



SAFETY SERVICES ORGANISATION



Session 3.2

Barricades and Traverses

**IATG Foundation Course:
Ammunition Storage Infrastructure Module**



Lesson Objectives

At the end of this lesson you should be able to:

- Explain how the use of barricades & traverses can be used as part of a risk reduction method in the design and construction of ammunition facilities
- Explain the purposes and use of different types of barricades & traverses
- Describe the main construction requirements

Introduction

- Barricades or traverses may be used to intercept high velocity, low angle fragments projected from an explosive event at a **Potential Explosion Site (PES)**, to prevent the prompt initiation of explosives at an **Exposed Site (ES)** on the opposite side of the barricade/traverse
- Barricades may also provide some protection to personnel from fragmentation, blast and thermal radiation
- Correct design and construction of barricades is essential for the effective calculation of Quantity Distances (QD)
- Natural features of the ground may be utilised as barricades, but normally barricades will be constructed specifically for the purpose



Definition

- **Barricade (aka Traverse or Bund)**
 - a natural ground feature, artificial mound, or wall which is capable of intercepting high velocity low angle projections from a potential explosion site and preventing initiation of explosives stocks stored nearby

Types of Barricades and Traverses

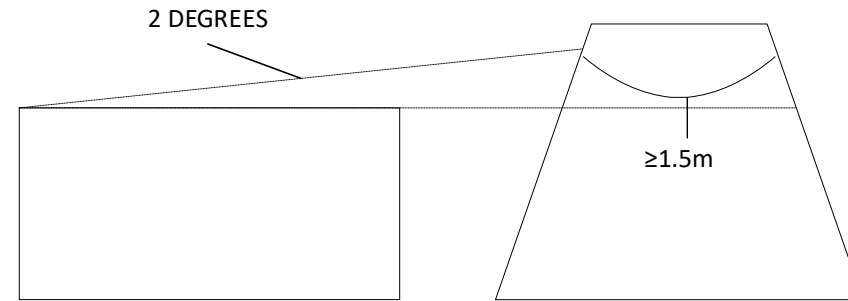
- **There are four types of barricade; each offers a different level of protection.** Often a barricade will cover more than one function, depending on its location and geometry relative to the PES and ES
- **Classification by function** is important to ensure that it is designed and constructed to meet the strength and performance requirements for the primary purpose

Types of Barricades and Traverses

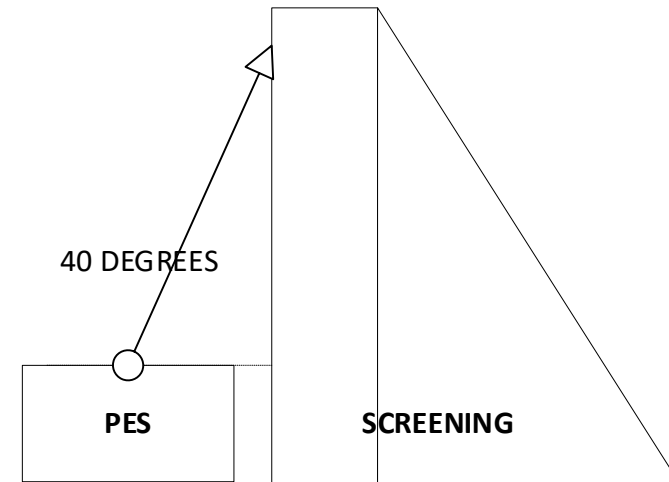
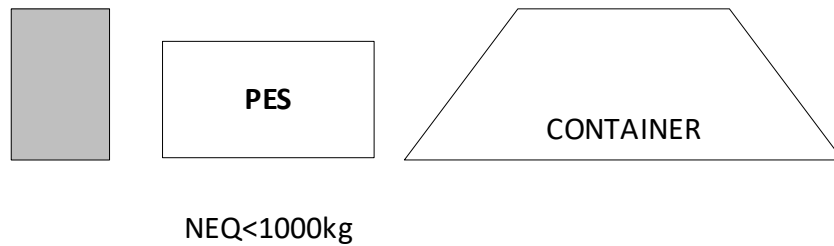
- **The four types of barricade/traverse are:**
 - Receptor barricades
 - Interceptor barricades
 - Container barricades
 - Screening barricades



Receptor and Interceptor



Container and Screening



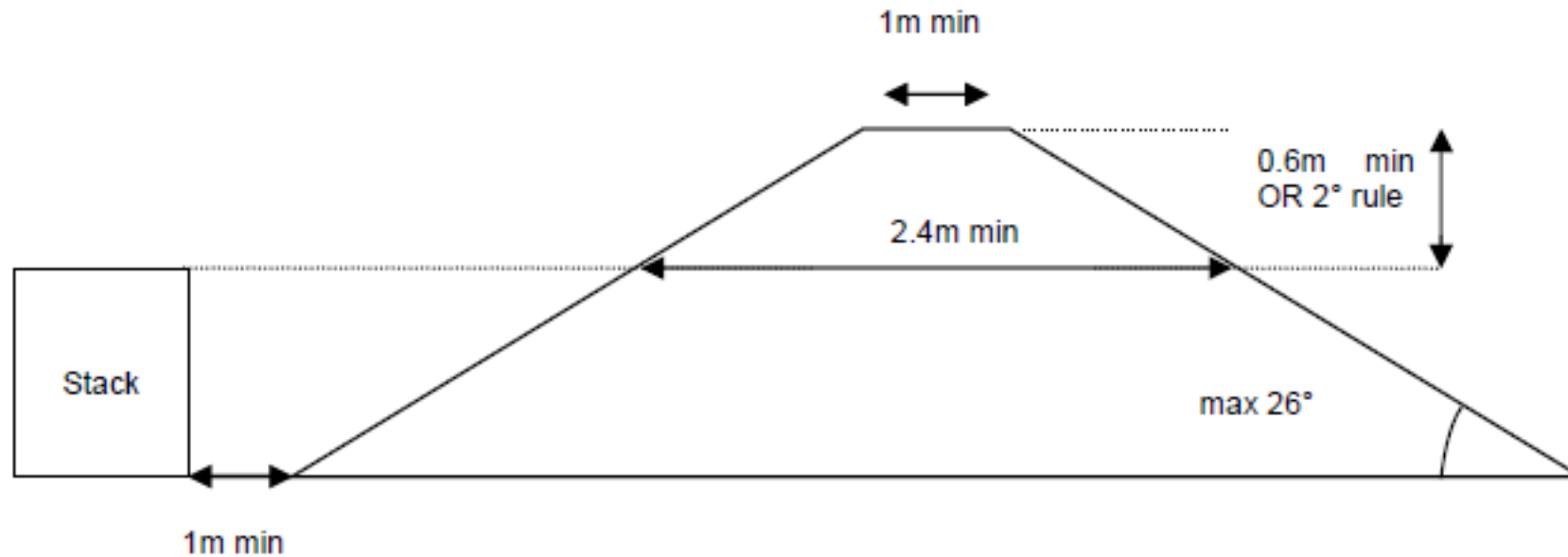
Location of barricades

- **Toe of barricade minimum 1m from stack/wall**
 - Unless access required for MHE etc
- **If:**
 - $NEQ > 75,000\text{kg}$
 - Risk of undermining
- **Then:**
 - Move barricade further away; or
 - Increase thickness so that at least $\frac{2}{3}$ of base is outside likely crater
 - Use $D = Q^{1/3}$ as approximation



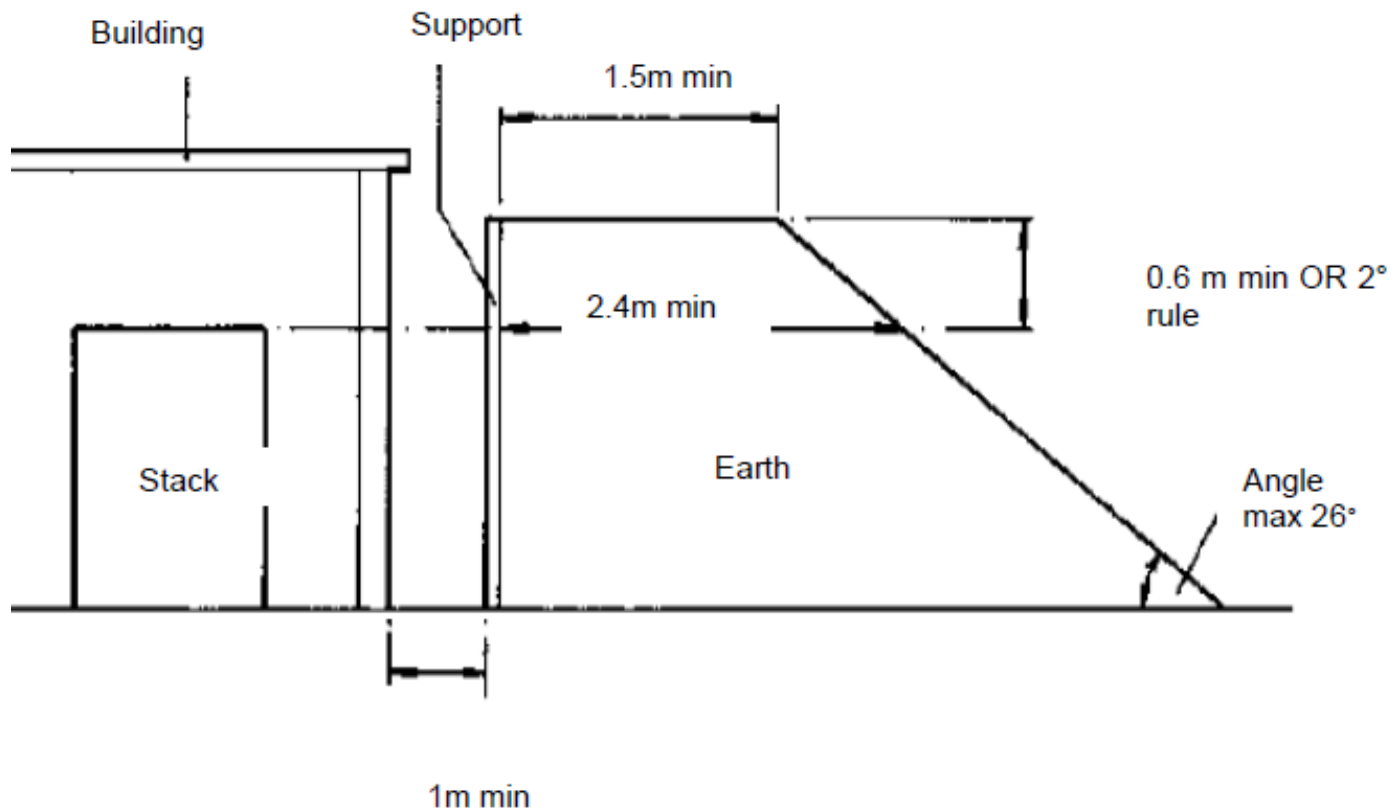
Types of Barricades and Traverses

Type I – standard double slope



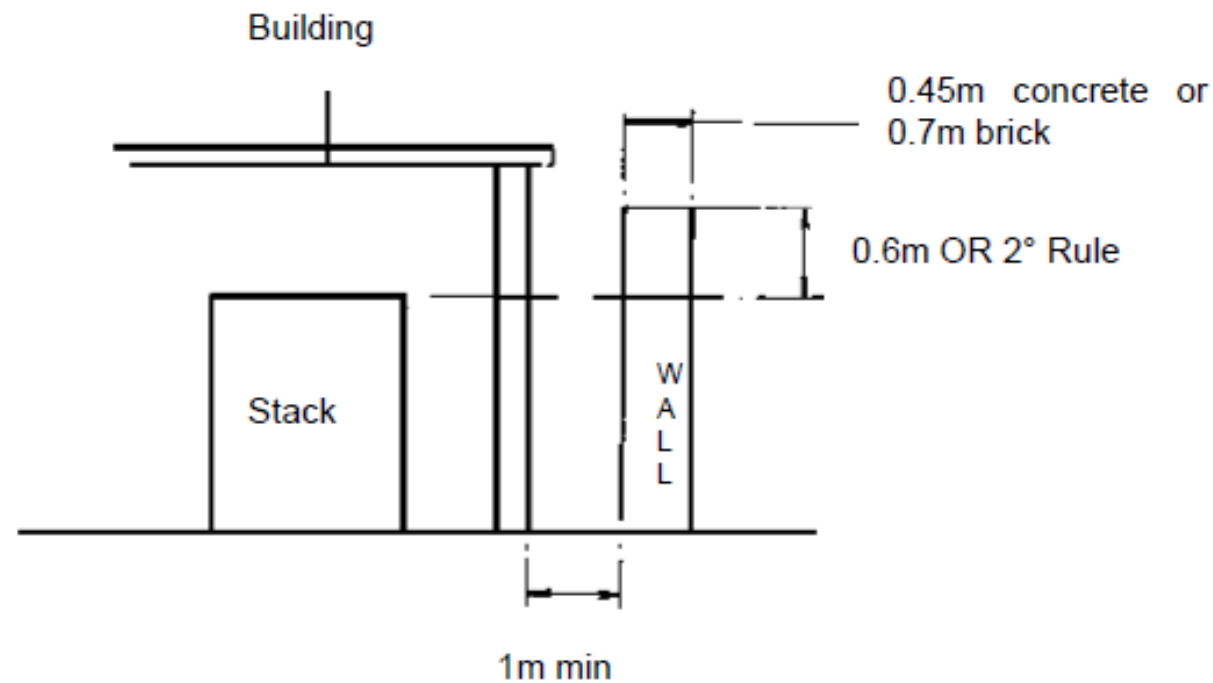
Types of Barricades and Traverses

Type II – single slope vertical face type



Types of Barricades and Traverses

Type V – wall barricade



Positioning of Barricades/Traverses

- **The positioning of the barricade between the PES and ES will vary depending on the primary purpose of the barricade**

Geometry

- The geometry of the barricade should preclude direct line of sight between the PES and the ES **to reduce the risk of high velocity fragments or debris escaping above the barricade**
- The 2 degrees rule for height of the barricade **is used to eliminate the aforementioned risks**
- **It is important to ensure that the slopes of earth barricades are stable. The flatter the slope, the less erosion and maintenance is required**



Geometry – 2-degree rule

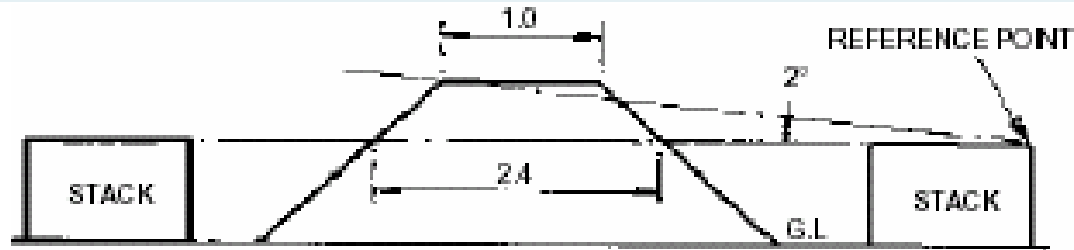


Fig 1 Determination of Traverse Height on Level Terrain

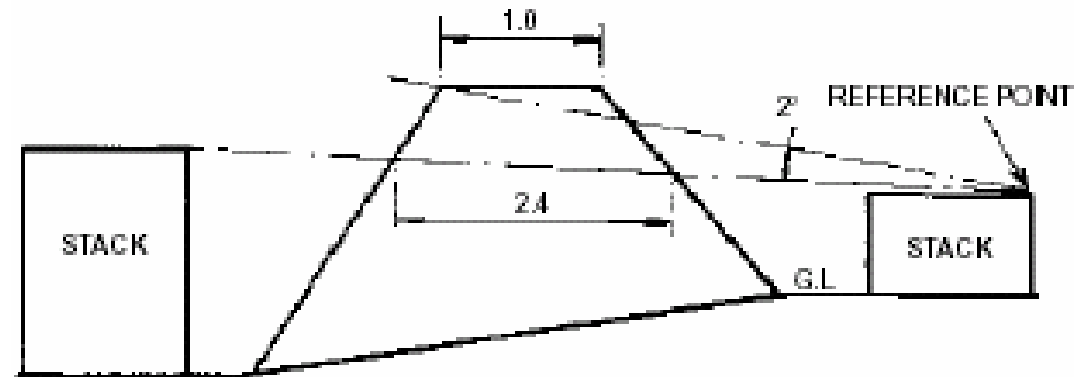


Fig 2 Determination of Traverse Height on Sloping Terrain

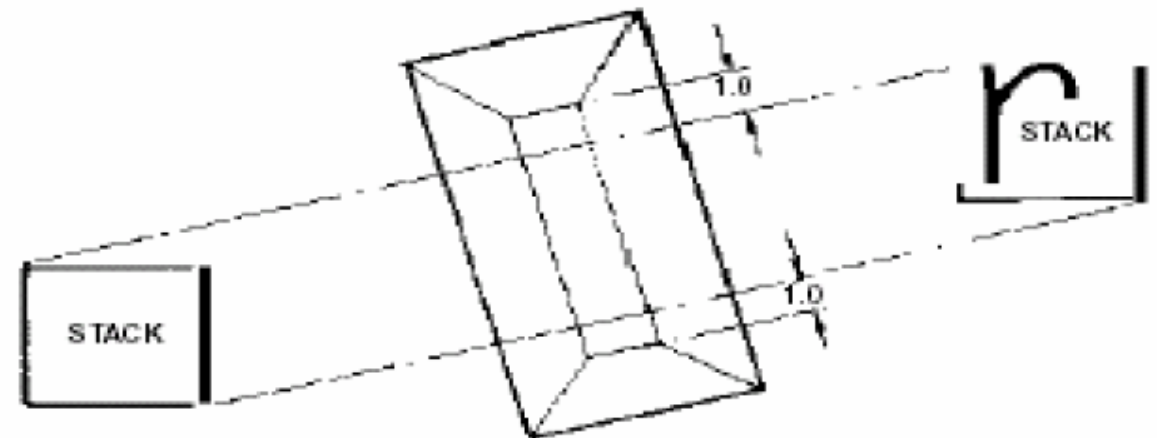


Fig 3 Determination of Traverse Length

Geometry – 0.3 metre rule (AASTP-1)

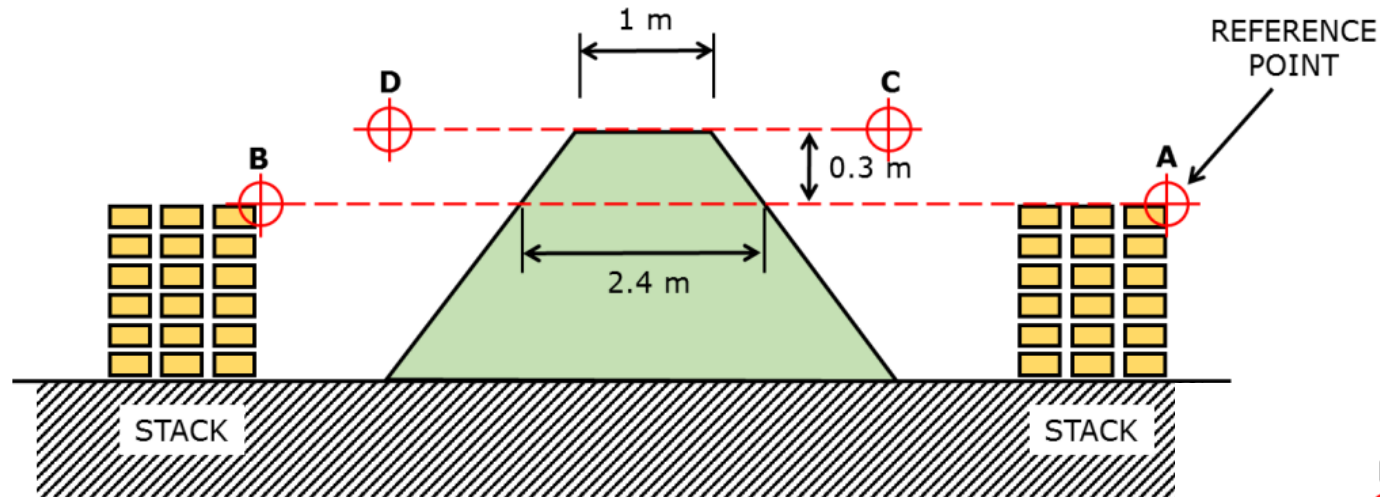


Figure 2-2: Determination of Barricade Height on Level Terrain

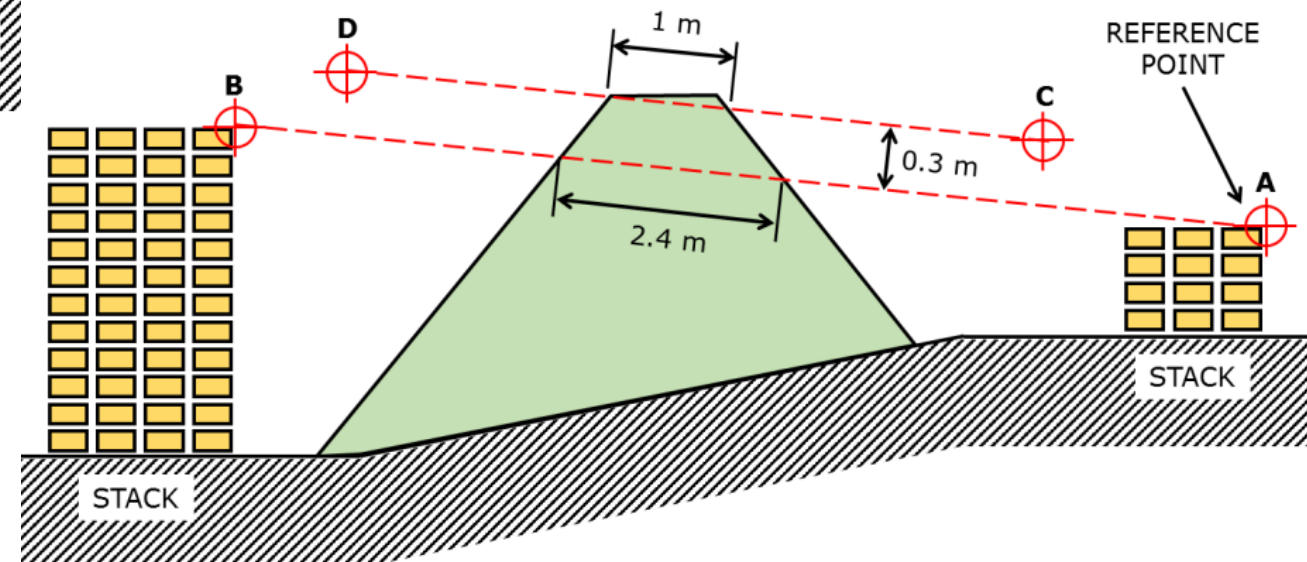


Figure 2-3: Determination of Barricade Height on Sloping Terrain

Materials

- Different types of material may be used to construct barricades **dependent on the storage hazard and the level of protection to be afforded**
- **There are a variety** of benefits and deficiencies **with using different barricade materials often** taking into account the availability of materials in the nation
- Materials that may be used for temporary barricades, include:
Hesco Bastion, Water barricades, **soil barriers, HD1.4 (*in-extremis* only)**



Questions?

Lesson Objectives

You should now be able to:

- Explain the purpose of barricades & traverses
- Understand the importance of barricades & traverses in calculation of QDs
- Describe the different types of barricade and their purposes
- Understand the main design and construction requirements of barricades



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