Weapons Systems and Explosives Safety in a Joint Warfighting Environment

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Agenda

- Safety Importance to Navy/Marine Corps
- Safety: Common Sense?
- Weapon System Explosives Safety Review Board (WSESRB)
- Other Services’ Boards
  - USA Materiel Release Board
  - USAF NNMSB
- Joint Staff: Safe Weapons Capabilities Review
- Where to Next?
Safety Importance to the Navy/Marine Corps

- Nature of Expeditionary Mission
- All Weapons Carried to the Fleet
  - Initial Allocation
  - Sustaining Requirements
- Fuel
- Other Hazardous Materials

No Where To Escape, In Case of Incident
Safety: Common Sense?

• Common Sense isn’t always common.

• Mishaps/Accidents both on and off duty have cost hundreds of USN and USMC lives and an average of $4B every 5 yrs.

• Need for greater hazard awareness by all personnel at all times to preserve our greatest asset:

  **PEOPLE**
Although a weapon system can be designed to maximize safety, 

People really can make poor decisions without applying either risk management OR common sense .................
Safety: Common Sense?

What is wrong with these pictures?
Safety: Common Sense?
PHS&T Approved unit loads?
....and “Risk Management” closer to home?!!
Safety: Common Sense?
WSES RB: Why?

WSES RB:
- established in 1968 as a result of mishaps aboard aircraft carriers
- provides independent oversight of weapon program safety effort to ensure maximum compliance with long standing weapon safety requirements.
WSESRB Authority

**DODI 5000.2 Para E7.7**
- PM shall identify, evaluate and manage safety and health hazards
- Explains the process for accepting risk

**SECNAVINST 5000.2C**
- CNO may establish system safety advisory boards

**SECNAVINST 5100.10H**
- Directs CNO/CMC to establish safety programs

**OPNAVINST 8020.14/MCO P8020.11**
- Explosives Safety Policy
- Tasks COMNAVSEASYSCOM to establish WSESRB

**NAVSEAINST 8020.6D**
- Defines WSESRB process and procedures
WSESRB: Who?
Policy Flow and Membership

- CNO
- Naval Sea Systems Command (Chair & Secretariat)
- NOSSA
- NAVSEAINST 8020.6
- Weapon System Explosives Safety Review Board (WSESRB)
- OPNAV
- NAVSEA
- MARCOR SYSCOM
- NAVSEAINST 8020.6
- EOD TECHDIV

Member:
- Naval Safety Center
- Navy Environ Health Center
- Fleet Members
- NAVAIR Members
- OPNAV Member
- NAVSEA Members
- EOD TECHDIV Member
- MARCOR SYSCOM Member
WSESRB: What?

- Reviews weapon and combat system acquisition programs, including Product Improvement Programs, for compliance with longstanding safety design requirements.
  - PM identifies, evaluates and manages safety and health hazards
  - Focus on safety from an overall Combat System perspective
  - Emphasis on Human Systems Integration (HSI)
- Provides concurrence or nonconcurrence with the design; makes recommendations.
- PM responds to the Board with the actions taken or planned.
- For those hazards that cannot be eliminated, risk is assessed, Board provides concurrence.
- PM must get any residual risk accepted at appropriate level.
  - High risk = ASN (RDA)
  - Serious risk = PEO
  - Moderate/low risk = PM
WSESRB: Why?

- WSESRB works in partnership with Program Managers and the Fleet in identifying hazards
- Identify hazards
- Develop actions to mitigate the hazards
- Communicate any residual risks to Fleet operators
WSES RB: When?

Acquisition Events That Trigger WSES RB Reviews

Milestones

- Acquisition Strategy
- Component Advance Development

Concept & Technology Development

- Pre-PDR
- Pre-CDR
- Developmental Tests
- Operational Tests
- Product Improvements

System Development & Demonstration

- LRIP
- Production
- Deployment

Production & Deployment

- FRP Decision Review

IOT&E

- Mishap
- QE Data

Operations & Support

IOC

FOC
USA: Safety Reviews

• Army Fuze Safety Review Board
  – Board of Technical and Safety Experts
  – Certify fuze design for Army munitions based on STANAGs 4157, 4187 and 4497 and associated AOPs
  – Fuze Board approval included in milestone decision review package

• Army Ignition System Review Board

• Materiel Release Board
  – Looks at a system’s Safety, Supportability and Suitability
  – Final QA check
    ➢ Unresolved safety hazards?
    ➢ Meets approved capabilities document?
USAF: Nonnuclear Munitions Safety Board (NNMSB)

System Program Office

- Acquisition Strategies & Solicitation Activities
- Partnership and Interfaces - Government & Contractor Design Authorities
- Programmatic Decisions - Cost/Schedule/Performance (Safety) Trades

Joint Teaming and Analysis

Systems Safety Engineering

- Safety Design Criteria
- Hazard Identification, Evaluation, and control
- Safety Analyses and Formal Studies

USAF NNMSB

- Adequate Design Safety of Munitions
- Approval For Live Flight Testing
- Safety Certification for Operational Use

Munitions Experience & Knowledge

Operational Safety Policies

Safety Evaluation & Assessment

Lessons Learned

User Concerns
Current Drivers in DOD

Joint Operations Are Now the Norm
Challenges to Safe Joint Environment

• Limited Joint Review of Safety Capabilities
• Increased Weapon System Complexity
• Weapon/Environment Incompatibilities
• Service Unique Design Requirements
• Implementation of Evolving and Varied Acquisition Strategies
• Technology Gaps
• Budget Pressures
CJCS, J8 (DDFP) Action

• Supported Chartering Service Representatives to Explore Process to Ensure
  – Safe Weapons in a Joint Warfighting Environment

• Review Capability Documents

• Recommend Process
  – CJCSI&M 3170 Changes
  – Charter
  – Process Development
JCIDS Recommended Process

• ICD/CDD/CPD Required to Address Weapon Safety
  – ICD to Contain Weapon Safety Capabilities Statement
  – CDD and CPD to Address Specific Weapon Safety Attributes Needed for Joint Warfighting Environments

• DDFP Validates that the ICD/CDD/CPD Adequately Address Weapon Safety Attributes within the JCIDS Process

• J-8/DDFP Provides Weapon Safety Capabilities Endorsement, with Any Limitations Identified

• Joint Weapons Safety Technical Advisory Panel Council (JWSTAP) Created to Advise the DDFP and Sponsors in the Weapon Safety Capabilities Endorsement Process
Acquisition Process
Overarching Policy
Joint Vision
Joint Capstone Policy

Functional Area
Analysis

Functional Area
Functional Concept
Integrated Architecture

Materiel Process

Analysis of
Materiel Approaches

DOTMLPF

Feedback

JROC

ICD

CDD

CPD

Advise DDFP that appropriate weapon safety attributes are included in capabilities documents

J-8/DDFP Endorse Weapon Safety Capability

ICD/CDD/CPD

Weapon Safety Attributes

Joint Weapon Safety Tech Advisory Panel

Existing Service’s Safety Review Processes

Service Acquisition Executive

PEO

PM

Air Force
NNMSB

WSES RB

Army Materiel Release Boards and Fuze Safety Review Board

Acquisition Process
Joint Weapon Safety Technical Advisory Panel

Working Within the Joint Capabilities & Integration Development Process

Weapon Safety Capability Endorsement Recommendation to the J-8/DDFP Regarding ICD, CDD, CPD

Existing DoD 5000 Acquisition Process

Hardware/Software Safety Design Review and Approval
Where Will This Take Us?

- Toward Service Collaborative Reviews
- Toward More Universal Cross-Service Criteria
- Toward Single Safety Reviews
How Can You Help?

• If the WSES RB is Remiss in Coordinating Reviews…
  – ask for coordinated review?

• Communicate Early in the Acquisition Process?
Questions?
Back-ups

- USAF NNMSB
  - Chart #5
Why a Weapon Safety “Certification” Process?

Over a program’s lifecycle it costs less to integrate safety early

Curve adapted from NASA’s Practice No. PD-AP-1314.
Joint Operations Example

- **USS DWIGHT D. EISENHOWER** September 1994
  - Embarked Army Contingent; 14 AH-1F Cobra, 13 MH-58 Kiowa and 26 MH-60 Blackhawk Helicopters
  - Examples of Issues
    - Shipboard Bow Whip Antennas Secured Until All Cobra Helicopters Departed
    - Hot tube loading of 2.75” Rockets Not Authorized
    - Thermite Grenades (NALC G900) Not Permitted, Exceeded Jettison Locker Capacity
    - Army Munitions on Wooden Pallets, Wooden Boxes; Shipboard Fire Issue
Joint Operations Example

• USS KITTYHAWK, Fall 2001
  – Embarked Army SOF in Support of Enduring Freedom
  – Examples of Issues
    • HERO Unsafe, Untested, or Susceptible; Required Restrictive EMCON to be Set When Handling SOF Ordnance
      - Reduces Communications, Detections, and Tracking Capabilities of the Ship
    • Waiver Granted for Non-thermally Protected Ordnance Aboard Ship
    • Waiver Granted for SOF to Conduct Hot Tube Loading of 2.75 Inch Rockets
    • Identification, Compatibility, Segregation of SOF Ordnance
Joint Operations Example

EMV Compatibility Issues

• Aircraft Susceptibility Issues Discovered During EMV Testing to the Army/Navy Joint Operation Electromagnetic Environment (Reports Available Dated July 1986, April 2001, February 2002)

  - Engine Instrumentation
  - Avionics Systems
  - Multifunction Display
  - Weather Radar
  - GPS System
  - HF and UHF Communication Set
  - Digital Electronic Control System
Interim Workarounds

• Joint Shipboard Helicopter Integration Program (JSHIP)
  – Ordnance was One Part of the JSHIP Effort
  – Attempt to Develop Procedures to Mitigate Risk
  – Cost: $22M

• Joint Shipboard Weapons/Ordnance Program (JSWORD)
  – 1 Year Quick Reaction Test Sponsored by DoD JT&E
    (12 May 03 – 31 March 05)
  – Sponsored by USSOCOM
  – Focused on Developing Shipboard Procedures for Hot Tube
    Loading of 2.75” Rockets On Army Helicopters
  – Cost: $1M
Working Group Recommendations

• Establish a Weapon Safety Capability Certification Process for Joint Warfighting Environments
  – Not Modeled on Current CJCSI Certification Processes
  – Risk Identification and Acceptance Decision Process
  – Safety Is Risk Management, Not Compliance, Issue

• Identify Weapon Safety Capabilities in ICD/CDD/CPD Process

• Establish a Technical Advisory Committee to Review Capabilities Specified in the ICDs/CDDs/CPDs and Advise DDFP on Risks and Limitations, If Any