MOVING INFANTRY TARGET (MIT)

MIT Emplacements Under Construction

General: The standard MIT utilizes a concrete emplacement with a geotextile/gravel drainage layer, a treated railroad tie front wall protection and a protective earthen berm. Installations may prefer other materials, which are acceptable as long as compatibility with target equipment, equipment protection, and durability issues are satisfied. The MIT emplacement must be positioned 45 degrees, +/-5 degrees, to the engagement point, with the Load Center (LC) and Master Target Data Panel (MTDP) located at the end of the emplacement closest to the engagement point. Low rounds are normally captured by the compacted earthen berm. If a round skims the top of the berm, the treated railroad tie front wall protection will capture the round before the round can damage the concrete emplacement. All permanent electrical and communication boxes are mounted on the front wall to protect them from rounds that might skim over the top lip of the emplacement. The target mechanism is located on the floor of the emplacement as far forward as practical to minimize its potential to be hit by a low round, yet still allow access to the electrical/data panels. MITs can be placed above- or below-grade. In locations where snow, sand or debris accumulates in the target emplacement, the target mechanism can be raised on pedestals to allow the target to work with minimal maintenance. When this is accomplished, the target emplacement walls will also need to be raised the same amount as the target mechanism.

Below-Grade Emplacement: The optimum situation is to utilize below-grade emplacements. They blend with the natural terrain and do not divulge the target emplacement profile to the soldier/firer. Unfortunately, below-grade emplacements present several design issues as follows:

a. Drainage: On flat or down-slope emplacements, a lower elevation toward which to drain the emplacement must be available nearby; on up-slope emplacements, provisions must be made to prevent natural slope drainage from entering the emplacement. It is difficult on below-grade emplacements to achieve positive drainage.

b. Unexploded Ordnance (UXO): UXO potential disturbance increases with the depth of excavation. While an above grade emplacement might only require disturbing the surface to 150mm (6 inches) below natural grade, a below-grade emplacement will require approximately a meter of excavation.

c. Line-of-Sight (LOS): LOS between the soldier/firer and the target emplacement may not be possible utilizing the natural terrain.

d. Other Debris: Below grade emplacements will also gather sand, dirt, trash and any wind blown objects that can cause a maintenance problem.

Above-Grade Emplacement: Above-grade emplacements are more common in range construction due to their ease of drainage, ease of obtaining line-of-sight and small disturbance to the existing grade. The disadvantage of an above-ground emplacement is the "anthill" profile easily recognized by the soldier/firer.

The designer should discuss with the Installation whether they desire above- or below-grade MIT emplacements while ensuring that the Installation understands the design issues and costs associated with either choice.

Configuration: The MIT emplacement configuration is shown in the Civil Details in the Appendix of this document. The emplacement design is configured for the ballistic characteristics of 5.56-mm and 7.62-mm projectiles.

Wall Height: As shown in the Civil Details in the Appendix, the front wall height is determined based on a maximum angle of fire above level. The angle of fire is the path of the projectile versus the top of the front wall of the emplacement. In the Civil Details, the non-hash marked area is available for the lifting mechanism and electrical enclosures with maximum protection from projectiles. If the angle of fire on any engagement is estimated to be greater than that indicated on the Civil Details, the designer must calculate a new front wall height to maintain the protected area of the emplacement.

Berm Criteria: Protective berm thicknesses are determined by using the Target Protection Design Curves in the Appendix of this document.

These berm widths are based upon weapon type, soil compactive effort, and the in-place soil density. However, the designer must also coordinate with the range trainer or user in order to determine the appropriate berm width for each target, since individual target sites may dictate added target protection. For example, when MIT emplacements are sited in front of or behind a Moving Armor Target (MAT) or a Stationary Armor Target (SAT), the emplacements will need to be designed to withstand the largest weapon system that will engage this group of targets.

Historical experience shows that, under normal usage, well-compacted berms designed with the recommended widths require maintenance on 6-month cycles.

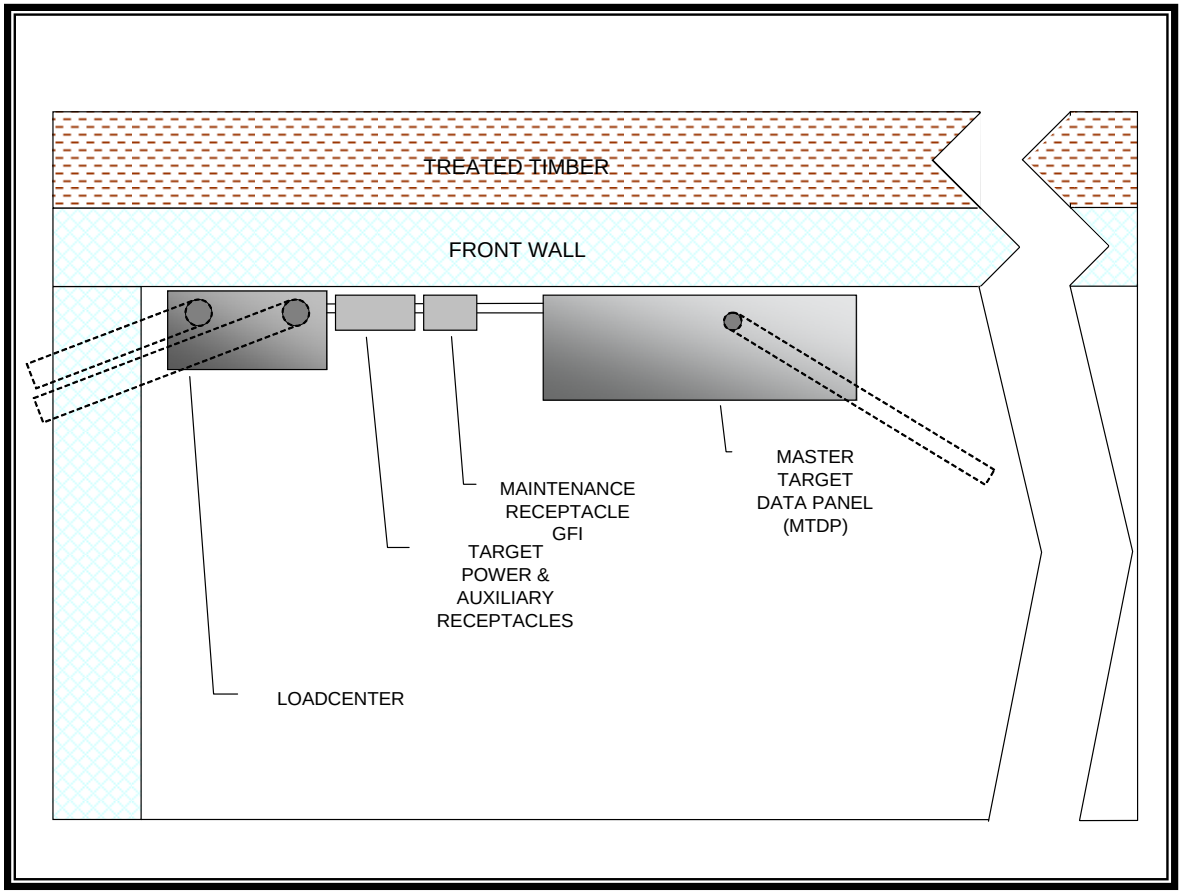
Electrical/Communications: This section discusses electrical/communication considerations unique to this specific emplacement type. Downrange power, communication, transformers, trenching requirements, etc., are discussed in the Downrange Distribution Section of this document.

Representative MIT Photos

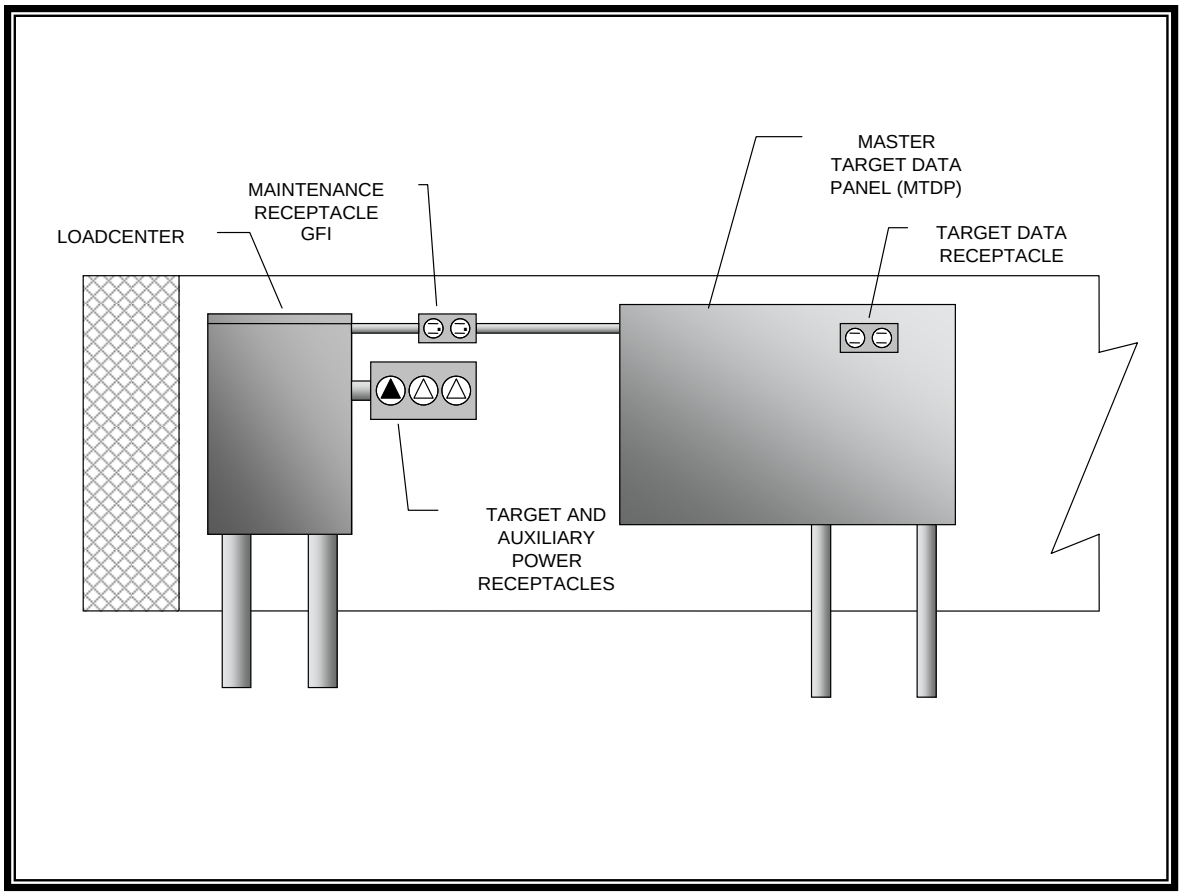
Target Emplacement Wall Configuration: All conduits and/or cables should enter and exit from the side or rear of the emplacement. This cable routing helps to minimize damage to the cables from range operations and maintenance crews performing berm repair. The Load Center (LC) houses the secondary power cable and provides feed-thru capability for the power cable to the next adjoining LC. The LC also contains circuit breakers to provide power to the Target Power Receptacle (TPR), auxiliary receptacles (AR), maintenance receptacle (MR) shall be a Ground Fault Interceptor (GFI) receptacle, and the Target Data Receptacle (TDR). Depending upon the network design, the Master Target Data Panel (MTDP) or Target Data Panel (TDP) can house the fiber optic splicing, cross-connect panel, category 5e or better (copper) cabling, a combination of fiber and copper cables, or simply the copper cabling and the TDR. A 254mm (10") x 254mm (10") area on the interior left-hand side of the MTDP/TDP shall be reserved for use by others. All fiber optic cabling shall be terminated with SC type connectors and the category 5e or better cable shall be terminated with the appropriately rated male RJ45 connectors. All copper cabling terminated inside the MTDP/TDP shall be a minimum of 457mm (18") in length. Fiber cabling shall have a minimum one meter service loop. The MTDP or TDP also provides space for Other Procurement-Army (OPA) funded equipment which includes the fiber optic jumpers, switch/media converter, target data outlet, and category 5e or better network cables. All boxes and receptacles on the front wall of the emplacement should be mounted no higher than two inches from the top of the emplacement wall; this protects the boxes and receptacles from low rounds that might skim the top of the emplacement wall. See the Electrical Details in the Appendix of this document for detailed mounting requirements.

EMPLACEMENT TYPE	POWER FEED TYPE	PEAK	STATIC LOAD	DESIGN LOAD
MIT	120/240VAC Single Phase	2kVA While moving.	50VA	2kVA

MIT Emplacement Power Requirements Table



Representative MIT Plan Drawing (Not to Scale)

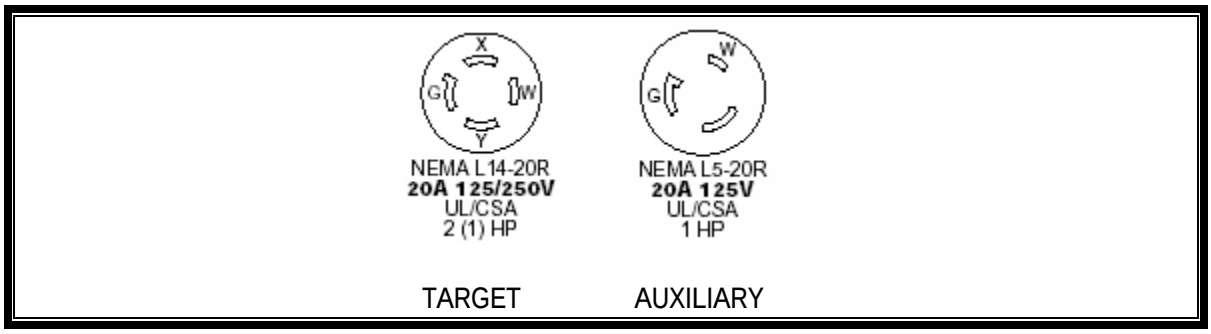


Representative MIT Elevation Drawing (Not to Scale)

Target Outlets: All target power and target data receptacles shall be weatherproof regardless of whether the outlet is in use. The standard TPR configuration is shown below.

TARGET POWER RECEPTACLE	AUXILIARY POWER RECEPTACLE	FIBER OPTIC CABLE CONNECTORS	CATEGORY 5E OR BETTER CABLE CONNECTORS
NEMA L14-20R	NEMA L5-20R	Type "SC"	MALE, RJ45

SIT Emplacement Target Interface Specifics



Target Power Receptacle (TPR) – Auxiliary Receptacle (AR)

Special Criteria:

a. Construction Materials: MIT emplacements have been successfully utilized when made out of wood in non-rot regions (i.e., Alaska).

b. Weather Considerations: In regions with large quantities of blowing sand or snow, consideration should be given to providing elevated target mechanisms platforms and emplacement covers. The elevated target mechanism platform allows for shoveling out snow and sand, while the emplacement cover keeps the accumulation of blown or fallen material to a minimum. Emplacement covers are usually constructed of wood and moved by hand before and after each training exercise.

c. Emplacement Protection: Though not endorsed by Army safety doctrine (DA PAM 385-63, DA PAM 385-64), some installations still favor skip plates on their MIT emplacements. Skip plates are hardened steel angles mounted to the top-front wall lip of a MIT emplacement. The concept is based on the theory that a round hitting low will hit the skip plate and skip (ricochet) away from the target emplacement in lieu of hitting the emplacement's front concrete wall or protective treated timber beams, thus lowering long-term maintenance costs. Since the skip plate induces ricochet, it is not recommended. Installation Safety and ATSC must approve the use of skip plates.

d. Simulation Devices: Some types of training may require Night Muzzle Flash Simulators and Hostile Fire Simulators (HFS). These devices are to be used with the MIT emplacement. A night muzzle flash simulator is a flashlight-type device that is mounted on the target mechanism or coffin and flashes on the target to visually simulate enemy fire. Night muzzle flash simulators are self-contained units provided and installed by the

target provider; no special design is required. The Hostile Fire Simulators can be build into the MIT emplacement or have their own emplacement next to the MIT emplacement.