

**National Defense Industrial Association  
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**Status of the  
U.S. DoD Munitions Safety Program  
Program Management Pillars**

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- Inspection, compliance and program oversight are an essential part of the DoD's Explosives Safety Management Program (ESMP)
- U.S. DoD requirements have been developed based on hundreds of accidents (U.S. and international, during conflict and peacetime), test series, analyses and expert deliberation dating back to the early 1900's
- The role of the DDESB as an oversight body has also evolved from compliance based surveys to programmatic reviews
- This presentation will provide an overview of programmatic pillars, developed over the last decade of DDESB Service-level reviews



# Basis of U.S. Explosives Safety Requirements

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- U.S. DoD requirements are anchored to accident data
  - The English Table of Distances was adopted by Massachusetts in the early 1900s
  - The Bureau of Explosives proposed an American Table of Distances (ATD) in 1911 based on 100+ large accidents as part of a rail industry self-governance program
  - In 1928, the newly formed Joint Army Navy Munitions Board (following the 1926 Lake Denmark Explosion) adopted the ATD and it formed the basis of military requirements until WWII
  - In the late 1940s another 66 accidents were used to update the military's requirements and account for more powerful explosives
- Current criteria additionally factors in hundreds of tests, 343 deliberative meetings of the Joint Board and international collaboration (NATO)



- *The Great Halifax Explosion (WWI 1917)*

The *Mont Blanc* collided with another ship while carrying 2,300 tons of picric acid, 200 tons of TNT, 35 tons of gasoline and 10 tons of gun cotton. The ship drifted to the shore line and exploded killing 1,800 and injuring 9000.

- *The Port Chicago Disaster (WWII 1945)*

4,600 tons of explosives on two munitions ships exploded during loading operations, another 450 tons on nearby railcars subsequently exploded. 320 were killed and 390 injured.

- *The Bien Hoa Disaster (Vietnam 1965)*

A bomb loaded on a B-57 accidentally detonated starting a chain reaction of fire and explosions that killed 28 Americans and 6 Vietnamese. 10 B-57's were destroyed along with 28 additional aircraft.

**Maximum practical distance between explosives, unrelated personnel, mission assets, and the public form the basis of consequence mitigation**



- The vast majority of supporting munitions-related infrastructure is WWII-vintage
- Consolidation efforts (reductions in real estate) run contrary to the maximum practical distance maxim
- Installations occupy valuable real estate (think NB San Diego)
- Operations can have significant impacts on the surrounding communities (think MCAS Miramar)
- In many instances, deviations (encroachment on explosives mission) already exist
- Continued encroachment and incompatible land use (high-rise condos) at installation boundaries will continue to increase exposures



- Larger, more complex weapons systems require new storage solutions (large missiles in small arch magazines)
- Insensitive munitions development, while very important, has not resulted in significant changes in required real estate
- Large inventories of conventional (high-explosive) artillery remain
- Contractor operations are increasingly intertwined with the U.S. munitions enterprise, to include purely commercial production and warehousing (commercial space launch)
- Joint and multi-national operations are increasingly the norm with no consistent guidance on explosives safety (harmonization)



- The core pillar in any program is the front line explosives safety professional; their responsibilities are broad:
  - Production, safety in storage, operations and demilitarization
  - Thousands of munitions shipments per year by sea, air and land
  - Complex UXO/MEC cleanup projects at FUDS as well as in support of large MILCONs
  - Upkeep of aging infrastructure
  - Tracking of complex tenant arrangements
  - Support to training activities, ranges and RDT&E operations
  - Managing pressures from surrounding communities as well as from other installation activities for buffer real estate
  - Balancing mission needs with accident prevention



- Organizational alignment should extend from the headquarters level through to the installation
- Explosives safety professionals should have adequate access to the Commander, Component Head or appropriate risk decision authority
- Command schools should provide an overview of the risks posed by munitions and detail commanders' responsibilities with respect to managing that risk
- Components require deliberate methodologies for determining appropriate staffing levels and must provide advocacy for achieving required staffing based on mission analysis
- The explosives safety function needs adequate, dedicated resources



- DoD installations host an increasing number of Joint, inter-agency, multi-national and commercial activities
- Tenants can be difficult to track and manage and often have significant/complex explosives and munitions missions
- Tenant activities must be fully integrated into the installation's ESMP
- Operations need to be coordinated between tenants and the host installation
- Operations need to be overseen by appropriately training explosives safety professionals
- MOUs/MOAs must be kept current with full buy-in from all parties



- Industry remains an integral part of the DoD munitions enterprise
- Contracts are dynamic and transient in nature; interaction with explosives operations can be difficult to track
- Non-explosives contract activities must be kept outside arcs
- Leases and out-grants that involve contractor explosives operations need safety responsibilities clearly identified (also OSHA and ATF coordination may be required)
- Contracting officers and explosives safety personnel require open lines of communication
- Government safety personnel should provide direct oversight of operations that involve DoD-titled munitions or occur on DoD installations (to include GOCOs)



## Pillar – Deviations and Compensatory Measures

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- Munitions-related risks (those in excess of regulation) should be quantified, documented, operationally necessary and accepted at the appropriate leadership level
- Installations through headquarters should track deviations and use the information to support resource allocation decisions to reduce risks
- Consolidation efforts can inadvertently increase risks
- Accepting a deviation often means tracking and management of the condition for the life of the installation
- Master planning activities should use deviation information to guide future development efforts



- All facilities located inside IBD require an approved site plan
- DoD munitions-related operations on non-DoD land also require site plans
- The site planning process, roles and responsibilities should be clearly understood across the organization
- An approved site plan should form the basis for SOP development
- Current and cancelled site plans should be maintained along with original designs of all explosives-related facilities
- Site planning requires accurate maps
- Automated site planning (ESS) greatly speeds the process of site planning through site approval and provides a dynamic tool to support master planning and rapidly changing mission requirements



### Master Planning

- Consequence management is based on maintaining adequate distances as a base grows and develops (or prior to land transfers)
- Explosives safety personnel require close, continuous communication with base master planners
- Master planners should have good knowledge of explosives safety and coordinate closely with explosives safety professionals

### Accident Prevention Program

- Mishap and accident data should be collected, reported and disseminated as quickly as possible (both to safety personnel and operators)
- Root cause analysis should be used to improve future operations
- Near-miss data can be just as critical



## Issuances

- Updates to policy must flow quickly to the activity level
- Activity level SOPs should accurately reflect current safety requirements and implementation of compensatory measures
- SOPs should be developed with subject matter expert (SME) input

## Facility Conformance and Maintenance

- From simple pads to complex RDT&E buildings, all facilities should conform to approved site plans
- Storage and compatibility, vegetation control, overburden, LPS systems, and glazing must all comply with regulations
- Activities must adequately fund and prioritize explosives safety related maintenance
- Components should plan for facilities as part of new weapons systems development and acquisition



### Records Management

- Explosives safety-related records must be maintained
- Items stored must be tracked and kept in compliance with approved site plan limits

### Emergency Response

- Emergency responders (to include mutual aid) must be aware of and trained to respond to the hazards posed by unique systems
- ER plans should be developed and exercised, withdrawal distances understood, communications systems compatible

### Inspections, Evaluations, Audits and Surveillance

- Critical to any ESMP
- Findings must be documented and actions tracked



- Explosives safety and munitions risk management across the entire lifecycle is a critical mission enabler
- U.S. DoD requirements represent over a century of development, analysis, test and expert deliberation
- Installations are becoming increasingly dense and weapons systems more complex; explosives safety has never been more essential to ensure safe operations, protection of the public and availability of mission assets
- This presentation provided some basic pillars observed by the DDESB Staff during the last decade of program evaluations
- At the core, remains the well-trained, dedicated explosives safety professionals (military and civilian) to advise the commander of the unique risks posed by military munitions and the myriad of other explosives and energetic materials on DoD installations

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