

## Chapter 4

### GBAD GUN FIRING

#### INTRODUCTION

**0401. General.** Both the RN and the Army operate dedicated GBAD guns, primarily based upon the PHALANX and GOALKEEPER systems. The RN also has a variety of 20/30mm cannon that could be used in the GBAD role. All the RN systems are ship mounted and therefore the firings all take place at sea.

**0402. Aim.** The aim of this chapter is to provide guidance on the operation of a range being used for GBAD guns firings. This is additional to the general requirements applicable to all Surface to Air firings given in Chapter 1.

**0403. Foreign Forces using UK Ranges.** Several NATO and PfP countries have GBAD gun systems and may from time to time use UK ranges. DOSG Advice should be sought in order to develop/issue/allocate a suitable WDA template for the gun system to be fired on a UK range. Early contact with DOSG is essential in order that the necessary ballistic and technical data can be gathered and analysed.

#### GBAD GUN RANGE AND FIRING POINT PROCEDURES

**0404. Template.** Because it is probable that high QE will be involved, the WDA template for a GBAD gun system is likely to reflect the total energy area for the weapon system. It should also subsume the danger area from debris falling from the target although the normal target flight danger area will probably require greater space. It should also be noted that high angle fire will require greater consideration of meteorological effects.

**0405. General.** A GBAD gun system usually relies on firing a large number of projectiles into the path of the target in a short space of time. In addition, it is likely that multiple weapons will engage the target in order to maximise the chances a hit. This type of firing will generate noise, smoke, discharge debris, dust and toxicity, all of which present hazards and need to be mitigated. The firing point safety management system should therefore include special attention to:

- a. Control by flags and lights.
- b. Taping restricted/prohibited areas.
- c. Arc markers.
- d. Multiple Safety Supervisors.

**0406. Safety Supervisors.** The firing point/gun line will be supervised by the Firing Point Safety Officer (FPSO) who reports to the RCO. Individual weapons on the firing point should have dedicated Safety Supervisors.

**0407. Flags.** During a GBAD gun practice each weapon system is to display a red flag when engaged in live firing. When the gun has been made safe a green flag is to be displayed. Where there is no flag displayed, the gun is to be fully unloaded.

**0408. Firing Arcs.** It is the responsibility of the user unit to mark the firing arcs in such a way that they accurately correspond to the arcs shown in the range detail provided by the RAU. It is the responsibility of the FPSO to check the arc markers and to confirm to the RCO that they correspond to the range detail. Individual weapons will need to have their own dedicated arc markers. Care must be taken in positioning the markers so that they do not become obscured by firing debris or smoke.

**0409. Radar Controlled Firings.** Where the GBAD gun is part of a fully automated system that is radar directed, care must be taken to ensure that 'taboos' and arc restrictions are correctly set. The reliability assessment of the Taboo system will be part of the Safety Case and any additional precautions or procedures will be in the relevant Service publication. The RCO will need confirmation from the FPSO that the gun is correctly set prior to firing.

**0410. Control.** All firings and range practices, including those by Foreign Forces, must be conducted by a properly qualified, competent and current RCO. The RCO, the FPSO and the Safety Supervisors must be familiar with the firing cut out controls for all automated gun systems under their control.

### TARGET OPERATIONS

**0411. General.** Chapter 7 should be consulted for further details.

**0412. Presentation.** Due to the high attrition rate of targets against multi-barrel, radar controlled, high volume automatic GBAD guns, it is common practise to use towed targets, either by UAS or by manned aircraft. Towed targets, however, require a large amount of turning room. There should be a dry (non-firing) run across the firing point by the target before the actual live firing pass. This is to confirm the target track is within the firing arcs and to prevent the gun being seduced out of arc. An exception might be made for tactical firings, in which case a dry run should be made during the setting up of the range.

**0413. Overflight.** The question of whether a target may overfly an unprotected position or any other range user or critical store will be addressed in the Aircraft Release and the Safety Case. Limitations will also be addressed in the same documents. The hazard generated by loss of control of a UAS or towed target dictates that the presentation must not be on a direct line over the firing point. Towed targets should not be flown directly at the FP and UAS must turn away before the in-flight danger area reaches the firing point.