Comments and Position Regarding the Joint Technical Bulletin “Department of Defense Ammunition and Explosives Hazard Classification Procedures”

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Military Explosives

The United States (U.S.) Department of Defense Explosives Safety Board (DDESB) is responsible for siting ammunition and explosives (AE) for Department of Defense (DoD) storage and transport worldwide in times of peace and war. All siting requirements are outlined in DoD 6055.09-STD, “DoD Ammunition and Explosives Safety Standards” (Reference 1). Current methodologies for siting AE allow mixed storage of Hazard Division (HD) 1.1, 1.2, X, 1.3, 1.4, and 1.6 and follow the equation: D = kW1/3. Generally, if a storage site or an operating building is sized for HD1.1, the only limitation for HD1.3 AE storage is the physical capacity of the facility. However, HD1.3 systems pose a mass fire hazard and are uniquely different when compared to detonable systems (HD1.1). This paper discusses the following: Many of the recorded accidents have been caused by fire. The false impression that HD1.3 materials are safer than HD1.1. For example, HD1.3 material is much easier to ignite than HD1.1. In addition, HD1.3 ready burns at atmospheric pressure, whereas HD1.1 material generally does not. Mixed storage of HD1.3 with HD1.1 may increase the probability of accidental fire. While HD1.3 materials do not contain hazardous fragments, burning HD1.3 materials in buildings with heavy confinement can cause catastrophic failure of the structure with projection of lethal fragments. Why D = kW1/3 is inappropriate for determining safe separation distances for mass burning events and may result in excessive safe separation distance requirements. This paper presents a recommendation for an alternate method for determining safe separation distances from mass fire accidents based on human response to fires and radiation from the fires. It is based on preventing second-degree burns caused by heat flux and exposure time.


Explosive Hazard Reduction

The Marine Corps continuously trains and deploys with military munitions. The storage, handling, transportation, and employment of these items are inherently hazardous. Therefore, it is imperative that a safety program designed to minimize the potential hazards be aggressively pursued at all levels.

Rules and Regulations for Military Explosives and Hazardous Munitions: Excerpts from Title 46, C.F.R., Part 146

This Manual is composed of several volumes, each containing its own purpose, and administratively reissues DoD 6055.09-STD. The purpose of the overall Manual, is to establish explosives safety standards for the Department of Defense. These standards are designed to manage risks associated with DoD-titles ammunition and explosives (AE) by providing protection criteria to minimize serious injury, loss of life and damage to property. This volume provides general quantity-distance (QD) criteria for the accidental detonation of hazard division (HD) 1.1 through 1.6 and HD 7.1 items containing toxic chemical agents.

Marine Corps Ammunition and Explosives Safety Program


Some of the more difficult environmental problems facing the Department of Defense (DoD) include (1) chemical weapons destruction, (2) explosive waste remediation, and (3) unexploded ordnance clearance and extraction. It is conceivable that $50 to $100 billion will be spent by DoD for these three programs; offering unusual opportunities for environmental engineering and related firms. Military installations are similar to small cities in terms of population, industrial activities, and some types of contaminated sites. However, some cover an area larger than a small state. DoD has operated industrial facilities on its installations for several decades that have generated, stored, recycled, or disposed of hazardous wastes. Many of these activities have contaminated the nearby soil and groundwater. To study and clean up contaminated sites, DoD established the Installation Restoration Program (IRP) in 1984, the Fleet and Environmental Restoration (FERA), and the Defense Environmental Restoration Account (DERA). Cleanup actions are usually accomplished under contract with private firms, which are monitored by the services. Most cleanup actions are funded through the Defense Environmental Restoration Account (DERA) and the Base Realignment and Closure Account. Congress established DERA in 1984 to fund the cleanup of inactive contaminated sites on DoD installations. The technology to clean up the conventional hazardous wastes on DoD sites are those as those utilized for industrial sites, and well-documented by this publisher. However, there are three DoD programs that require the utilization of somewhat unusual or different technologies that have not been as well documented. These three programs are: 1. Chemical weapons destruction 2. Remediation of explosives contaminated soils and 3. Unexploded ordnance detection, clearance, and extraction This book discusses the current and potential treatment technologies involved in these three programs.

Analysis of Heat-activated Explosions in Storage of HD 1.2 Munitions

This FM deals with Army terminal operations in a TD. It contains procedures and techniques to plan, use, and control Army water, motor, rail, and air terminal operations. It explains the transportation doctrine and organizational structures needed to deploy Army terminal operations in a TD. It covers Army water, motor, rail, and air terminal operations. This FM establishes Army requirements for operation of storage facilities. Terminals are key nodes in the total distribution system that support the commander's concept of operation at all levels of war and through the range of military operations. They provide loading, unloading, and handling of cargo and personnel between various transportation modes. When linked by modes of transport, they define the transportation structure for the operation. Force projection missions require early identification and establishment of terminals. A well-conceived plan assures that terminals can transport the deployment, reception, and onward movement of the force and its sustainment. Crucial to the execution of the operation is the assignment of the right personnel, cargo, and material handling equipment at each terminal. TV of material moving through the transportation system also provides the CINC with information pertaining to location and final destination of all cargo. The Army is required to function across a range of operation from peace time through conflict to war (see FM 100-3). Terminal operators must be able to operate in every TD. Terminals will be vulnerable to air and missile attacks, especially if US and allied forces have not established air superiority and sea control. They may also be subject to attacks by unconventional forces and to sabotage, terrorism, mining, espionage, and chemical or biological attacks. Whatever the level of the Army operation, terminals will remain a critical piece to ensure continuous movement of personnel and cargo.

2004 emergency response guidebook

Chemical Weapons Destruction and Explosive Waste

You don’t need to be a trained soldier to fully appreciate this edition of the U.S. Army Improvised Munitions Handbook (TM 31-210). Originally created for soldiers in guerrilla warfare situations, this handbook demonstrates the techniques for constructing weapons that are highly effective in the most harrowing of circumstances. Straightforward and incredibly user-friendly, it provides insightful information and step-by-step instructions on how to assemble weapons and explosives from common and readily available materials. Over 600 illustrations complement elaborate explanations of how to improvise any number of munitions from easily accessible resources. Whether you’re a highly trained soldier or simply a civilian looking to be prepared, the U.S. Army Improvised Munitions Handbook is an invaluable addition to your library.

Rules and Regulations for Military Explosives and Hazardous Munitions

Hazard Classification of United States Military Explosives and Hazardous Munitions

The manual of tests and criteria contains criteria, test methods and procedures to be used for classification of dangerous goods according to the provisions of Parts 2 and 3 of the United Nations Recommendation of the Transport of Dangerous Goods, Model Regulations, as well as chemical hazards according to the globally Harmonized System of Classification and Labelling of Chemicals (GHS). As a consequence, it supplements also national or international regulations which are derived from the United Nations Recommendations on the Transport of Dangerous Goods or the GHS. At its ninth session (7 December 2018), the Committee adopted a set of amendments to the sixth revised edition of the Manual as amended by Amendment 1. This seventh revised edition takes account of these amendments. In addition, noting that the work to facilitate the use of this Manual for the purposes of training in the context of the GHS has been completed, the Committee considered that the reference to the "Recommendations on the Transport of Dangerous Goods” in the title of the Manual was no longer appropriate, and decided that from now on, the Manual should be entitled “Manual of Tests and Criteria”.

Naval Ammunition Depot, Oahu

Alternatives for the Demilitarization of Conventional Munitions

When the Department of Defense (DoD) reviewed its chemical hazard classification guidelines in Technical Bulletin (TB) 700-2, NAVSEAINST 8020.88, TD 1 1A1-47, DLAR 8220.1 dated 5 January 1998. I. It significantly changed the procedures used to determine the explosive classification of rocket motors, to be shipped or placed in DoD storage facilities. The revised test protocols outlined in this document, (hereafter referred to as TB 700-2) is more conservative and costly to implement than the previous ones.
Online Library Dod Ammunition And Explosives Hazard Classification Procedures

**Manual of Tests and Criteria**

**Rules and Regulations for Military Explosives and Hazardous Munitions**

Lead is a ubiquitous metal in the environment, and its adverse effects on human health are well documented. Lead interacts at multiple cellular sites and can alter protein function in part through binding to amino acid sulfhydryl and carboxyl groups on a wide variety of structural and functional proteins. In addition, lead mimics calcium and other divalent cations, and it induces the increased production of cytotoxic reactive oxygen species. Adverse effects associated with lead exposure can be observed in multiple body systems, including the nervous, cardiovascular, renal, hematologic, immunologic, and reproductive systems. Lead exposure is also known to induce adverse developmental effects in utero and in the developing neonate. Lead poses an occupational health hazard, and the Occupational Safety and Health Administration (OSHA) developed a lead standard for general industry that regulates many workplace exposures to this metal. The standard was promulgated in 1978 and encompasses several approaches for reducing exposure to lead, including the establishment of a permissible exposure limit (PEL) of 50 μg/mL air (8-hour time-weighted average (TWA)), exposure guidelines for instituting medical surveillance, guidelines for removal from and return to work, and other risk-management strategies. An action level of 30 μg/mL (8-hour TWA) for lead was established to trigger medical surveillance in employees exposed above that level for more than 30 days per year. Another provision is that any employee who has a blood lead level (BLL) of 40 μg/dL or higher or three consecutive BLLs averaging 50 μg/dL or higher must be removed from work involving lead exposure. An employee may resume work associated with lead exposure only after two BLLs are lower than 40 μg/dL. Thus, maintaining BLLs lower than 40 μg/dL was judged by OSHA to protect workers from adverse health effects. The OSHA standard also includes a recommendation that BLLs of workers who are planning a pregnancy be under 30μg/dL. In light of knowledge about the hazards posed by occupational lead exposure, the Department of Defense (DOD) asked the National Research Council to evaluate potential health risks from recurrent lead exposure of firing-range personnel. Specifically, DOD asked the National Research Council to determine whether current exposure standards for lead on DOD firing ranges protect its workers adequately. The committee also considered measures of cumulative lead exposure. Potential Health Risks to DOD Firing-Range Personnel from Recurrent Lead Exposure will help to inform decisions about setting new air exposure limits for lead on firing ranges, about whether to implement limits for surface contamination, and about how to design lead-surveillance programs for range personnel appropriately.

**Transportation by Water of Explosives and Hazardous Cargo**

**Rules and Regulations for Military Explosives and Hazardous Munitions**


**Manuals Combined: EOD, UXO, IED, DEMOLITION MATERIALS, LAND MINE WARFARE, MINE/COUNTERMINE OPERATIONS AND PHYSICAL SECURITY OF ARMS, AMMUNITION, AND EXPLOSIVES**

**Classifications of Hazards in Shipping and Storage of Ammunition and Explosives**

The U.S. military has a stockpile of approximately 400,000 tons of excess, obsolete, or unserviceable munitions. About 60,000 tons are added to the stockpile each year. Munitions include projectiles, bombs, rockets, landmines, and missiles. Open burning/open detonation (OB/OD) of these munitions has been a common disposal practice for decades, although it has decreased significantly since 2011. OB/OD is relatively quick, procedurally straightforward, and inexpensive. However, the downside of OB and OD is that they release contaminants from the operation directly into the environment. Over time, a number of technology alternatives to OB/OD have become available and more are in research and development. Alternative technologies generally involve some type of contained destruction of the energetic materials, including contained burning or contained detonation as well as contained methods that forego combustion or detonation. Alternatives for the Demilitarization of Conventional Munitions reviews the current conventional munitions demilitarization stockpile and analyzes existing and emerging disposal, treatment, and reuse technologies. This report identifies and evaluates any barriers to full-scale deployment of alternatives to OB/OD or non-closed loop incineration/combustion, and provides recommendations to overcome such barriers.

**Hazards Classification of MTSQ Fuze M582A1 in Ammunition Box**

**Army Terminal Operations**

**Can We Better Address the Siting of Hazard Division 1.3 Systems**

Meant to aid State & local emergency managers in their efforts to develop & maintain a viable all-hazard emergency operations plan. This guide clarifies the preparedness, response, & short-term recovery planning elements that warrant inclusion in emergency operations plans. It offers the best judgment & recommendations on how to deal with the entire planning process -- from forming a planning team to writing the plan. Specific topics of discussion include: preliminary considerations, the planning process, emergency operations plan format, basic plan content, functional annex content, hazard-unique planning, & linking Federal & State operations.

**Potential Health Risks to DOD Firing-Range Personnel from Recurrent Lead Exposure**

**Ammunition Handbook: Tactics, Techniques, and Procedures for Munitions Handlers (FM 4-30.13)**

**Behavior of Large Quantities of Hazard Division 1.2 Ammunition in Fires**

The objective of Explosive Hazard Reduction (EHR) is to reduce the Maximum Credible Event (MCE) should an inadvertent detonation with munitions occur. MCE is defined by the DOD as the worst single event likely to occur from a given quantity of munitions or explosives. This is being achieved by development of technologies and procedures, and by applying both new and existing technologies and procedures through site/explosives hazard reduction planning practices. The result will be improved survivability, sustainability, and operability of US air bases and Contingency Operating Locations (COLs).

**Department of Defense Manual - DoD Ammunition and Explosives Safety Standards: General Quantity-Distance Criteria for Accidental Detonations**

The Department of Defense Explosives Safety Board by DoD Directive 5154.4 is charged with protecting personnel from the hazards associated with DoD ammunition and explosives. Chapter 13 of the subject standards establishes blast, fragments, and thermal hazards protection principles and applies to all operations/facilities where personnel are exposed to ammunition/explosives hazards during industrial, processing, manufacturing, and more routine operations.

**Guide for All-Hazard Emergency Operations Planning**

**DoD Contractors’ Safety Manual for Ammunition and Explosives**

This field manual, “Ammunition Handbook: Tactics, Techniques, and Procedures for Munitions Handlers,” provides ready reference and guidance for units and soldiers that handle munitions items. It provides useful data on important points of munitions service support. Also, it is a training tool for munitions units and soldiers. Focus is on tactics, techniques, and procedures used by soldiers handling munitions. The information and guidance contained herein will help them to safely receive, ship, store, handle, maintain, and issue munitions. The manual provides information on processing unit turn-ins, destroying unserviceable munitions, and transporting munitions in new, maturing, or mature theaters of operations in support of US Air Force Projection Army. The information in this manual conforms to the procedures of MOADS, MOADS-PLS, and modularity, and will take munitions units well...
At present, the quantity-distance (Q-D) requirements for open storage of Hazard Division (HD) 1.2 ammunition are different in the U.S., the United Kingdom (UK), and NATO. In 1989, NATO AC/258 (Group of Experts on the Safety Aspects of Transportation and Storage of Military Ammunition and Explosives) began an effort to review HD 1.2 Q-D requirements with the objective of reconciling the different approaches. However, test data to support the effort were very limited at that time. Therefore, it was recommended that a series of bonfire tests be conducted to characterize the hazards produced by fires involving large stacks of HD 1.2 items. In order to support this effort, the U. S. Department of Defense Explosives Safety Board (DDESB) and the UK Explosives Storage and Transport Committee (ESTC) jointly sponsored a series of bonfire tests using 105mm artillery cartridges and 81mm mortar cartridges. A total of twelve tests were conducted during the period May 1991 through September 1995. This report describes the test program, test and analysis methodologies, and summarizes the results of the tests.