CHAPTER 20

THE MECHANISED MOVING TARGET TRAINER RANGE

INTRODUCTION

2001. **General**. The standard Mechanised Moving Target Trainer Range (MMTTR) is an open range with six lanes. Each lane has a moving target run of 10 m. A markers' bunker at either end of each run limits the arcs of fire and enables the fall of shot to be indicated. If AMS is installed on new ranges, the bunkers are not required but a control console will be necessary. Standard engagement distances are 50 m and 100 m and 150 m, beyond which there is no current requirement.

2002. **Aim.** This chapter describes the design and construction requirements for a standard MMTTR and in particular covers:

2003. **Purpose.** The MMTTR provides transition to LFTT training as set out in Reference C (Army Operational Shooting) in the engagement of moving targets at various speeds.

RANGE DANGER AREA

2004. **RDA**. The RDA for the MMTTR is shown in Figure 20-1. Where the original RDA was established from the centre of the 50 m firing point the revised 100 m firing point covering the width of a lane will not greatly affect the size of the RDA. Where existing RDA fall close to MOD boundaries TAS (RE) are to confirm the extent of the RDA.

2005. **Template Overlap.** The minimum CofF to be used on MMTTR is 60 mils (3.4^0) see Figure 20-1. However if this exceeds the DA available, it may be overcome by reducing the target run appropriately. This may be achieved by extending the timber boarding in front of the markers' bunkers

2006. **Hard Surfaces and Hard Targets**. Where hard surfaces exist or when hard targets are engaged, the hard target template wings are to be applied. (see figure 20-1)

DESIGN

2007. **Design Criteria.** This range is designed for firing 5.56 mm, 7.62 mm and 9 mm ammunition only at moving targets. If automatic (burst) SA practices are required to be used refer to TAS(RE) . The range is shown in outline in Figure 20-2.

2008. **Siting**. The range requires level ground free of undulations and a gradient down-range that does not exceed 1:20. The gradient for the target railway is not to exceed 1:100. Wet marshy sites should be avoided and the target run requires well drained stable ground.

2009. **Dimensions**. The MMTTR and its RDA require a substantial area of ground. The total length of 3325 m with an average width of 1132 m is an area of 3,763,900 m2 (376 hectares or 930 acres).

2010. **Night Firing**. The range can be used for night firing at a minimum engagement distance of 50 m. A red range-in-use light will be required.

CONSTRUCTION

TARGET LINE

2011. **Moving Target Equipment.** Typically, targets are mounted on four wheel trolleys running on a narrow gauge railway. The track is normally laid on concrete sleepers on a bed of ballast, which should be wide enough for an access path on each side. The six trolleys are moved at variable speeds by a winch cable which passes through a block anchored to an adjustable tensioning bar. The tension of the bar and anchorage is critical; if it is incorrect, the equipment fails to operate. The winch is in a hut which should be large enough to enable the winch to be serviced. The finished floor level of the winch room must be above that of the path to prevent flooding. Older MMTTR have the winch in a pit, which creates maintenance and condensation problems; the new hut design overcomes these. The hut is protected by an earth bund with a minimum thickness of 1.5 m. Further details are shown in Figure 20-3.

2012. **Turning Target Mechanisms.** Turning target mechanisms and sockets for zeroing screens are included on the target line between bunkers. This extends the scope of range practices.

2013. **Targets.** For elementary practices a screen with two targets mounted on it are used to teach application of lead by establishing where each shot strikes. The marker indicates the shot strike with a marking disc when the target is at rest behind the bunker. As experience and confidence are gained, the screen target is dispensed with and the more advanced shot is presented with a single or a pair of single targets mounted on the trolley. Figure 20 targets can be used facing in the correct direction of movement. The targets used on this range are:

a. Figure 20 Running Man.

b. Locally made 'bandit' type using in-service veneers.

c. Vehicle silhouettes no higher than a Figure 11 and the point of aim at the same height as a Figure 11 target.

2014. **ILAW / NLAW Sub Calibre Trainer Targets.** Only two targets on lanes 2 and 5 may be mounted as more targets put unacceptable stresses on the target moving equipment. Markers' bunkers are not to be manned.

2015. **Mantlet.** A mantlet of stone-free soil protects the trolleys and rails from strike. It is to be of sufficient height above the track level to protect targetry from the highest firing position on the range. The face is to slope to the range floor at an angle of 600 mils (34^0) and is to be 1.5 m wide at the crest. A crest board is set in to form the top edge of the mantlet forward face. The mantlet extends beyond the last markers' bunker to protect the cable tensioner at one end and is formed into an embankment to protect the winch hut at the other. The embankment face must also be at an angle of 600 mils (34^0).

2016. **Flag Poles and Lights**. A flagpole of non-ricochet inducing material to carry the red range in use flag is flown in a prominent position for those approaching the range. A red light is fitted to the top of the pole for night firing.

MARKERS' BUNKERS

2017. **Bunkers.** A typical markers' bunker is illustrated in Figure 20-4. The walls of the seven markers' bunkers are built in solid brick or concrete block. The roof is reinforced concrete and the floor concrete. To protect the occupants:

a. A safety bar is fitted across the bunker opening for the marker to lower on entering; a red disc is fitted to the end of the bar so that in the raised position it signals stop firing.

b. The inside of the bunker has a fitted bench seat, a shelf and a warning notice "DO NOT LEAN OUT WHEN TARGETS ARE MOVING" in 25 mm white letters on a red background.

c. If AMS is fitted the bunkers will not be required. However, subject to local assessment, bullet-proof screens may be required at the flanks of the range.

2018. **Anti-splash Screen**. Each bunker is shielded by a timber screen placed at least 600 mm clear of its rear wall. The screen protects firers from backsplash and provides a gap for inspecting and repairing the brickwork of the wall. The screen is 3.6 m long by 2 m high and is constructed in 50 mm minimum thick timber fixed to three 150 mm square posts. A bar should be provided across the space between the bunker and screen to prevent it being used inadvertently for cover.

FIRING POINTS

2019. **Firing Points**. The whole of the target and mantlet must be visible from all firing positions. The firing points may be grass or 10 mm single sized rounded gravel chippings retained by a light timber frame. There is no

requirement for fire trenches. Structures representing fire from cover may be added to the 100 m or 150 m firing point as shown in Figure 20-5.

2020. **Markings**. Firing points are marked out with 100 mm x 50 mm boards set on edge and flush with the range floor. A timber board, marked with the firing distance, on a timber stake is placed on each end of the firing points. Each lane has a numbered centre line indicator board as illustrated in Figure 20-2.

2021. **Target Control Points**. A moving target control point may be sited on the flank and slightly behind each firing point (see Figure 20-2). Alternatively, it can be in a building behind the rearmost firing point.

ELECTRICITY SUPPLY

2022. Electricity is required to operate the winch and control unit. For isolated ranges this could be a generator located either in an extended winch hut or behind the rearmost firing point. The supply cable should be buried 600 mm deep, protected by cable tiles and run down the side of the range.

COMMUNICATIONS

2023. **External**. A means of summoning the emergency services, ideally a land laid telephone, is to be available.

2024. **Internal**. A telephone terminal connection is placed at each target control point to connect with a terminal in the centre markers' bunker for the RCO and NCO in charge of the markers to communicate. Commands between bunkers are by mouth. All cables are to be buried.

MAINTENANCE

2025. **Responsibilities**. Special attention is to be paid to the winch equipment, markers' bunkers and the mantlet. Maintenance is the responsibility of the RAU. Responsibilities may be divided as follows:

a. **Range Warden**. See Reference A1.

b. **Property Management**. General inspection with particular emphasis on:

(1) The stability of bunker back walls.

(2) The condition of timber clad walls.

(3) The moving target system.

c. **Equipment Management**. Repairing and servicing equipment installed by single Service contract.

2026. **Frequency**. Proper maintenance is dependent upon good liaison between the Range Warden and the RAU, and on properly scheduled maintenance periods. A heavily used range may need one day's maintenance each week plus one or two days' maintenance by the Range Warden each month. Two closed periods of a week or so may be needed each year for building and earthworks repair; this work should be combined with the contract repair of equipment.

2027. **Markers' Bunkers.** As bunkers are damaged by shot, regular and careful inspection of the structure is essential to ensure that the walls do not

become shot through. If the bullet penetration or scabbing depth is more than 10% of the thickness of the bunker wall the bunker must be taken out of use until repaired. Repairs must be completed with material that is at least as resistant to penetration as the existing structure.

2028. **Mantlet.** The mantlet must be maintained to its full height and depth to ensure that trolleys and rails are not visible to firers from any firing point and that they cannot be struck by bullets.

COMPLIANCE CHECKS

2029. The following are to be checked:

a. Authorised weapons, ammunition and practices.

b. Main firing point profile.

c. Lane identification and alignment from all firing points.

d. Target exposure.

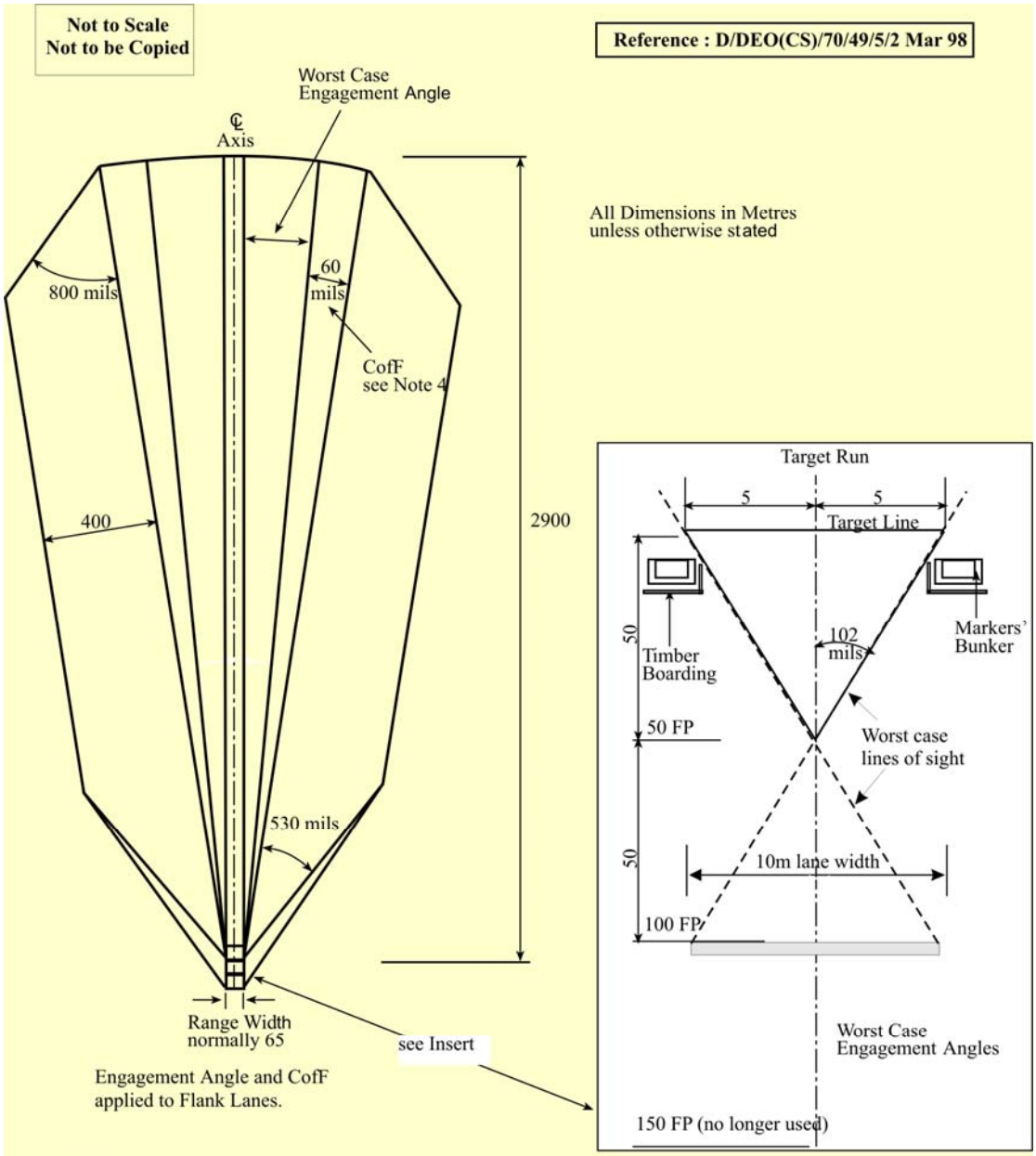
e. Profile of mantlet and rail system.

f. Protection to the moving mechanism and housing, if applicable.

g. Construction and protection to markers bunkers.

h. Quadrant Elevation.

i. Template alignment.



Notes:

1. ADH:5.56 ball & tracer 500ft, 7.62 mm Ball 750 ft, 7.62 mm Tracer: 1500 ft AGL
2. When firing 7.62 mm Ball an air sentry may be required.
3. Maximum permitted MV 1000 m/s, maximum permitted ME 7000 J. See also Chapter 2 Table 4.
4. Static - moving target: 60 mils single shot.
5. Where bunkers are not protected from all possible hard ricochet add 400m hard target wings.

Figure 20-1. RDA Template, MMTTR
(RDA for 5.56mm and 7.62mm QE <150 Mils shown)

Reference: Type Drawing 55743/2

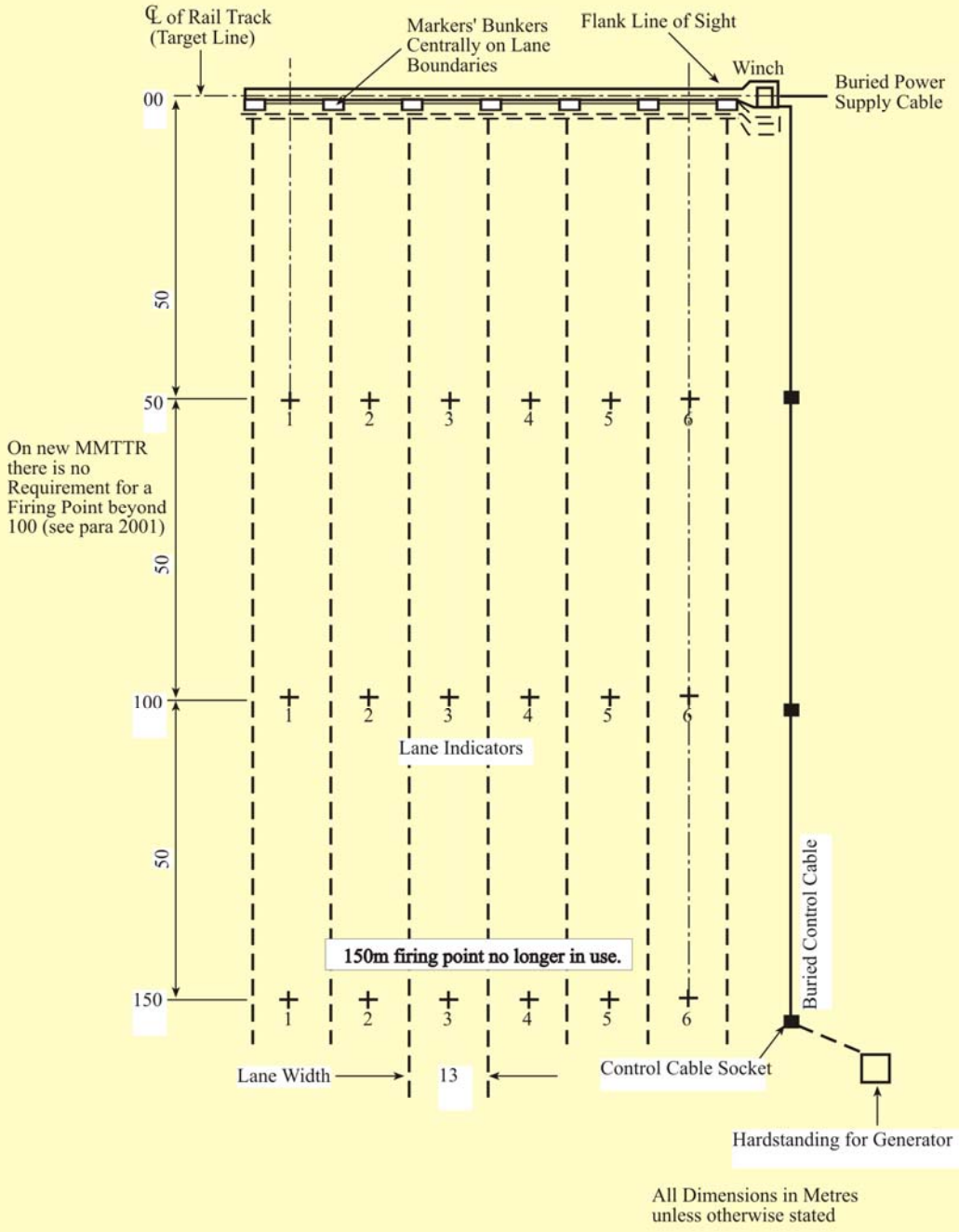


Figure 20-2. Layout MMTTR

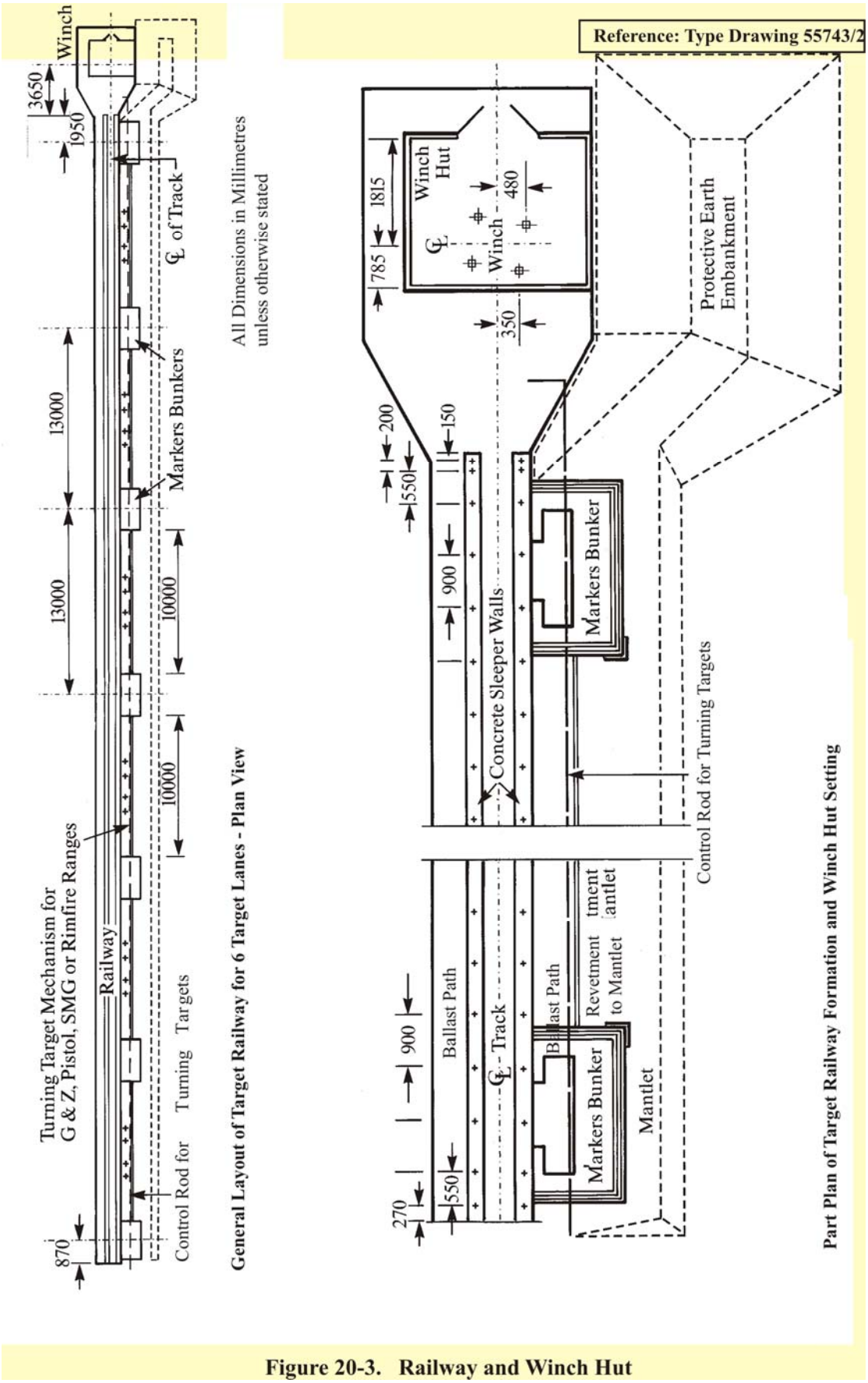


Figure 20-3. Railway and Winch Hut

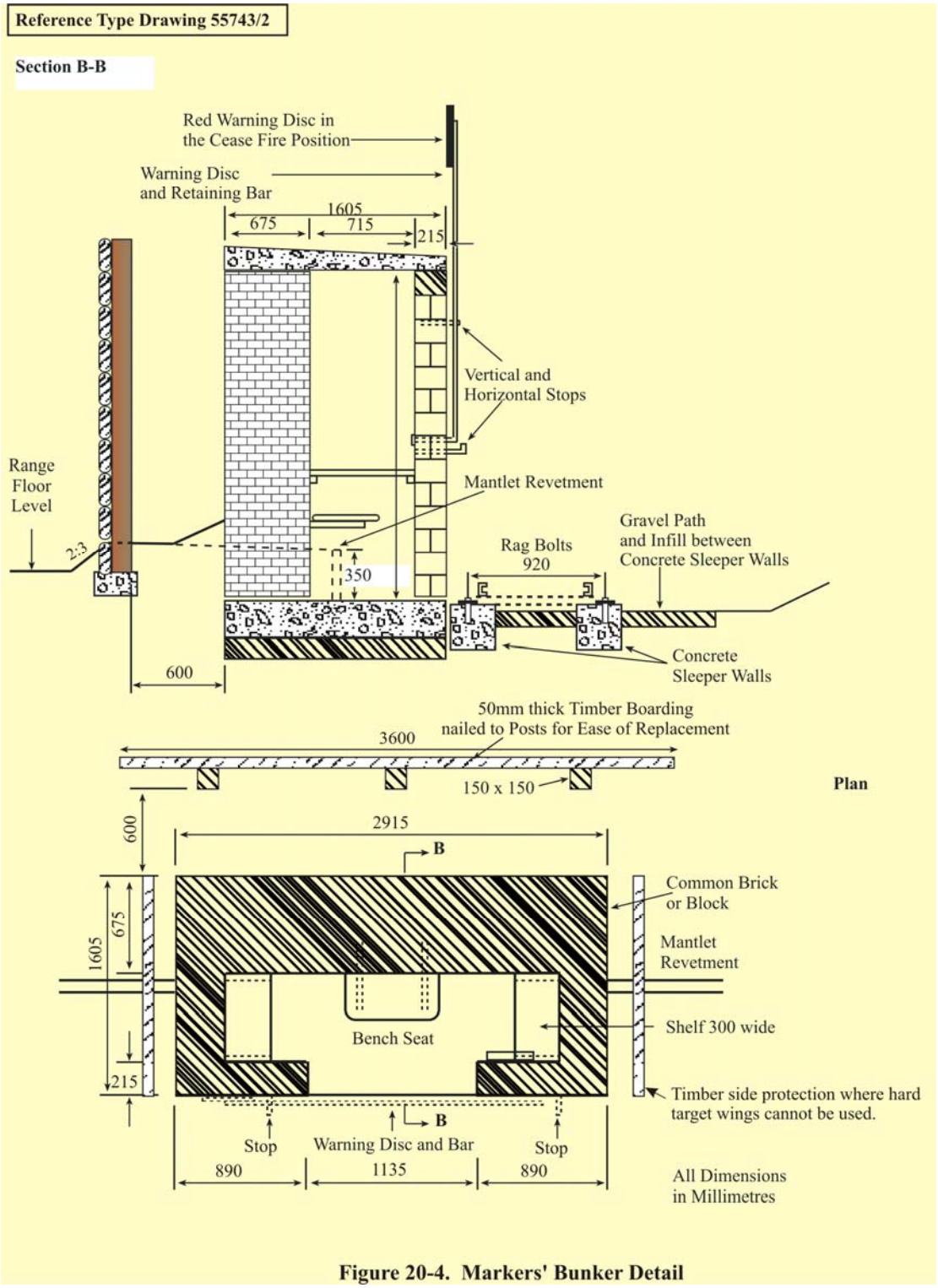


Figure 20-4. Markers' Bunker Detail

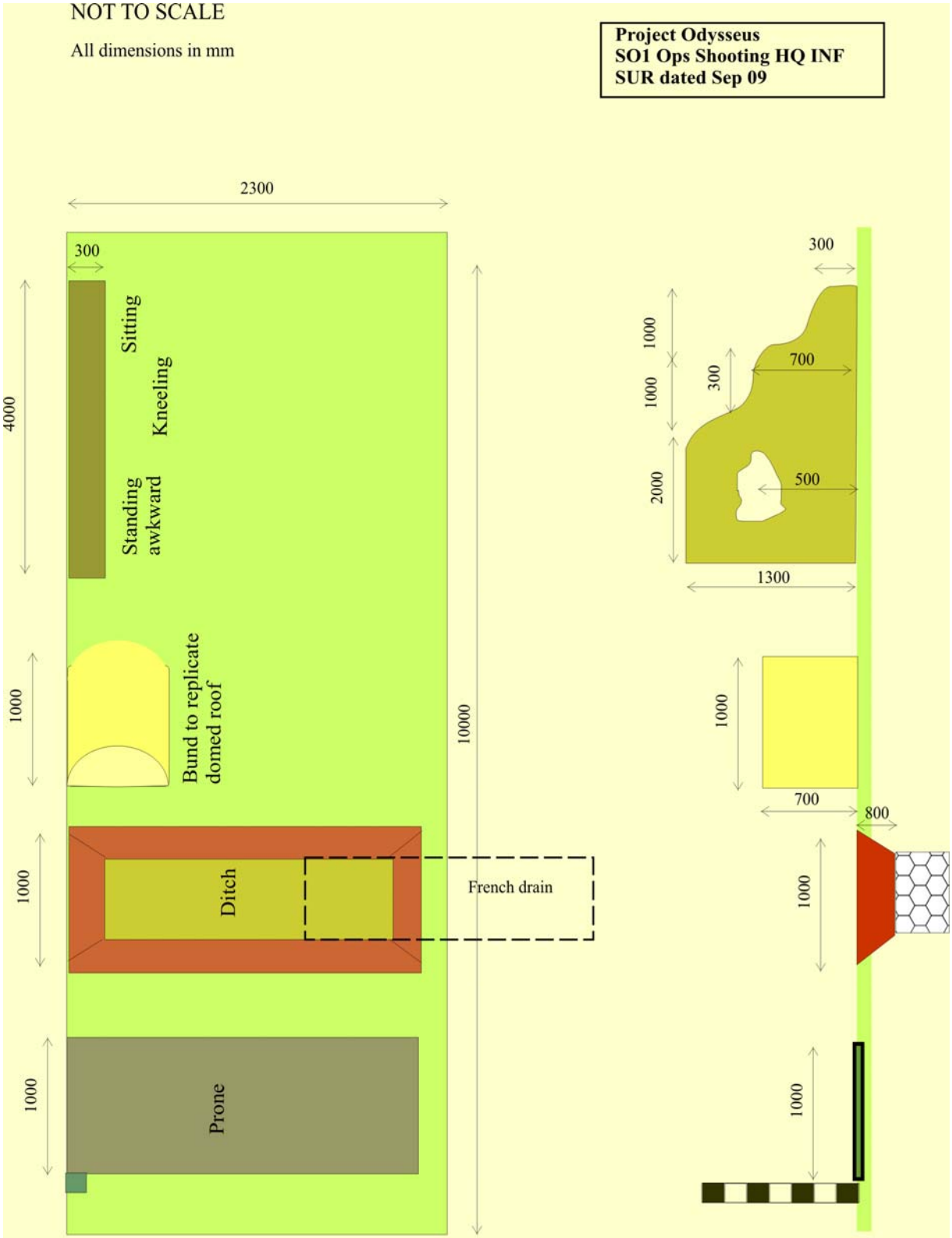


Figure 20-5 - MMTTR Adapted Firing Point