TRI

INDUSTRIAL SERVICES LTD

TRAM

FALL PROTECTION SYSTEMS

Introduction to TRAM

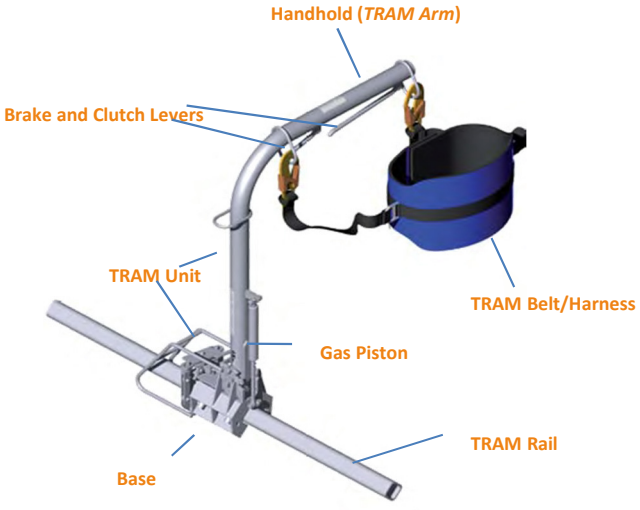
TOTAL RESTRAINT ACCESS MODULE (TRAM)

An innovative personal fall protection system

An ideal system of mobility and restraint is achieved through the movement of the **TRAM**, which provides a handhold that moves with the operator and is also a moveable anchor point for the restraint harness.

The design incorporated industry input that included management, operational staff and significant input/ feedback from drivers.

Tested in accordance with EN795



TRAM technology utilizes a handhold that moves with the operator (vertically and horizontally) and acts as a moveable anchor point for the restraint harness.

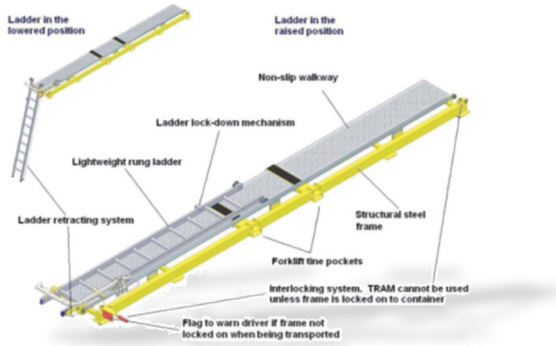
The operator is secured to the moveable anchor point via 2 lanyards and a restraint harness. The system is classified as a fall restraint system.

The system provides the user with mobility, restraint & protects operator during dangerous transition from the ladder to catwalk.

The user is securely attached to the unit at all times

TRAM Variations

The **TRAM** is available in several standard variations, designed to meet all requirements.



Standard TRAM

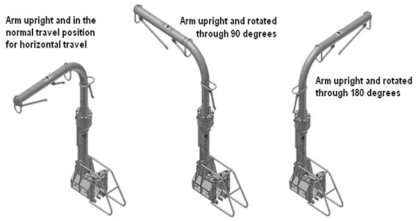
Access along work platform to several areas

Fixed Base TRAM

Single Access to work area

Rotating Arm TRAM

Allows shift to wider work area



ISO TRAM

Specific design for ISO Tanks and Containers

TRAM Industries

Due to its unique safety system and versatility the **TRAM** system can be used in many different areas of working at height

Bulk Tanker Access

Mobile Cranes

Overhead Cranes

Ship Loading

Conveyors

Site Installed

Wind Energy

Mine Vehicles

Road Construction

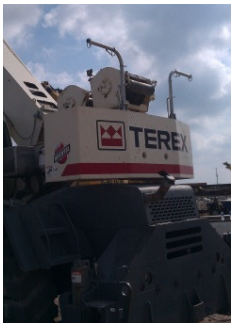
and many more…

Crane Access and Maintenance

Working on cranes, whether they are mobile cranes or site installed is inherently dangerous.

With fall risks on all sides, machinery and traffic as additional hazards the **TRAM** system offers 100% protection using restraint principles whilst giving full access to the work area.

Specially designed anchorage solutions are provided by the team at Standfast to suit your specific requirements.



Access to maintenance areas provides specific access needs. Standard fall protection often wont work due to the low clearance allowances.

The **TRAM** system overcomes these issues using restraint principles and assisted access to remove the risk of a fall during access and maintenance.

Mobile Cranes offer unique problems when it comes to essential and emergency repairs. If a crane is out of service on a site more often than not there is no means of safe access to the arm.

This issue is removed by the installation of a **TRAM** system.

Site Installed cranes often have height restrictions for access areas on the top side of the boom, where motors and cable drums are housed. This removes the possibility of hand rails and other such passive safety systems.

The **TRAM** system can be installed within these height restrictions whilst still ensuring 100% safety for the worker.

Mobile Tanker Access and Maintenance

Road Tankers offer dangers different to most work areas. The access platforms and ladders are subject to whatever weather is prevalent at the time, giving rise to increased risks of slips and falls.

The unique nature of the industries where tank containers are used means that access is required in all weather to load, empty and maintain tanks, both on site and at the delivery point.

Access to maintenance areas provides specific access needs. Standard fall protection often wont work due to the low clearance allowances.

The **TRAM** system overcomes these issues using restraint principles and assisted access to remove the risk of a fall during access and maintenance.

Regardless of the design of the tanker, the **TRAM** system can be installed to suit the access and work requirements. Height is not an issue, including clearance for bridges as the **TRAM** can be installed within the current profile in many cases.

Installation of a **Mobile TRAM** or a **Fixed TRAM** can ensure safety for access to a single hatch point or indeed several hatch points along the length of a tank.

Unique in the industry the **TRAM** offers freedom of movement and 100% safety wherever your vehicle is stationed.

ISO Tank Access and Maintenance

ISO Tanks are similar to Road Tankers in their working at height risks in that the access requirements can be anywhere at anytime, removing the possibility of ensuring safety through site based installations.

The **ISO TRAM** solution provides site wide safety for the access and maintenance of ISO Tanks, using the same restraint principles as the individual installations.

Access to maintenance areas provides specific access needs. Standard fall protection often wont work due to the low clearance allowances.

The **ISO TRAM** system overcomes these issues using restraint principles and assisted access to remove the risk of a fall during access and maintenance.

Mounted to a frame to lock into the lifting and lock points for the ISO Tank, the **ISO TRAM** is universal, and easy to install using a standard fork truck. Available in standard 20', 30' or 40'

The **ISO TRAM** is available either with a fold down ladder and integral platform or purely as the **ISO TRAM** unit, dependant on the style of ISO Tank.

Installation of an **ISO TRAM** can ensure safety for access to a single hatch point or indeed several hatch points along the length of a tank.

Unique in the industry the **TRAM** offers freedom of movement and 100% safety wherever your ISO Tank is stationed.

Site Installed

In all industries there can be found unique working at height safety issues that cannot be successfully solved by traditional methods.

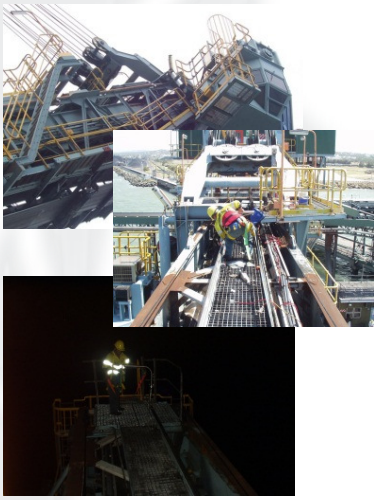
The unique solutions offered by the **TRAM** family of products provides solutions to these problematic situations.

Access to maintenance areas on **Drill Rigs** provides specific access needs. Standard fall protection often wont work and the **TRAM** system is ideal for this situation, with stainless steel construction and robust manufacture.

The **TRAM** system overcomes safety issues using restraint principles and assisted access to remove the risk of a fall during access and maintenance.

Roller Coaster Access is always difficult due to the construction style of the structures, the requirements of the tracks and the aesthetic qualities required by the owners.

The installation of a **TRAM** system can provide safety and access assistance without interfering with any part of the ride, access or profile by clamping directly to the tracks.



Access to **Offshore platforms, Loading Docks** and other access and maintenance points in offshore and dockland situations provides a unique set of circumstances.

With aggressive environments, strong winds, sifting platforms and 24 hour access requirements the **TRAM** system offers not only access and safety, but also a physical hold-point and guide for these extreme conditions.

The **TRAM** system with its stainless steel robust manufacture can cope with all the conditions of the offshore and dockland environment, providing height safety in a way no traditional methods can.

Quarry & Mining Industry

The Quarry & Mining Industry, whether Open Cast or Shaft method has many areas of height safety that are specific to this industry, while not being able to be protected by traditional means.

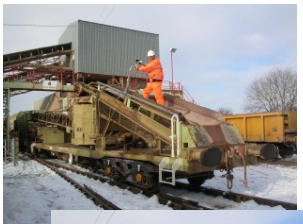
From the large vehicles used in large quarries and open cast mining, to the conveyors and final distribution vehicles there are many applications where the **TRAM** is the only 100% solution.

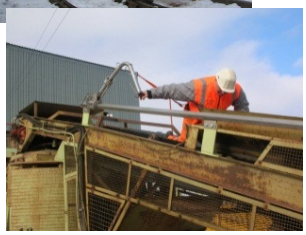
Access to maintenance areas on **Mobile Plant** provides specific access needs. Standard fall protection often wont work due to the low clearance allowances. The fact that this maintenance is required anywhere on site during a failure compounds the problem.

The **TRAM** system overcomes these issues using restraint principles and assisted access to remove the risk of a fall during access and maintenance.

Agitators offer unique problems when it comes to essential and emergency repairs. Blocked chutes and damaged hydraulics require on site maintenance, and the majority of places visited by these vehicles are not equipped with such access equipment.

This issue is removed by the installation of a **TRAM** system.





Conveyor Systems, whether mobile or permanent require on-going maintenance for roller repair, blockage removal and greasing. Access can often be problematic and dangerous due to imposed overhead height restrictions removing the possibility of a structural solution, and low clearances removing the ability of traditional methods to provide safety.

The **TRAM** system can be installed within these height restrictions whilst still ensuring 100% safety for the worker using restraint principles.

Other Application Examples

The **TRAM** System is so versatile the list of applications is endless. Below are a selection of examples.

Emergency Fire Vehicles have unique access compared to any other vehicle. With maintenance on pumps, hoses and ladder units, combined with limited fall clearance the **TRAM** system provides all the access required.

The stainless steel construction and ease of use also means that the “in action” use of the **TRAM** system provides long term safety for the Fire Fighters when in even the most arduous of environments.

Access to the Nacelle top of **Wind Turbines** is one of the most hazardous jobs in the world.

With turbines installed in the highest wind areas in any country the workers are subjected to being unbalanced and possibly blown off the nacelle at any point. With the towers also being flexible there is more movement at the top of the tower than you would expect, meaning the floor is continually shifting.

Installation of the **TRAM** system not only provides a safe means of anchorage using restraint, but also provides access assistance to the nacelle top, and a mobile structure to give the worker stability.

Standard TRAM

Standard TRAM - right hand version, shown mounted on rail and with belt

Standard TRAM - left hand version

The **Standard TRAM** unit comes in left and right hand variants. Standard TRAM is suitable where access to the work platform or walkway is at one end of and in line with, the TRAM rail.

EXTENDED OR REDUCED ARM FOR TRAM

The length of the TRAM arm can be shortened or lengthened if desired. Please advise us of your requirements when you place an order.

Fixed Base TRAM

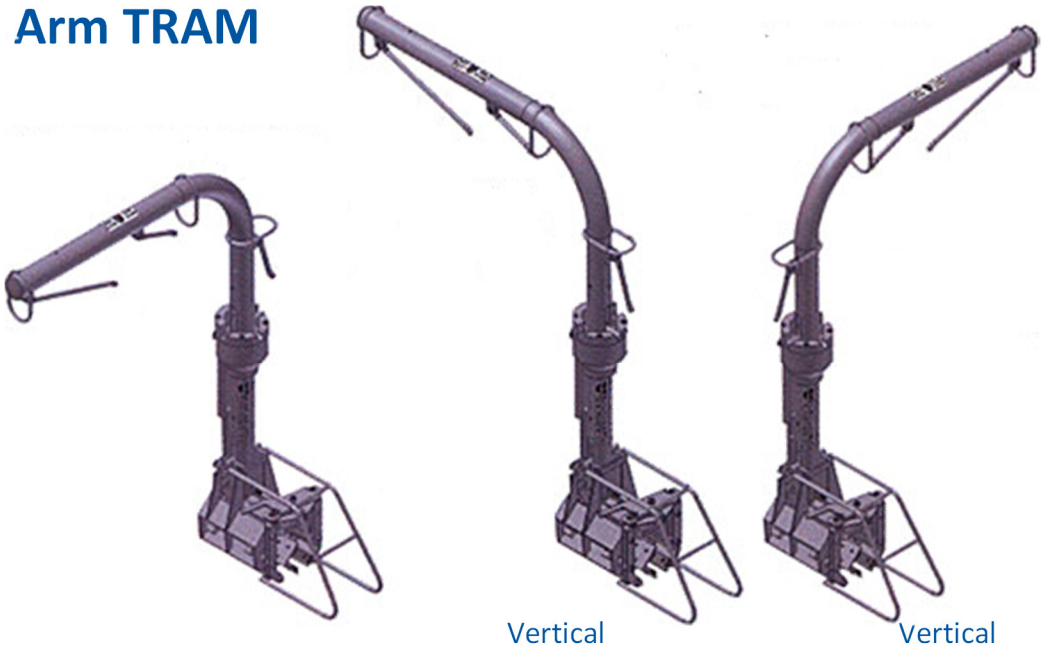
Horizontal position

45 degree position

Vertical position

The Fixed Base TRAM consists of a pivoting TRAM Arm without a TRAM Rail. This gives the operator access and egress from a ladder to a platform where movement by the operator long a fixed rail is not required. A 270 degree rotating arm may be fitted to provide access to a greater work area.

Rotating Arm TRAM



Normal Position

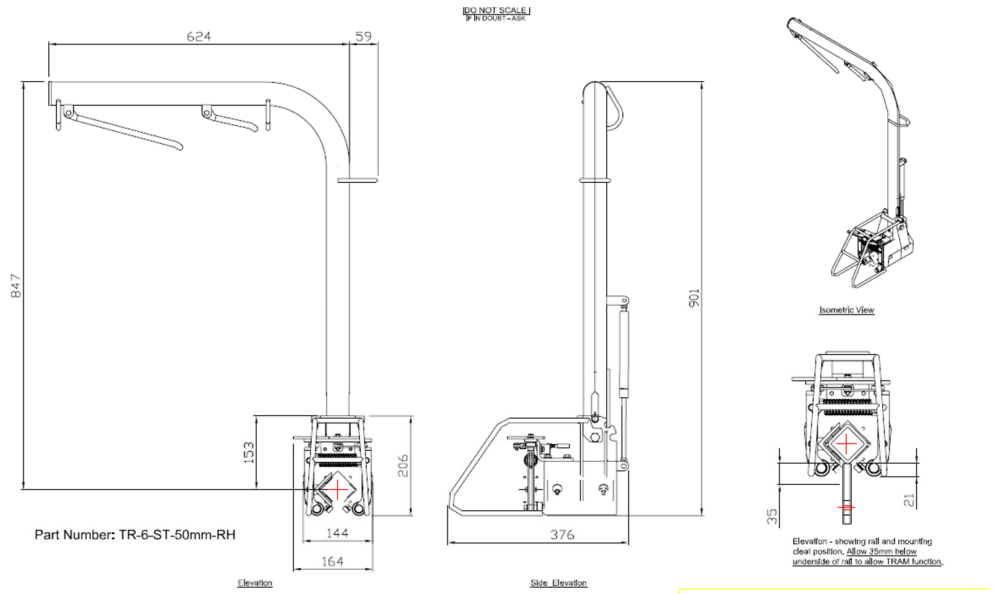
Vertical position and turned through 90 degrees

Vertical position and turned through 180 degrees

Provides 270 degree rotation. Also available in Extended arm and Reduced arm variants

The **Rotating Arm TRAM** consists of a Standard TRAM with a rotary joint mounted on the TRAM allowing the arm to pivot perpendicular to the rail. This allows TRAM to be used where the access point is to the side of the walkway. The Rotating Arm TRAM is available in Left and Right hand variants.

TRAM Dimensions



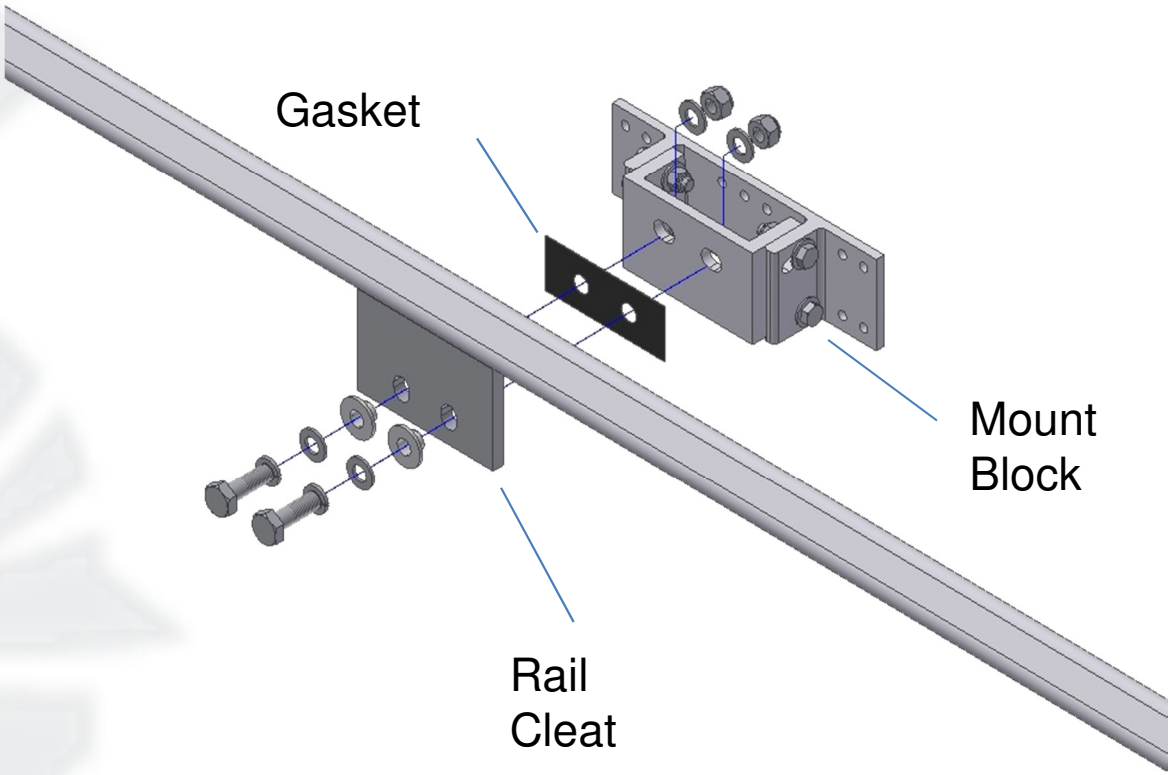
TRAM Material Specifications

Weight per TRAM unit	:	18 kg
Weight of TRAM rail	:	4.5 kg/m
TRAM Base	:	2205 Duplex Stainless Steel
TRAM Arm	:	Grade 316 Stainless Steel
TRAM Rail	:	50 x 50 x 3mm welded square box tubing Grade 304 Stainless Steel

Attaching the Rail.

Cleats are welded to the rail in specified positions to marry up with the positions of the mounting blocks.

Once the mounting blocks are in place the rail cleat is simply bolted to the mounting block, with a gasket in between to prevent cross metallic corrosion where this is a possibility..



The **TRAM** system can be fixed using a variety of methods, purely determined by the requirements of your site and situation.

Welding, Bolting, Banding, Mechanical Fix to Concrete and Structural Adhesives are all used by the **TRAM** installation teams.

A range of brackets are available for use with the **TRAM** system, each designed specifically for the application, and special brackets can be designed for individual requirements where needed.

Welding

For welding to standard structures the specifications are given specific to the install, dependent on materials and system design.

For welding to tank containers a specialist welder and suitable permits are required.

Bolting

Using existing structural elements and drilling and bolting to suit is the quickest and least specialist installation type.

Examination of the structure by an engineer is required, and if the structure is not suitable then additional brackets will be required as strengthening elements or new welded anchorages.

Banding

On Crane booms or smaller box cranes and similar structures in several cases drilling or welding or the structure is not permitted due to integrity concerns.

In these instances a specially developed banding system can be employed to provide the structural anchorages required.

Structural Adhesives

Using Terostat MS 9399 the mounting brackets can be mounted to structures where no other fixing method is possible or allowed.

Terostat MS 9399 is a highly viscous, sag-resistant, two-component adhesive based on silane-modified polymers, which cures independently of the atmospheric moisture to an elastic product

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