

**Meeting of Experts of Protocol V on Explosive Remnants of War, of the
Convention on Certain Conventional Weapons
Geneva, April 3 – 4, 2014**

Working Document

CUBAN EXPERIENCE IN THE SAFE STORAGE OF AMMUNITION

**I. SELECTION AND REQUIREMENTS FOR SITES INTENDED TO BUILD
AMMUNITION WAREHOUSES**

Ammunition warehouses¹ are built in areas of low relative humidity and with well-maintained access roads that ensure rapid evacuation of the stored materials.

Locations should be selected on the outskirts of towns, at least 500 m away from houses and at least 600 m away from railway hubs and factories, far from high voltage power lines, above-ground or buried telephone lines, oil and gas pipelines.

Distances between ammunition warehouses and fuel warehouses, boilers and parking lots must be at least 300 m.

II. AMMUNITION WAREHOUSE CHARACTERISTICS

Ammunition warehouses must be well-ventilated and have wide doors to ensure receiving and dispatching, as well as ease of evacuating materials. Doors must be built in such a way as to permit movement of personnel during their work.

Because of the characteristics of warehouses for rockets and ammunition, these are considered to be extremely dangerous targets. The danger is given by the possibility of explosions, fires, removal or disabling materials with the resulting negative effects on the materials' availability for combat and other economic and

¹ For purposes of this document, "ammunition warehouse" is understood to mean the place destined to store rockets and ammunition and their complementary equipment, where safety and protection regulations are fulfilled and the technical standards for keeping and conserving them are satisfied. Every building, silo or shed complying with these requirements is considered to be a warehouse.

social repercussions, as well as the fact that the material stored could be of interest to terrorists.

III. REQUIREMENTS FOR STORING ROCKETS AND AMMUNITION

Storage of rockets and ammunition requires the observance of and compliance with a group of technical standards that ensure its care, maintenance, protection, technical condition and prolonged preservation.

Care involves compliance with technical safety and protection measures for rockets, ammunition and their elements, with a high degree of professionalism that diminishes as much as possible the probability of its deterioration or the occurrence of losses, misplacing, removal or accidents relating to these materials.

Technical regulations for storing rockets and ammunition include the following, among others:

- a) Observance of aisles in the warehouses.
- b) Correctly stacking packages.
- c) Separating rows of packages from warehouse floors and ceilings.
- d) Observance of maximum permissible stacking heights.
- e) Observance of the requirements for storing ammunition and explosive substances together.
- f) Separate storage for rockets and ammunition.

Measures to be taken into account include the following, among others:

- ✓ Ammunition boxes are stacked with their lids facing upward.
- ✓ Stack heights cannot exceed the weight that can be supported by the floor or by the lowest row of boxes.
- ✓ Ammunition stacks must be solidly built; for this purpose they are stabilized with wooden strips half-way up.
- ✓ When cartridges are stacked, the boxes on the outside rows must have their markings visible from the aisles.
- ✓ Ammunition is kept in their packages. Markings must be clear and match the contents.
- ✓ Hand grenades are stored without their fuses (disarmed), keeping their orifices closed with covers.

- ✓ Hermetic packaging for infantry cartridges, hand grenade fuses, fireworks and artillery fuses may only be opened if the material is going to be used.
- ✓ Instruction ammunition may not be stored in the same stack as combat ammunition.

By complying with these aspects, the following is attained:

- ✓ Ensuring the integrity and care of rockets and ammunition, preventing damages that would flaw their technical condition.
- ✓ Protecting rockets and ammunition from the direct actions of weather and biological agents.
- ✓ Preventing removal, losses and misplacing rockets, ammunitions and their complementary equipment.
- ✓ Extending the useful life of rockets and ammunition and keeping them permanently available so that they may be used by, transported and opportunely supplied to combatants.
- ✓ Receiving, classifying and storing rockets, ammunition and complementary equipment not suited for combat use in central warehouses, and subsequently sending them to be repaired or inactivated.
- ✓ Ensuring correct individual and group seals for rockets, ammunition and their complementary elements.

Management and optimum distribution inside the warehouse:

Rockets and ammunition must be **placed according to a** consistent order depending on their classification. This order must ensure rational accessibility to the material, fewer and less frequent internal searches, logical and rapid delivery systems along with the necessary removal of the concentration of rockets and ammunition and with their internal rotation. The principle to be followed is: the first to be manufactured is the first to be used.

Safe and efficient handling:

Handling and internal transportation of rockets and ammunition will be done trying to make maximum use of designated equipment for that activity, without exceeding their maximum capacities and complying with safety regulations in order to prevent accidents that could injure personnel or damage the rockets and ammunition. Handling efficiency also rests on using the most of the volume of warehouses without violating established technical storage regulations.

Protection from potential and environmental risks:

Ammunition is stacked on wooden or non-iron prisms no less than 10 cm high, to ensure stability and security of the stacks in order to provide protection from floors humidity and contribute to the circulation of air.

Rockets and ammunition should be stored in places where they are protected from being stolen, from fire and electrical charges (lightening), accidents, dust and dirt, high humidity and temperature levels and any other potential and environmental harm.

Ammunition must be stored in such a way that allows technical inspection, monitoring and accounting.

The following aisles must be left open in ammunition warehouses:

Work aisles: In front of every door, 1.5 m wide if the length of the packages is greater than 1m. Aisle widths may be increased up to 1.75 or 2 metres.

Inspection aisles: A space of 0.6 m is left along the walls of ammunition warehouses; the same amount of separation is left between the last package in the stack and the ceiling. When mechanized equipment (fork-lifts) is being used, aisles widths must be at least 3.50 m. wide.

Aisles should be indicated on the floors using 10 cm. thick white or yellow lines.

IV. SAFETY AND FIRE PROTECTION MEASURES

Depending upon local conditions, provisions will be drawn up to establish the following:

- a. Entry permit to ammunition warehouses and their territories.
- b. Obligations of personnel assigned for protection in case of alarms or fires.
- c. Special features of each warehouse.
- d. Orders for passage to warehouse territory for fire-fighting teams or others that should arrive in response to fire alarms.

In the areas where ammunitions warehouses are located, there must be fire-fighting areas (extinguishing points) at least 5 m from each warehouse, with the following equipment: picks, shovels, axes, sand and water tanks, buckets and 50 Kg or larger fire extinguishers on wheels making their handling easier in order to extinguish fires. This devices are installed in accessible spots so that it may be easily used.

Because of their special characteristics, some warehouses must have soda-acid and foam extinguishers.

It is forbidden to:

- a. Light bonfires, use camp stoves or portable ovens in the vicinity of the warehouses, at a distance less than 100 m.
- b. Smoke inside the ammunition warehouse premises and in their territory. Separate smoking areas shall be provided.
- c. Enter the warehouse area with matches or lighters, etc.
- d. Keep stored fuel or flammable materials in the ammunition warehouses. These must be stored in special locations just for them, away from the warehouse areas.
- e. Keep electrical installations in the warehouses in poor shape.
- f. Stack objects higher than the established heights.
- g. Use oil lamps or other open-fire equipment inside the warehouses.

V. SAFETY REGULATIONS DURING TRANSPORTATION OF AMMUNITION

Vehicles intended for the transportation of ammunition must fulfill the following minimal requirements:

- ✓ Be in good mechanical shape. They cannot have any fuel leaks or have their electrical systems in poor shape.
- ✓ Have covers, tarps or other water-proof material in good shape in order to protect the cargo in inclement weather.
- ✓ Have ropes to tie down the cargo.
- ✓ Have fire extinguishers and ground systems for electrical charges.

Whenever there are several vehicles destined to transport ammunition, once they have been loaded, the vehicle escort will not allow persons or vehicles not involved with the activity to approach them. Vehicles or the caravan of vehicles will be provided with red signal flags.

If during the trip the vehicles loaded with ammunition find it necessary to make a stop, the escort personnel will set up guards around them until the trip resumes.

During ammunition loading or unloading and its transportation, all kinds of unnecessary movement or blows will be avoided.

To refuel loaded vehicles, the following safety measures will be taken:

- a. In the case of tractors, trucks with trailers, etc. that can be separated from the cargo, separation will be executed, keeping the cargo at least 20 m away from the fuelling pump, along with guards.
- b. In the case that truck types do not permit separation from the cargo carrier, fire extinguishers will be ready and engines will be turned off.
- c. During refueling, measures will be taken to make sure no other vehicles or persons are in the area.

It is forbidden to:

- ✓ Move ammunition in vehicles without an escort.
- ✓ Load ammunition into trucks, caterpillars, trailers, etc. where the cargo capacity established for them is being exceeded. Nor can boxes be placed so that their edges hang over the edge of the truck bed for more than one half of the upper row.
- ✓ Store materials together with explosive products, fireworks, grenades and rockets.
- ✓ Move other flammable materials (explosives, initiating devices, etc.) along with ammunition.
- ✓ Smoke in vehicles transporting initiating devices, explosives, cartridges or flammable materials.
- ✓ Stacking materials in the vehicles without their packaging.

- ✓ Move activated projectiles, without positioning them carefully (in bulk).