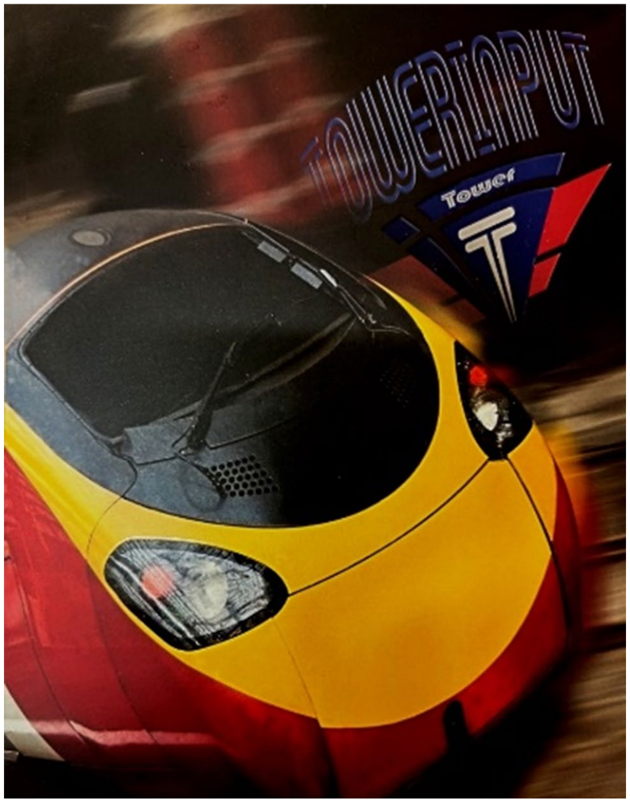
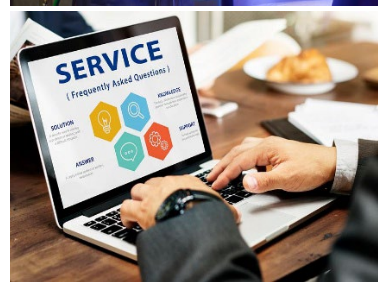


PRODUCTS & SERVICES INFORMATION



Towerinput Group Limited

CONTENTS

Manufactured Products and Finishing.

Strategically located in the heart of the UK, Towerinput Rail Supplies Ltd (TRS) are specialists in the production of GRP and Phenolic Resin Mouldings for both the UK and European Rail, Transport and Associated Industries.

TRS has more recently enhanced their portfolio with the ability to supply ***Rail Industry Pipe Work Systems.***

TRS has a team of highly qualified and competent manufacturing staff with many years experience in the production of ***Internal and External Doors, Body Panels, Valances, Head Light Housings in GRP and Phenolic Resins.***

To these strengths is added the ability to successfully procure and supply qualitative products for both ***Rail Bogie*** and ***Carriage Pipe Work*** requirements.

TRS designs, produces and maintains its own Tooling for the manufacture of ***GRP*** and ***Phenolic Resin Mouldings.***

This encompasses:

Doors – External – *MKI, MKII, MKIII, CL158 Gangway End Door.* Internal – *All Classifications as well as Toilet and Modular*
Side Skirts – *All Classifications*
Valances – *All Classifications*
Head Light Covers – *All Classifications*
Litter Bins – *All Classifications*
Wall Panels – *All Classifications*
Ceiling Panels – *All Classifications*
Egress Covers – *All Classifications*
Register Doors – *All Classifications*
Baby Change Tables – *All Classifications*
Information Pods – *All Classifications*

TRS maintains in-house **curing ovens** and **paint spraying** facilities. Colour specification (**RAL**) are maintained to ensure product uniformity.

TRS is now able to supply Pipe Work associated product for both Carriage and Bogie applications.

This would entail the production of ***Preformed Pipe Work in Stainless Steel, Zinc Plated Mild Steel, Alpha Brass and Copper. Flexible Hydraulic and Pneumatic Hoses, Preformed Silicon Hoses, Pipe and Hose Clamps, Quick release couplings, Fabricated Brackets, Pipe Work Unions and Fasteners*** would form an intrinsic part of the total supply package.

TRS prides itself in continuing product improvement

The benefits to our customers:-

- **Single Source Supplier**
- **Reduced Stock and Warehouse commitments**
- **Simplified Supplier Management**
- **Reduced Purchasing Costs through less administrative involvement**
- **Just in time delivery**
- **Supplier with an aim of never ending product improvement**

TRS is committed to ***Total Quality Management*** and is accredited to ***BSEN ISO 9001-2008*** and has also achieved ***Link-Up approval.***

The quality systems within the company are maintained to the highest levels and as such are audited on a regular basis.

TRS suppliers are constantly audited to ensure the maintenance of the highest quality of product available and that they share our ideals of continued quality improvement.

The company is currently reviewing ***IRIS accreditation*** as a part of its further commitment to quality improvement.

A Selection of Manufactured / Reconditioned Products in Situ.

Doors | Tables | Headlights | Valances | Cab Dash | Panels | Galley

Repair processes Rail:


Internal - Exterior Repair / Refurbishment



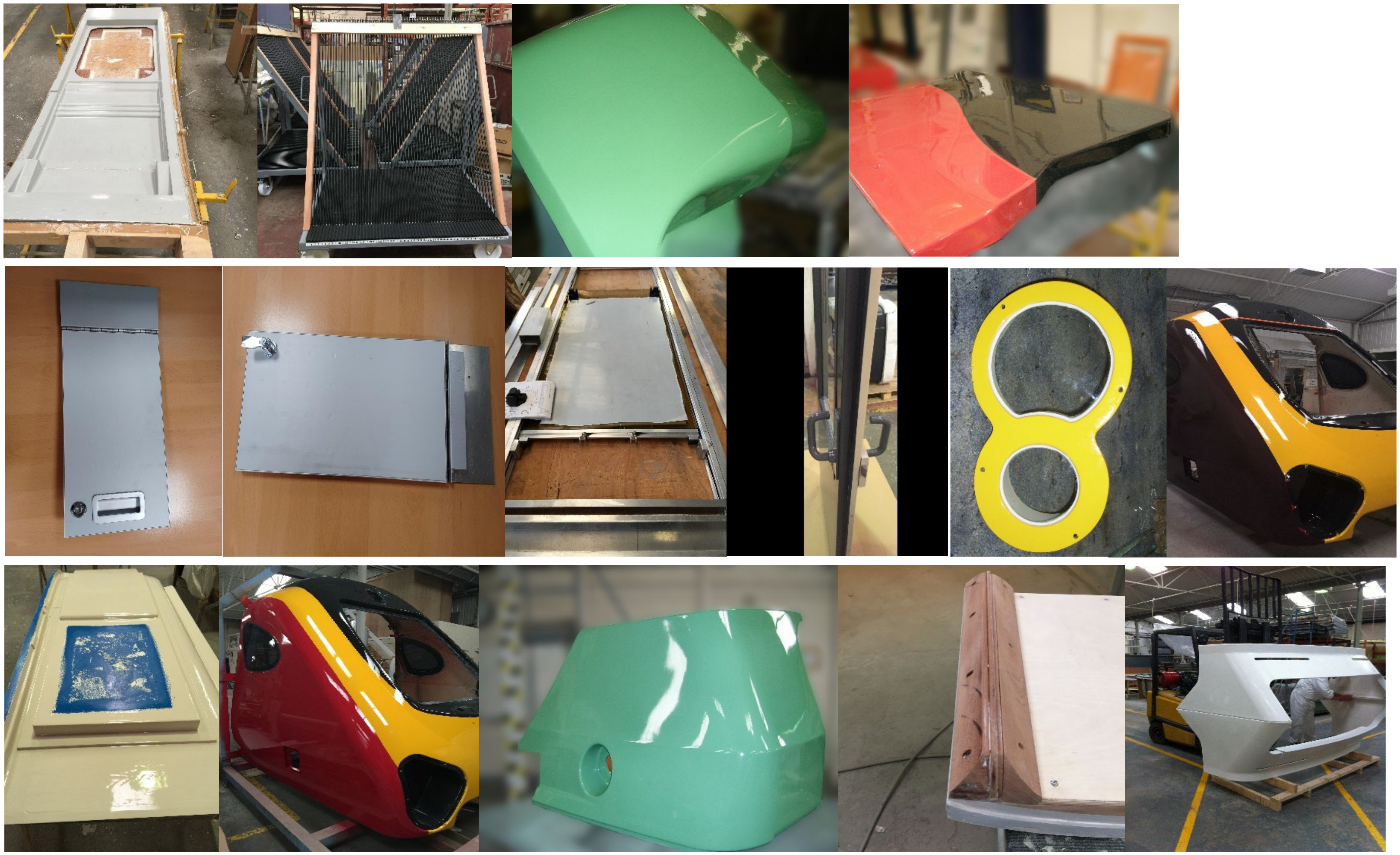

Refurbishment of Aluminium Disabled Toilet Doors, Passenger doors and Composite Draw Gear

Overall Operational Capabilities

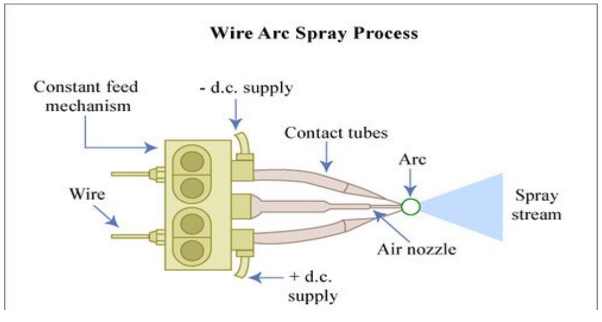
- Composite manufacturing / painting.
- Repairs and carriage refreshes.
- Manufacture of Train passenger and driver doors in Aluminium,
- Composite / Stainless steel, Hard wood inner luggage doors.
- Aluminium / laminated Galley doors,
- Load testing for Gangway end doors.
- MIG/TIG and Plasma facilities / programs for use on the manufacture of all metals including low carbon high strength steels.
- Side Skirts and Valances, headlight Assy's

- Aluminium oxide blasting of stainless steel,
- Thermally sprayed coatings using Electric arc processes,
- Two component hot applied solvent free coatings to D.W.I. specifications,
- Glass flake polyester and vinyl ester coatings,
- Airless and conventional spray applications.
- Two pack and single pack multi-coat paint systems.
- Urethane and epoxy coatings.
- Fire protection systems - intumescent thick and thin film deposits.
- Structural sections for major UK projects.

Manufacturing in Composites, Hard Woods, and Metals.



Anti-Corrosion Arc-Metal / Finished Paint Coatings



Thermal Spraying / Airless Spraying

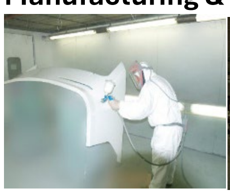


Arc spray (sometimes referred to as twin wire arc spray) is a process that uses an electric arc to melt wires.
The molten metal is then atomised with compressed air to create a spray stream that applies the coating onto the surface being sprayed. The resulting coating offers exceptional corrosion resistance, thermal protection, and wear resistance.
Metal or thermal spraying is a technology, which protects and greatly extends the life of a wide variety of products in the most hostile environments and in situations where coatings are vital for longevity.

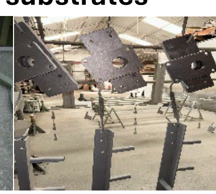
The variety of metallised coatings is vast but can be broken down into two main categories. These include finishing coatings, such as anti-corrosion or decorative coatings, and engineering **coatings such as wear resistant and thermal barrier coatings.**

Finished coated post metal Spray protection.


Manufacturing & Painting processes for composite and metalic substrates



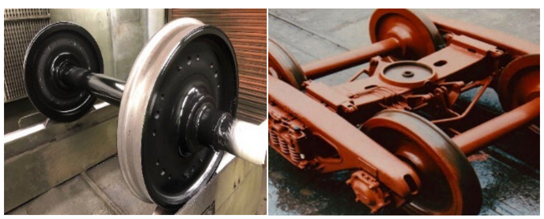


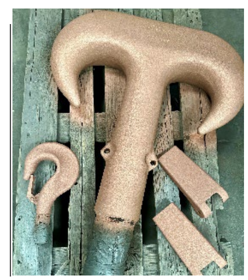




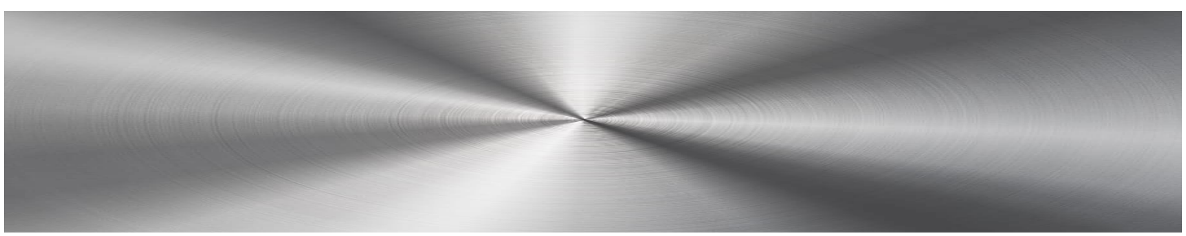
Further examples of treated products conducted by Towerinput.

Thermal Spraying has proved itself to be extremely effective in the 100 years of its existence in all manner of different applications ranging from coatings in gas turbines to corrosion protection on outdoor seating.
As a protective system for structural steelwork, it is unsurpassed being the only system, recommended by International and European standards EN ISO 14713
Providing more than 20 years to first maintenance in very aggressive environments such the marine splash zone (category lm2) as well as all other categories.





Used materials for corrosion protection are Aluminium and Zinc. A third material is Zinc / Aluminium Alloy (85%Zn / 15%Al). The choice of material to be used is a vast topic with many factors to be taken into consideration such as environment corrosive atmosphere, temperature etc.), local authority specifications, life expectancy of the coating, adhesion requirements, availability of material to name but a few.



Corrosion Testing

Products have undergone a range of accelerated corrosion testing.
This offers a comparison of the performance between the coating.
and 99.5% Aluminum that has offered corrosion protection for several decades, in harsh, corrosive environments around the world.

Two tests were undertaken by an independent research laboratory:
• Galvanic corrosion tests for 1 week.
• Neutral salt spray corrosion tests for one thousand hours.

The latter was performed in accordance with ASTM B117.
It was concluded that in both tests, the corrosion protection performance of the product was comparable to 99.5% Aluminum, thus enabling confidence that the coating will provide excellent corrosion protection in harsh environments.

FLEXIBILITY

Metal spraying is a very flexible process. The range or materials that can be sprayed is almost limitless.
In effect, if a material can be heated to its melting point without boiling away, the material can be sprayed. Other common materials used in finishing applications are: -

- Copper,
- Aluminium/Bronze
- Phosphor/Bronze, often used for decorative purposes.
- Also, a wide range of steel materials can be used for corrosion and wear protection.

Bridges and other Steelwork including iron
Protection from corrosion – it also helps extend a bridge's life. The arc and is melted, is ideal for protecting bridges. Metal spraying is proven to be the best protection from corrosion and can provide protection for up to **25 years to first maintenance**.
Any material exposed the various adverse conditions, including Train Bogies and heavy Plant and equipment benefits from Arc Metal protection, including reclamation of worn parts.

Metal Spraying Versus Galvanising
Metal spraying has many advantages for lots of industries, as well as being a great alternative to hot dip galvanising, which can cause distortion to the structures being dipped. Galvanising is a hot process whereas metal spraying is a warm process. The advantages of metal spraying include: no distortion due to heat, fabrications to be treated without the risk of explosion; no size limit; carried out on site, when equipment's not being used it can be switched off – saving money.

Twin component Thixotropic Mastic Coatings

Anti-Slip Coating for platforms and walkways: -

Anti slip applications for flooring to reduce the risk of slips and falls for industrial usage.

The system can be installed indoors and outdoors including retail, commercial, industrial, and marine environments.

The anti-slip coating creates an ultra-hard layer that will provide excellent friction and water resistance on flooring, making it a great alternative to offer protection for workers in the industrial field and public walkways. The recommended applications for anti-slip coatings can be installed on:

- Ferrous and non-ferrous metals (including Marine)
- Concrete
- Wood surfaces
- Stone – marble, granite, limestone
- Brick

Marine deck post treatment.

Wear and non-slip testing for defense standard 80-134/2 Systems M.O.D.

The system used is as follows.

- Mastic
- Tower Non-Skid

The results of wear testing (samples one & 2) are detailed in table 1.

Samples 1-6 in table 2.

Painted system panels to Defense Standard (as above) were subjected to wear testing in accordance with Annex F of the specification (system panels one & 2)

In addition, non-slip testing was conducted on the new coating (system panels 3.4.5 & 6) and on the worn coating (samples 1 & 2). The non-slip testing was caried out both on wet and oil conditions according to Annex G of the specification.

Table 1. Results of wear test

Sample	M1 Grams	M2 Grams	M1-M2 Grams	Comments
1	642.29	641.42	0.87	No penetration of the substrate. Small amount of grit / dust and peaks removed. The sample met the standards of defence requirement 80 134 / 2
2	637.40	635.56	1.84	No penetration of the substrate. Small amount of grit / dust and peaks removed. The sample met the standards of defence requirement 80 134/ 2

Table 2. Results of Anti-Skid

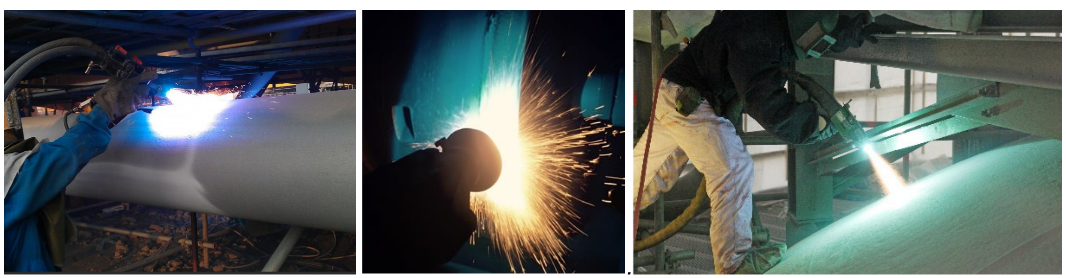
Sample	Wet Nonslip Average TRL reading	Oil Nonslip Average TRL reading	Comments
3,4,5,6.	87.5	51.5	Both Oil and Wet Non-slip exceeded the specification for a new unused coating

Materials

Used materials for corrosion protection are Aluminium and Zinc. A third material is Zinc / Aluminium Alloy (85%Zn / 15%Al). The choice of material to be used is a vast topic with many factors to be taken into consideration such as environment (corrosive atmosphere, temperature etc.), local authority specifications, life expectancy of the coating, adhesion requirements, availability of material to name but a few.

In general terms, zinc is used in reasonably low corrosion applications such as water tanks, some bridges and general structural steelwork. Aluminium is used in harsher corrosion applications such as saltwater and splash-zone areas. In addition, aluminium is used in high temperature applications such as flare booms on offshore oilrigs as the aluminium effectively dissolves into the substrate when exposed to high temperatures (aluminising). Zinc/Aluminium alloy is used in environments where the corrosion resistance of zinc is borderline.

Thermal Spraying has proved itself to be extremely effective in the 90 years of its existence in all manner of different applications ranging from coatings in gas turbines to corrosion protection on outdoor seating.
As a protective system for structural steelwork, it is unsurpassed being the only system, recommended by International and European standards EN ISO 14713: - providing more than 25 years to first maintenance in very aggressive environments such the marine splash zone (category lm2) as well as all other categories.



Metal Arc Spraying on Steel Substrates

Applications- Metal Spraying

Metal spraying is a very flexible process. The range or materials that can be sprayed is almost limitless.
In effect, if a material can be heated to its melting point without boiling away, the material can be sprayed. Other common materials used in finishing applications are: -

- Copper,
- Aluminium/Bronze,
- Phosphor/Bronze, often used for decorative purposes,
- Also, a wide range of steel materials can be used for corrosion and wear protection.

This is a very short summary of a virtually endless list of applications. A few examples are: -

Wind Turbines - Atmospheric corrosion causes damage. It’s for this reason many manufacturers specify thermal sprayed zinc or zinc/aluminium alloys as a method of corrosion protection.

Oil Industry – Pipes are often exposed to harsh elements and oil and gas platform structures benefit from the application of thermal sprayed aluminium (TSA). This is done using the arc spray process, where the molten material is atomised by a cone of compressed air and propelled towards the pipes.

Petro-chemical Plants- In the Petro-chemical in where accelerated corrosion can occur under wet insulation – consumes a significant percentage of maintenance budgets. By protecting against CUI, companies can move towards inspection-free and maintenance-free piping systems and significantly reduce maintenance costs. Metal spraying is the ideal solution for the protection of refinery and process plant vessels, tanks and steel fabrications, as it’s proven to be a very robust coating solution for protecting against CUI.

Structural Steelwork any material exposed the various adverse conditions, including Train Bogies and heavy Plant and equipment benefits from Arc Metal protection, including reclamation of worn parts

Reclamation of parts **Repair of Damaged Hydraulic Cylinders**

Architectural Coatings

There are many creative architectural coating solutions for things like balcony parts, such as support columns, balcony decks and curved railings, and decorative window and doorframes. If used externally, they will be subjected to the corrosive effects of the weather so need to be protected. Metal spraying is ideal for this, as being a cold process there is no risk of distortion or fettling, unlike with hot dip galvanizing. There's also the opportunity to use different coatings, such as bronze or copper, to fit with the overall design scheme.


AERO STAKING
TOOLS FOR BEARINGS
PRODUCT LINE

THE TEAM

- **Marc Rickards CEO**
- **John C Green Director**
- **Lorna J Parker Customer Account Manager**
- **Michael J Round Senior Quality Manager**
- **Alex Ferguson Project Technical Manager**
- **S J Westwood Engineering Sales Coordinator**
- **TK Parker Purchase Ledger Control**
- **RG Bills Production Control**
- **Mathew Williams Senior Materials Engineer**
- **Andrew Pinson Senior Site Engineer**
- **C Compton Production Engineering leader**
- **Paul Brophy Coatings Team Leader**

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