<tr>
<td>Improbable</td>
<td>So unlikely, it can be assumed occurrence may not be experienced in the life of an item (example: $P_o &lt; 10^{-4}$).</td>
<td></td>
</tr>
<tr>
<td>Eliminated</td>
<td>Incapable of occurrence. This level is used when potential hazards are identified and later eliminated.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HAZARD SEVERITY</th>
<th>Catastrophic</th>
<th>Critical</th>
<th>Marginal</th>
<th>Negligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Could result in one or more of the following: death, permanent total disability, irreversible significant environmental impact, or monetary loss equal to or exceeding $10M.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>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 equal to or exceeding $1M but less than $10M.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Could result in one or more of the following: injury or occupational illness resulting in one or more lost workday(s), reversible moderate environmental impact, or monetary loss equal to or exceeding $100K but less than $1M.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Could result in one or more of the following: injury or occupational illness not resulting in a lost workday, minimal environmental impact, or monetary loss less than $100K.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: $P_o = \text{Probability of Occurrence}$

- 1-A HIGH AAE
- 2-A HIGH AAE
- 3-A SERIOUS PEO
- 4-A MEDIUM PM
- 1-B HIGH AAE
- 2-B HIGH AAE
- 3-B SERIOUS PEO
- 4-B MEDIUM PM
- 1-C HIGH AAE
- 2-C SERIOUS PEO
- 3-C MEDIUM PM
- 4-C LOW PM
- 1-D SERIOUS PEO
- 2-D MEDIUM PM
- 3-D MEDIUM PM
- 4-D LOW PM
- 1-E MEDIUM PM
- 2-E MEDIUM PM
- 3-E MEDIUM PM
- 4-E LOW PM
- Eliminated
Specific Hazard Analysis Process

- Understand System Design and Normal Use Scenario.
- Identify Potential Hazards.
- Independent Test of the System to Measure Potential Hazards.
- Assess Materiel System for the Potential for Credible Medical Outcome.
  - Evaluate Test Data Against a Medical Standard (not a Design Standard) using a Medical Model.
    - Determine Hazard Severity,
    - Calculate Hazard Probability.
  - Determine Risk.
- Make Recommendations to Reduce Risk:
  - Design Change.
  - Administrative Controls.
  - Personal Protective Equipment.
Health Hazard Categories Addressed by the HHA Program

**ACOUSTIC ENERGY**
- Impulse Noise
- Blast Overpressure
- Steady-state Noise

**BIOLOGICAL SUBSTANCES**
- Field Sanitation & Hygiene
- Poisonous Plants & Animals

**CHEMICAL SUBSTANCES**

**RADIATION ENERGY**
- Radio Frequency/Ultrasound
- Laser/Optical Radiation
- Ionizing Radiation

**SHOCK**
- Rapid Acceleration/Deceleration

**TRAUMA**
- Sharp/Blunt Impact
- Musculoskeletal Trauma

**VIBRATION**
- Whole-body (multiple shock)
- Segmental

**TEMPERATURE EXTREMES**
- Heat/Cold

**OXYGEN DEFICIENCY**
- High Altitude/Confined Spaces
- Ventilation
Acoustic Energy: Impulse Noise

Action Level per DA
PAM 40-501/MIL STD
1474E is impulse noise
at or above 140 dBP

![Graph showing time milliseconds vs pressure kiloPascals with a peak at around 140 dBP]
Current HHA Criteria

• MIL STD 1474 D has been replaced by new **Version E** design standard that incorporates an ear model (Auditory Hazard Assessment Algorithm for Humans - AHAHH) that is not yet accepted by the U.S. Army medical community.

• The **Army Hearing Conservation Program Interim Impulsive Noise Damage Risk Criterion (Interim Criterion)** makes allowances for weapon fire made outdoors if the waveforms comply with specific requirements; updates the old MIL STD, bringing it more in line with new science findings.

• Interim criterion is modified equation for Allowed Number of Rounds from **MIL STD 1474”D”**.

• **EMERGING ISSUE/SITUATION**: reflections in alleyways, tunnels, caves, rooms, etc.
Permissible Exposure per DA PAM 40-501/MIL STD 1474E is a Time Weighted Average of 85 dBA over an 8 hour day.
**Current Steady-State HHA Criteria**

- DA PAM 40-501 and MIL STD 1474E include an action level of 85 dBA (for any length of time) and define that level as noise hazardous.

- Exposure in excess of 85 dBA require warning signs and hearing protection, but additional requirements are imposed if the TWA is 85 dBA or higher (including annual screening audiometry).

- Testing requirements are contained in MIL-STD-1474E.
Acoustic Energy: Blast overpressure

- BOP-HHA assesses occupational health risk from BOP exposures.

- Army limits occupational exposure to the number of exposures that will produce **less than 1% incidence of any lung injury with one day**.

- Data collection and format is contained in USAPHC Technical Information Paper 88-001-0411
Acoustic Energy: Blast overpressure

Legacy Method to Determine Primary Threat Is Above the Z-Curve

![Diagram showing peak pressure vs B-duration for different weapons: K6 120mm Mortar, Carl Gustav MAW, AT4, Viper, M198/M203. The Z-Curve is plotted with peak pressure in dB on the y-axis and B-duration in msec on the x-axis. The BOP Effects of Some Weapons With Respect to Z-Curve are indicated.]
The BOP-HHA software analyzes time/pressure data from a Blast Test Device exposed to blast during a weapon test and generates injury probabilities and severities in the fashion described in AR 40-10.
Overarching Regulation is AR 40-5

Types of hazards

- Bacteria, virus, fungus, protozoa, mold, insects

Examples:

- Food Service Sanitation
- Field Sanitation
- Water Supply Equipment
- Field Laundry
- Solid and Liquid Wastes
- Pest Control
Chemical Substances

WARNING
WEAR YOUR RESPIRATOR

Health Hazard Assessment

Red flammability
Blue health
Yellow reactivity
White special

Army Public Health Center
Current HHA Criteria

- Occupational Safety and Health Administration PELs.
- American Conference of Governmental Industrial Hygienists TLVs ®.
- Military Unique Criteria.
  - NRC Committee on Toxicology Guidelines.
Chemical Testing Requirements


• Specialized Detailed Test Plans.
Toxicity Clearance: Definition

- “Process whereby a decision, from a toxicological standpoint, is formulated concerning an article or component thereof which may be introduced into the Department of Army’s supply system”.

- Examples: Arthropod Repellents, Protective Clothing, Solvents, Refrigerants, Fire Extinguishants, etc.
Nonionizing Radiation Electromagnetic Spectrum

Nonionizing Radiation

IEEE Band Designation*
- LF: Low Frequency
- MF: Medium Frequency
- HF: High Frequency
- VHF: Very High Frequency
- UHF: Ultra High Frequency

IEEE Radar Frequency Bands*
- L: 1-2 GHz
- S: 2-4 GHz
- C: 4-8 GHz
- X: 8-12 GHz
- Ku: 12-18 GHz
- K: 28-27 GHz
- Ka: 27-40 GHz

Key Wavelengths:
- Far Infrared: 15 μm to 1 mm
- Mid Infrared: 1.4-15 μm
- Near Infrared: 700-1400 nm
- Visible Light: 400-700 nm
- Ultraviolet: 100-400 nm

* IEEE: Institute of Electrical and Electronics Engineers

Army Public Health Center

UNCLASSIFIED
Radiation Energy: Radio Frequency Sources

WARNING RADIO FREQUENCY HAZARD
Radiation Energy: Radio Frequency Data Requirements

- Transmitter’s Operating **Frequency** (MHz, GHz): basis for the standard, MPE in the C95.1-2005
- Transmitter Output **Power** (Watts)
  - Average power output
  - Peak power output + duty cycle
- Transmitter **Duty Cycle** (%) – Continuous Wave (100 %) or Pulsed (0 to 100 %)
- Transmission Line Length and Losses (dB/100m).
  - Worst-case assumption is that all power transmitted goes to antenna
- **Antenna Type** – dipole, parabolic reflector, monopole.
  - Coaxial Cable-fed or waveguide-based?
- Antenna Physical Size and **Gain** (dBi)
Radiation Energy: Optical (Light) Sources

UV Germicidal Disinfection lamp

High Intensity Light Sources (Pyrotechnics) and Flash-Bang Grenades

High Intensity Broadband Sources like Flashlights and Search lights
• The **duration** of the flash/light (duty cycle), and **exposure** to personnel

• The integrated luminance data

• The **efficacy** of radiation data (how efficient is the source at producing visible light?)

• The **integrated radiance** (total beam radiance)

• The **spectral irradiance** (wavelength-dependent)

• The source **size** (how does it illuminate the skin/cornea and image on the retina of the eye?)
Radiation Energy: Laser Radiation Sources

AN/PEQ-2A Rifle-mounted pointer and illuminator

High Energy Laser Mobile Demonstrator (HELMD)

Green Laser Interdiction System (GLIS)
GLARE MOUT Plus
Radiation Energy: Laser Radiation Sources

CAUTION

Laser Light
Do Not Stare Into Beam
Helium-Neon

Class 2
Radiation Energy: Laser Classification

• Class 1 & 1M
  - No hazards
  - 1M some aided viewing hazard

• Class 2 & 2M
  - Visible
  - Blink reflex protection
  - 2M some aided viewing hazard

• Class 3
  - Class 3R and 3B
  - Direct viewing hazard
  - Specular viewing hazard

• Class 4
  - Direct viewing hazard
  - Specular viewing hazard
  - Diffuse viewing hazard
  - Fire and plasma hazards
Radiation Energy: Laser Radiation Data Requirements

- Wavelength(s)
- Beam size and shape
- Divergence
- Exposure duration

- For pulsed lasers:
  - Total energy per pulse
  - Pulse duration
  - Pulse repetition frequency (PRF)

- For continuous wave lasers:
  - Average power output

- For extended source lasers:
  - Viewing angle subtended by the source
Ionizing Radiation Sources

- LORAD Industrial X-ray
- Chemical Agent Monitor (CAMs) - Ni-63
- Tank muzzle reference source (MRS) - H-3
Types of Ionizing Radiation

- Alpha Particles (e.g., smoke detectors).
- Beta Particles (e.g., Tritium Exit signs).
- Gamma Rays (e.g., moisture density gauge).
- X-rays (e.g., medical x-ray).
- Neutrons (e.g., nuclear fuel rods).
Trauma: Musculoskeletal

Lifting

Force

Non-neutral Posture

Repetition
Trauma: Musculoskeletal

- Lifting
- Force
- Non-neutral Posture
- Repetition
Musculoskeletal Trauma Factors

- Most common MS Trauma hazard is from lifting, lowering, pushing, pulling objects.
- Heavy objects, unbalanced loads, inadequate number of lifters, & improper handholds can lead to Soldier injury.
- Maximum design weight limits for lifting with two hands are provided in TABLE XXXVIII in MIL-STD-1472G, 5.8.6.3.1.
- Assessments require data including object weights, dimensions and vertical lift heights.
Shock

- Rapid acceleration or deceleration—the rapid delivery of mechanical impulse or impact to an individual

- Examples include parachute openings and weapon recoils

- No current medical criteria
Whole-body Vibration (WBV)

- Prolonged exposure to vehicles or equipment that exhibit vibration to the entire body can be harmful to users.
- **WBV looks at adverse health effects/injury from exposure, not ride quality & performance.**
- USAARL created **JOLT program** for APHC to assess WBV.
Segmental Vibration

- Vibration exposure to specific regions of the body, the most prevalent areas are the **hands and arm**.
- Segmental vibration **reduces blood flow** to the affected region of the body. Prolonged exposure can harm nerves and tissue.
- Triaxial accelerometers are used to collect measurements **IAW procedures outlined in ANSI S2.70-2006 (R2011)**.

**Daily 8-hr Exposure Calculation:**

\[ A(8) = A_{hv} \sqrt{\sum_{i=1}^{n} A_i^2} \]  

- **Daily 8-hr Exposure Limit Value (DELV)** is 5.0 m/sec², frequency weighted, vector sum measurements.
- **Daily 8-hr Exposure Action Value (DEAV)** is 2.5 m/sec², frequency weighted, vector sum measurements.
Temperature Extremes

Heat and Cold Injury

Criteria Documents

- MIL-STD-1472G
- SAE J1503
- ANSI/ASHRAE Standard 55-2013
- ACGIH TLVs
Heating and Cooling System Design

Designing systems to maximize heating & cooling distribution to minimize heat & cold injuries
Oxygen Deficiency

Crew & Confined Space: Ventilation

• Oxygen deficiency occurs when oxygen is displaced from a confined space such as a fuel storage tank.
• Ventilation criteria for occupied spaces is found in MIL-STD-1472G.
• Inadequate ventilation may result in:
  ➢ Death or serious illness due to oxygen deficiency.
  ➢ Death or serious due to exposure to chemical substances such as carbon monoxide.
  ➢ Reduction of crew efficiency due to decreased oxygen levels and/or increasing carbon dioxide levels.
Crew & Confined Space: Ventilation

• A typical ventilation problem is the inability to adequately remove engine or weapon combustion products resulting in a chemical exposure.
  ➢ A prime example is an armored vehicle with an open breech weapon and insufficient ventilation to adequately exhaust weapon combustion products.
  ➢ Direct effects on insufficient ventilation include elevated levels of carbon monoxide and low levels of oxygen (less than 19.5%).
Questions?
Back Up & Reference Slides
Generic Acquisition Process (Pre-Tailoring)

Acquisition Decision Points and Phases

This chart illustrates the sequence of events in a generic program, which could be a Defense program or, except for the unique DoD terminology, a commercial product.

DoD Instruction 5000.02: Milestones, other decisons, phases, and major phase activities are shown in relation to the generic sequence of events.

Tailoring of Milestones, Decision Points, and Phases

The generic milestones and decision points on this chart are standard for DoD, however, Milestone Decision Authorities (MDA's) have full latitude to tailor programs to the most effective and efficient structure as much as needed to accommodate the characteristics of the program being acquired, and to the reality of circumstances associated with the program including operational urgency and risk factors.

MDA's will tailor program strategies and oversight, including program information, acquisition phase content, the timing and scope of milestone reviews and decision levels, based on the specific requirements of the program being acquired, including completeness, risk factors, and resource requirements to satisfy validated capability requirements.

When there is a strong belief that a potential solution to a problem is available in the short term, MDA's are authorized to implement streamlined procedures designed to accelerate acquisition system requirements. Statutory requirements will be complied with, unless in conflict with received priorities.
Pre-materiel Solution Analysis Phase

Key HHA activities during the Pre-materiel Solution Analysis Phase:

• Provide a medical review of the draft Initial Capabilities Document (ICD) to support Integrated Concept Development Team (ICDTs) and Capability Developers (CAPDEVs).
• Provide a medical review of the Analysis of Alternatives (AOA) Study Guidance.
• Encourage submission of an Initial HHA Report (IHHAR) request.
Materiel Solution Analysis Phase

Key HHA activities during the Materiel Solution Analysis Phase:

- Provide a medical review of the draft Capabilities Development Document (CDD) to support ICDTs/CAPDEVs.
- Provide a medical review of the AOA Study Plan.
- Provide a medical review of the draft Test & Evaluation Master Plan.
- Provide a medical review of the System Engineering Plan (SEP).
- Provide a medical review of the Preliminary System Specification.
- Identify applicable health hazard medical criteria, health effects, and data requirements.
- Communicate the requirement of including IHHAR hazard data in the Preliminary Hazards List for transmittal to the program safety officer.
- Participate in System Safety Working Groups (SSWGs)
- Participate in Human Systems Integration Working Groups (HSIWGs)
- Complete an IHHAR to support Milestone A based on HHA lessons learned from predecessor and similar systems.
Technology Maturation & Risk Reduction Phase

Key HHA activities during the Technology Maturation & Risk Reduction Phase:

- Provide a medical review of the Test Evaluation Master Plan (TEMP).
- Provide a medical review of the Programmatic Environmental, Safety, and Occupational Health Evaluation (PESHE) to ensure it includes potential health hazards identified in the IHHAR.
- Provide a medical review of the CDD to support CAPDEVs.
- Provide a medical review of the System Safety Analysis.
- Provide a medical review of the System Performance Specification.
- Provide a medical review of the Human Systems Integration Plan (HSIP) or other management tools being used.
- Provide input to Safety Releases.
- Participate in SSWGs.
- Participate in HSIWGs.
- Complete an updated HHAR to support Milestone B.
Engineering & Manufacturing Development Phase

Key HHA activities during the **Engineering & Manufacturing Development Phase**:

- Provide a medical review of the detailed Test Plans.
- Provide a medical review of updated PESHE.
- Provide a medical review of the HSIP.
- Provide a medical review of the Capabilities Production Document (CPD).
- Obtain health hazard test results and health risk management decisions.
- Review system user and maintenance manuals.
- Provide input to Safety Releases.
- Review Developmental Test Reports.
- Participate in SSWGs.
- Participate in HSIWGs.
- Complete an updated HHAR to support Milestone C.
Production and Deployment Phase

Key HHA activities during the Production and Deployment Phase:

- Provide a medical review of the Detailed Test Plans designed to evaluate any unresolved health hazards identified in the HHAR.
- Provide a medical review of the PESHE.
- Provide a medical review of the HSIP.
- Review the health hazard test results and health risk management decisions to support completion of a definitive HHAR.
- Review the System Safety Analysis.
- Participate in SSWGs.
- Participate in HSIWGs.
- Complete a definitive HHAR to support type classification and/or materiel release actions.
Operations and Support Phase

- The formal HHA activities end once the system is type-classified standard and has had a successful materiel release. The health information generated in the HHAR can be used by the Materiel Developer to support occupational health decisions associated with materiel fielding and ultimate disposal. Post-fielding testing will be coordinated with the HHA Program for those systems or items where unresolved health hazard issues exist.

- Modifications or changes to the system or use scenario may result in the need for an updated HHA.

- Soldier Occupational Health Assessment (SOHA) activities may be initiated.
Health Hazard Assessment Report
Assessment Standards

- Apply OSHA 29 CFR 1910 and other non-DOD regulatory health standards to military-unique equipment, systems, and operations, *insofar as practicable*.

- OSHA Standards are generally designed for 8-hr exposures and may not be applicable for 24-hr exposures, multiple exposures, or short duration exposures typical of military-unique applications.
Health Hazard Assessment Report
Assessment Standards

- When military design, specification, or deployment requirements render compliance with existing OH standards infeasible or inappropriate, or when no standard exists for military-unique applications, the Army will use the health risk management process or develop a military-unique OH standard.
Requesting a Health Hazard Assessment Report

https://usaphcapps.amedd.army.mil/MSRV_MVC/

- Click on “Request Services”
- Complete the “Request for PHC Products and Services” form
- Upload/submit a signed memorandum on letterhead
- Upon acceptance, the HHA-PjM:
  - contacts Client
  - develops project plan
  - sends SOW, ICE, MOA, & 1144 (if ACAT I, II, JPEO, SOCOM)
  - opens an official HHA project
- Provide all required funding, data/test results and materiel system information relevant to HHA at least 90 days in advance of the anticipated publication date.
Health Hazard Assessment Process

- Review historical Health Hazard (HH) data on similar items.
- Review health surveillance & safety data.
- Review designs, use scenarios, & test data.
- Assess the above information & assign a RAC to the Soldier HHs.
- Make recommendations to control or eliminate HH.
- Assign a residual RAC when applicable.
- Establish priorities for control actions.
- Support acquisition Milestone Decision Reviews, safety releases, materiel releases, and other events.
- Will soon provide an estimate of Medical Cost Avoidance using the Medical Cost Avoidance Model (MCAM).
<table>
<thead>
<tr>
<th>PROBABILITY</th>
<th>SEVERITY</th>
<th>Catastrophic (1)</th>
<th>Critical (2)</th>
<th>Marginal (3)</th>
<th>Negligible (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequent (A)</td>
<td>High</td>
<td>High</td>
<td>Serious</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Probable (B)</td>
<td>High</td>
<td>High</td>
<td>Serious</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Occasional (C)</td>
<td>High</td>
<td>Serious</td>
<td>Medium</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Remote (D)</td>
<td>Serious</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Improbable (E)</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Eliminated (F)</td>
<td>Eliminated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## SEVERITY CATEGORIES

<table>
<thead>
<tr>
<th>Description</th>
<th>Severity Category</th>
<th>Mishap Result Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catastrophic</td>
<td>1</td>
<td>Could result in one or more of the following: death, permanent total disability, irreversible significant environmental impact, or monetary loss equal to or exceeding $10M.</td>
</tr>
<tr>
<td>Critical</td>
<td>2</td>
<td>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 equal to or exceeding $1M but less than $10M.</td>
</tr>
<tr>
<td>Marginal</td>
<td>3</td>
<td>Could result in one or more of the following: injury or occupational illness resulting in one or more lost work day(s), reversible moderate environmental impact, or monetary loss equal to or exceeding $100K but less than $1M.</td>
</tr>
<tr>
<td>Negligible</td>
<td>4</td>
<td>Could result in one or more of the following: injury or occupational illness not resulting in a lost work day, minimal environmental impact, or monetary loss less than $100K.</td>
</tr>
<tr>
<td>Description</td>
<td>Level</td>
<td>Specific Individual Item</td>
</tr>
<tr>
<td>----------------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Frequent</td>
<td>A</td>
<td>Likely to occur often in the life of an item.</td>
</tr>
<tr>
<td>Probable</td>
<td>B</td>
<td>Will occur several times in the life of an item.</td>
</tr>
<tr>
<td>Occasional</td>
<td>C</td>
<td>Likely to occur sometime in the life of an item.</td>
</tr>
<tr>
<td>Remote</td>
<td>D</td>
<td>Unlikely, but possible to occur in the life of an item.</td>
</tr>
<tr>
<td>Improbable</td>
<td>E</td>
<td>So unlikely, it can be assumed occurrence may not be experienced in the life of an item.</td>
</tr>
<tr>
<td>Eliminated</td>
<td>F</td>
<td>Incapable of occurrence. This level is used when potential hazards are identified and later eliminated.</td>
</tr>
</tbody>
</table>
Health Hazard Assessment Program Web Page Hits

http://phc.amedd.army.mil/topics/workplacehealth/hha/Pages/default.aspx