

 <p>DEFENCE ESTATES Delivering Estate Solutions to Defence Needs</p>	<p align="center">TECHNICAL ADVISORY SECTION (ROYAL ENGINEERS) (TAS(RE))</p> <p>Headquarters Defence Training Estate Blenheim Hall Land Warfare Centre, Warminster, Wiltshire BA12 0DJ Tel: 0044 1985 222434 FAX : 2259 Email: frank.compton251@land.mod.uk</p>	
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RANGE ADVICE NOTE 10/09

See Distribution

Your reference:

Our reference: 28-14-01

Reference:

Date 9 Dec 09

- A. JSP 403 Vol.2
- B. Type Standard TS-08

ADVANCED CLOSE QUARTER BATTLE (ACQB) RANGES ON LIVE FIRE TACTICAL TRAINING AREAS (LFTTA) BULLET RETAINING WALL SYSTEMS.

Background.

1. Reference A provides basic capture criteria for bullet catchers and capture structures for No Danger Area (NDA) ranges and Close Quarter Battle (CQB) (Urban) ranges. Reference B provides further detail for the design of CQB(Urban) ranges. ACQB structures on LFTTA provide ballistic protection to those within but need not be fully NDA where there is the ability to apply full WDA. Where shoot through structures are provided normal safety rules for LFTTA in PAM 21 apply.
2. There are several aspects to be considered in the design of ACQB facilities:
 - a. Elements that need to be NDA for both users within the ACQB and those around it.
 - b. Elements that provide ballistic protection to those within but use WDA beyond the structure walls.
 - c. Limiting arcs if any including Quadrant Elevation (QE) where the RDA is less than full energy potential – apply normal LFTTA safety rules.
 - d. External engagement (assault phase) including sniper targets.
 - e. Explosive Method of Entry (EMOE) requirements.
 - f. Bullet containment and recovery.
 - g. Ricochet and backsplash.
 - h. Maintenance frequency to retain a stable and effective capture structure.

Advice.

3. **NDA structures.** In order to achieve NDA status all expected shot is to be captured and contained within the structure element. The NDA criteria in Reference A relates to general use ranges. For ACQB ranges we have assumed that all users will be fully competent and trained to a suitable standard with the weapon systems used and in this case smaller defence structures may be authorised. Where ACQB ranges are located on LFTTA with sufficient WDA allocation, it is possible to provide ballistic protection for those within the structure and permit rounds to leave

the structure into the LFTTA allocated. Internal protection criteria may be achieved with wall heights of at least 2.4m and flank margins from target position to any openings, doors or windows of at least 1m unless there are openings in the structure where rounds may escape. Clearly if there are situations where ladders, stairways or similar are used during the assault phase, RCOs must ensure there is no potential for reducing the protection of those in elevated positions or those exposed to firers in elevated positions. All planned tactical scenarios should be cleared by an SASC WO or Officer.

4. **NDA Criteria.** For NDA criteria see attached “Options to develop ACQB NDA structures”. This provides all of the criteria for full NDA for rifle and pistol practices giving data for rifle and pistol:

a. NDA criteria for general use established in Reference A. This uses existing criteria (height and angle) illustrated in Reference A Figure 2-2 and 2-3 plus logical data from Cone of Fire (CofF) and resultant ricochet, the worst case result is taken.

b. For ACQB ranges only, specific data is provided based on 12 degrees angle from line of sight to target and height of wall. This should exceed predicted CofF and resultant ricochet otherwise this becomes the criteria to be used. ACQB walls are to be at least 2.4m high.

5. **Limiting Arcs.** Where the full 2900m WDA cannot be provided NDA criteria must be met or limiting arcs established. Where targets are mounted high (>150mils (8.4deg)), HEF WDA in Reference A are to be used.

6. **External Engagements.** Sniper and assault phase will require all external faces of the structure to be protected from ricochet and backslash. Where sniper targets are silhouetted high on the structure, full WDA for the weapon system is to be provided. Where heli ops are used close to the structure, there is a requirement to ensure there are no loose materials that may be caught or loosened in the down draft.

7. **EMOE.** Light timber facades for doors may be provided with no metal fixings. Simple canvas straps can be used should hinges be required. A sacrificial wall of timber or sand bags will protect the main compound walls from blast damage where necessary. An alternative is to set the door inside the compound clear of the walls using timber side panels and roof.

8. **Bullet containment.** All structures expected to take bullet strike must do so without excessive damage to that structure. Reference A provides advice on depth of earth and sand needed to contain shot. For 5.56mm and 7.62mm ammunition a minimum of 900mm depth of material is required. The volume of shot is expected to be low therefore backslash from a build up of lead is not anticipated. Where a facility is heavily used over a longer period there will be a requirement to control the build up of lead within the walls.

9. **Ricochet & Backslash.** All surfaces exposed to live fire where troops are expected to approach closer than 50m are to be free of hard surfaces that will generate ricochet or backslash. As on LFTTA where close engagement is undertaken with targets located close to hard surfaces, such surfaces are to be protected with timber, earth banks or sand bags.

10. **Maintenance.** The minimum of 900mm depth of structure is to be maintained at all times. Bust or rapid fire can loosen sand and enable bullets to penetrate more than 600mm. Where elements are damaged both NDA and structure stability may be compromised. Reserve elements for repairs are to be available on site for the duration of the exercise.

Original Signed

F S Compton
OC TAS(RE)

Enclosure:

Annex A – ACQB Design data.

Distribution:

Action:

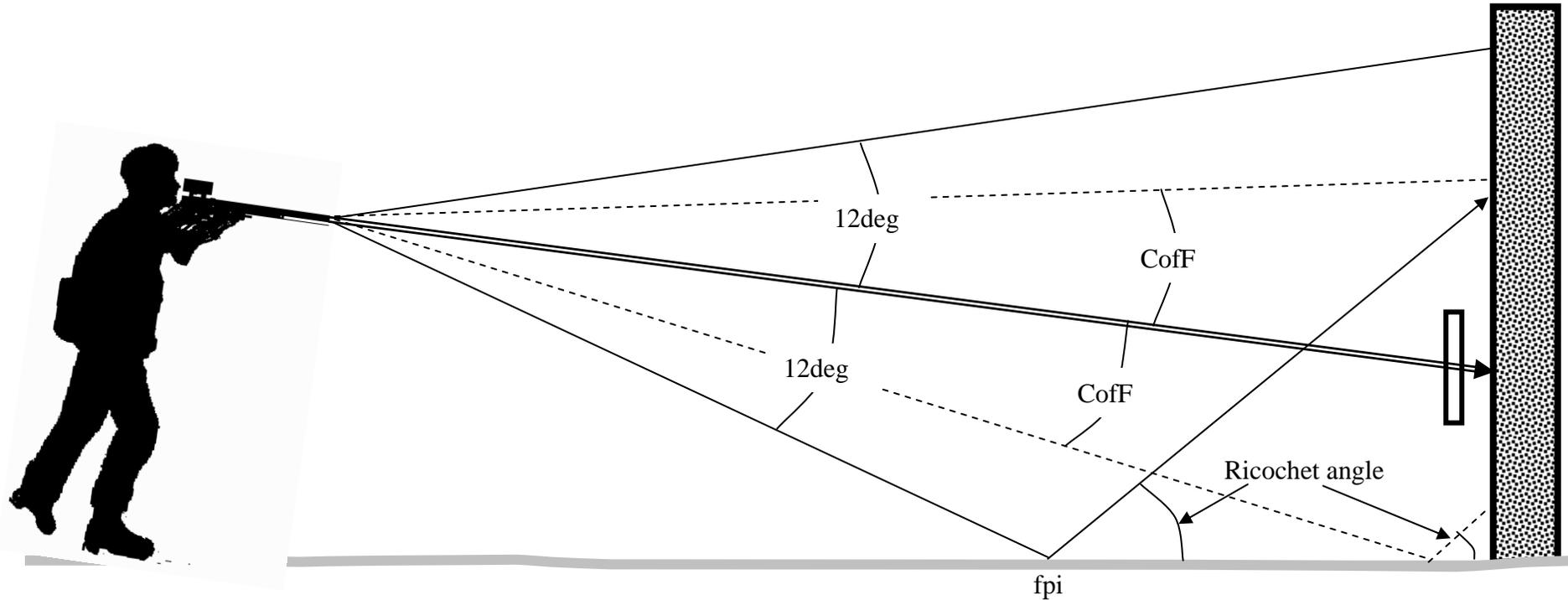
RM Poole – Dave Wright

Information:

DTE HQ SO1 J4 R&P
DTE HQ SO1 Trg Safety
170ENGR-FPE-SO2B
FAIW LST Oman - Chris Rose
LSS BSD-Tim Shapland

ACQB wall height using 12deg (213mils) safety angle and CofF. Standing or kneeling firing positions only. Minimum wall height 2.4m. Azimuth not considered as surrounding structure will capture rounds.

Apply both the 12deg and CofF criteria taking the worst case to determine the required wall height to meet NDA criteria where NDA is required.



CofF (JSP302 Vol.2 Ch.2 Table 3)	
Rifle	60mils (3.38deg)
Pistol	250mils (14.06deg)

Ricochet (JSP303 Vol.2 para. 0239)	
Rifle	30deg
Pistol	15deg

Table 1 – Cone of Fire used to determine where shot will be expected.

Table 2 – Predicted ricochet from first point of impact (fpi).