AN OVERVIEW

TRAM INSTALLATION – BULK TANKERS

This document gives an overview of the requirements, and procedures for the installation of a TRAM Safety System.

Support Structure Requirements

This system has been designed and tested to meet the requirements of EN795:1997 Class D. This standard requires the TRAM system to withstand a static load of 10kN vertically down at the extremity of the TRAM arm (location A, figure 5).

Furthermore, the TRAM device is also required to arrest a 100kg mass after it has free-fallen through a distance of 2.5m. Again, the load is transmitted to the extremity of the TRAM arm.

The structure to which the TRAM system is attached must also comply with the requirements of EN795:1997 Class D anchor point. The suitability of a support structure for TRAM installation should be assessed by an engineer.

1. Determine Rail Location.

a. The rail location must be chosen to permit the operators of the TRAM Safety System to access all areas required for their work.

b) The rail location must also fulfil the clearance requirements shown below (Figure 5) to permit operation of the TRAM Safety System

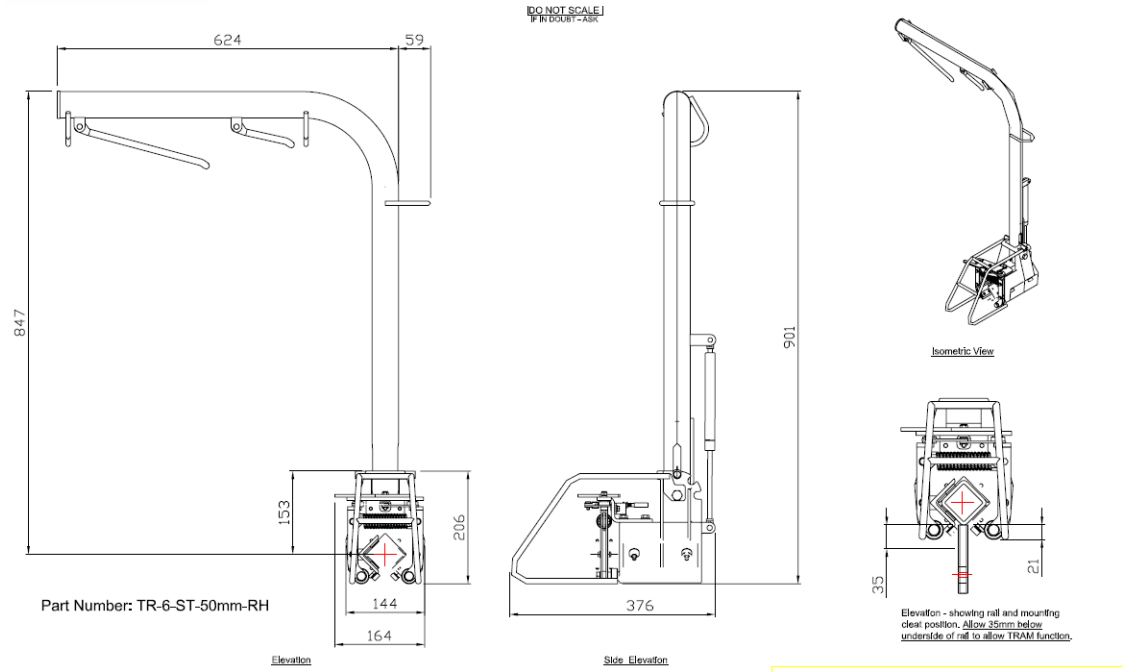

Figure 1: - Clearances required for TRAM Safety System installation

2. At the completion of the installation the TRAM should rest in a position level with the rear / front (see figures 2 and 3) of the tanker and in a position whereby the operator is not required to lean too far forward or lean back to connect his safety belt lanyards to the TRAM Safety System.

Figure 2 – TRAM in the rest position – positioned at the rear of the tanker.

Figure 3 – The TRAM positioned at the rear of the tanker allowing easy access for the operator to connect his safety belt to the attachment points on the TRAM Arm.

3. Prepare all parts required for installation:

a. The TRAM Rail is 50mm x 50mm x 5mm Square Hollow Section Material: Galvanised Mild Steel.

b. Rail Cleats in accordance with Standfast Drawing TR-06-1-035. Quantity required is subject to length of TRAM Rail to be installed. Note, if earthing[1] is required, then 1-off Rail Cleat should be in accordance with Standfast Drawing TR-06-1-D-036.

c. Mounting Brackets to suit the support structure. A range of standard mounting brackets is available from Standfast, and custom brackets can be designed to suit other installation geometries. Note, if earthing* is required, then 1-off Mounting

[1] Earth Strap: If Insulation Gaskets are to be used in an explosive environment, then an earthing strap must be used to earth the TRAM and TRAM Rail to the Mounting Brackets. An Earth Strap Kit is available from Standfast.

Bracket should facilitate the attachment of the Earth Strap (e.g. Standfast Drawing TR-06-1-D-027).

d. If required, a Rail Joiner (40mm x 40mm x 3mm) Square Hollow Section cut to 200mm length is inserted between the two oined lengths of 50mmx50mmx5mm RHS. Rail Joiner Material is: Galvanised Mild Steel.

e. Fasteners:

Item	Quantity per Bracket
Bolt Hexagonal Head M16 x 50mm Zinc Plated Steel, High Tensile (AS 1252 Grade 8.8)	2
Spring Washer M16, Zinc Plated Steel.	2
Flat Round Washer M16, Galvanized Steel	4
Nyloc Nut Hex M16 Zinc Plated Steel	2

f. Gaskets and bushes: If the Rail Cleat and Mounting Brackets are dissimilar materials, then gaskets should be used to insulate the materials and prevent corrosion. Insulation Gaskets and Bushes are available from Standfast.

g. Determine length of TRAM Rail to be installed. Note: If the required length of TRAM Rail is longer than supplied 50mmx50mmx5mm SHS, then sections of 50mmx50mmx5mm SHS must be joined using a Rail Joiner. Joining is to be carried out by inserting the Rail Joiner into the 50mmx50mmx5mm ends and fully butt welding around the external 50x50 joint.

4. Determine number of Rail cleats to be welded to TRAM Rail. Ensure the following 3 conditions are met:

a. Length of TRAM Rail to first Rail Cleat is less than 600mm (refer Figure).

b. Spacing between Rail Cleat must be 2400mm or less (between centres – refer Figure).

c. Distance between TRAM Arm lay-down position and bracket is 490mm maximum (refer Figure). This is to ensure Endstop with buffer does not interfere with Rail Cleat/ Bracket.

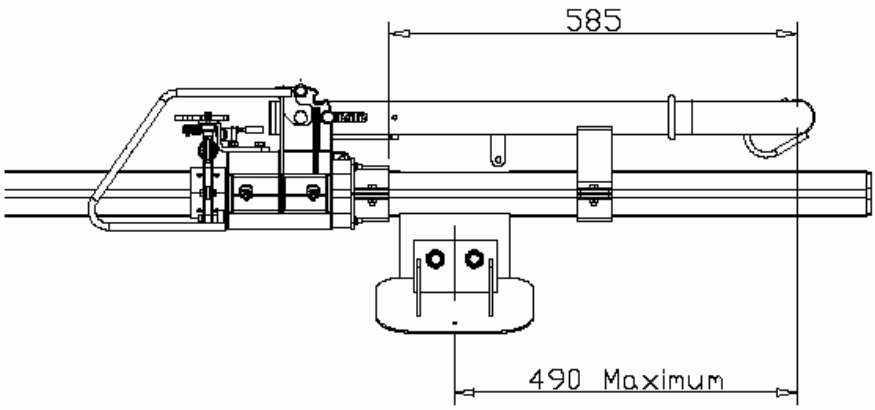

Figure 4: TRAM Layout in laydown position. Distance from centre of TRAM Arm to End Stop (with buffers) bracket is 585mm. Ensure the End Stop (with buffers) does not interfere with the Rail Cleat position.

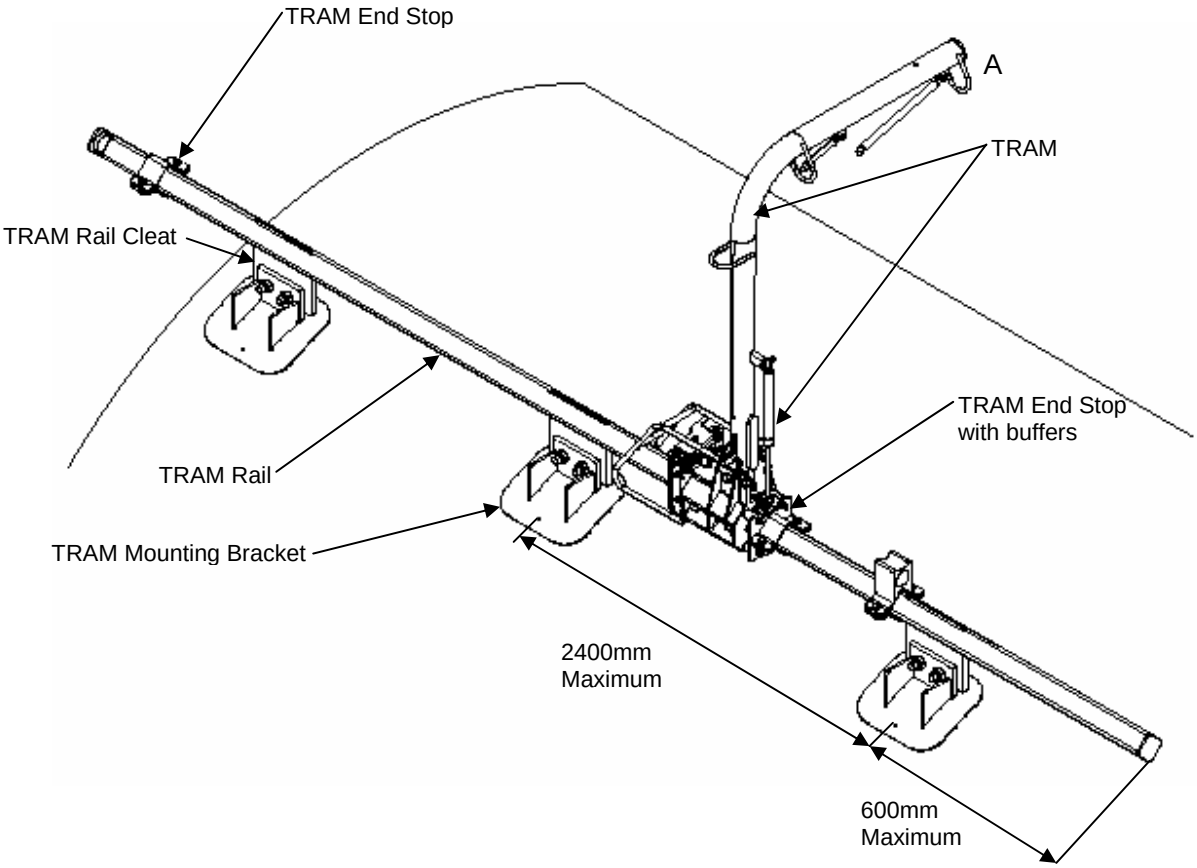

Figure 5: Parts of the TRAM System and Mounting Bracket positioning limits.

5. **Position the Mounting Brackets on the mounting surface. Ensure the bolting surface is vertical. Ensure the TRAM Arm lay down position will be correct – see Figure 1 for reference. Tack weld the mounting plates in place.**

6. **Fasten the Rail Cleats to the Mounting Brackets using the fasteners in 1.a.e. If fitted, ensure the Earth Strap Mounting Bracket and Earth Strap Rail Cleat are aligned together.**

7. **Position the TRAM Rail onto the Rail Cleats and tack weld in place. Ensure the TRAM Rail and all Mounting Brackets and Rail Cleats are in the correct position for correct function of the TRAM.**

8. **Remove the TRAM Rail (with Rail Cleats tack welded in place) and fully weld the Rail Cleats to the TRAM Rail with a continuous fillet weld of size 6mm along both sides of the Rail Cleat.**

9. **Fully Weld the Mounting Plate to the mounting surface using a continuous fillet weld of size 5mm around the compensation plate.**

10. **Install the TRAM Rail onto the Mounting Brackets using the fasteners in 1.a.e. Use corrosion insulation gaskets, bushes and earthing strap if required.**

End of Procedure