

connecting the world



TUNNELLING



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the tunnelling market

Tunnelling is a key facet of infrastructure development particularly where existing transport networks are stretched to capacity and need to be supplemented to cope with increases in throughput. The same can be said of tunnels that are constructed for water transfer, sewage management and storage purposes.

Delivery of specialist tunnelling products on a global scale to tight project schedules is one of Cooper & Turners core strengths.

Cooper & Turner has a long history of supplying tunnel bolts to the mining and tunnelling industry. With facilities in UK, Denmark and China, the company is one of the world's leading manufacturers of specialist bolts to the modern tunnelling industry. With a comprehensive network of worldwide agents, Cooper & Turner can service any project, no matter how complex, cost effectively and efficiently.

Tunnelling Products Expertise

With full 'in house' facilities, Cooper & Turner is capable of manufacturing a comprehensive range of tunnelling products. The range includes all sizes from M12 to M100 as standard. The company is also able to manufacture special fasteners for bespoke requirements and to drawing.

The company has a particular expertise in the manufacture and moulding of products for the global tunnelling industry offering contractors a 'one stop shop' for a comprehensive range of tunnelling bolts, plastic fittings including bolt sockets, dowels, spacers, grout/lifting sockets, plugs and non return valves.

Product is supplied packed and labelled to export standards with all of the necessary, completed documentation.

Cooper & Turner was the first company to develop a range of 'Fast Thread' products for this marketplace. These greatly facilitate rapid assembly in what can be an extremely dangerous environment.

All fixings can be manufactured across a diverse range of grades:

- *Mild Steel*
- *High Tensile*
- *Stainless Steel*

A full range of coatings is also available including galvanized, sherardised, bright zinc plating and other specialist finishes.



Alignment Dowels



Threaded Lifting/Grouting Sockets



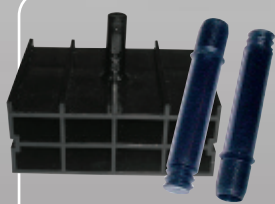
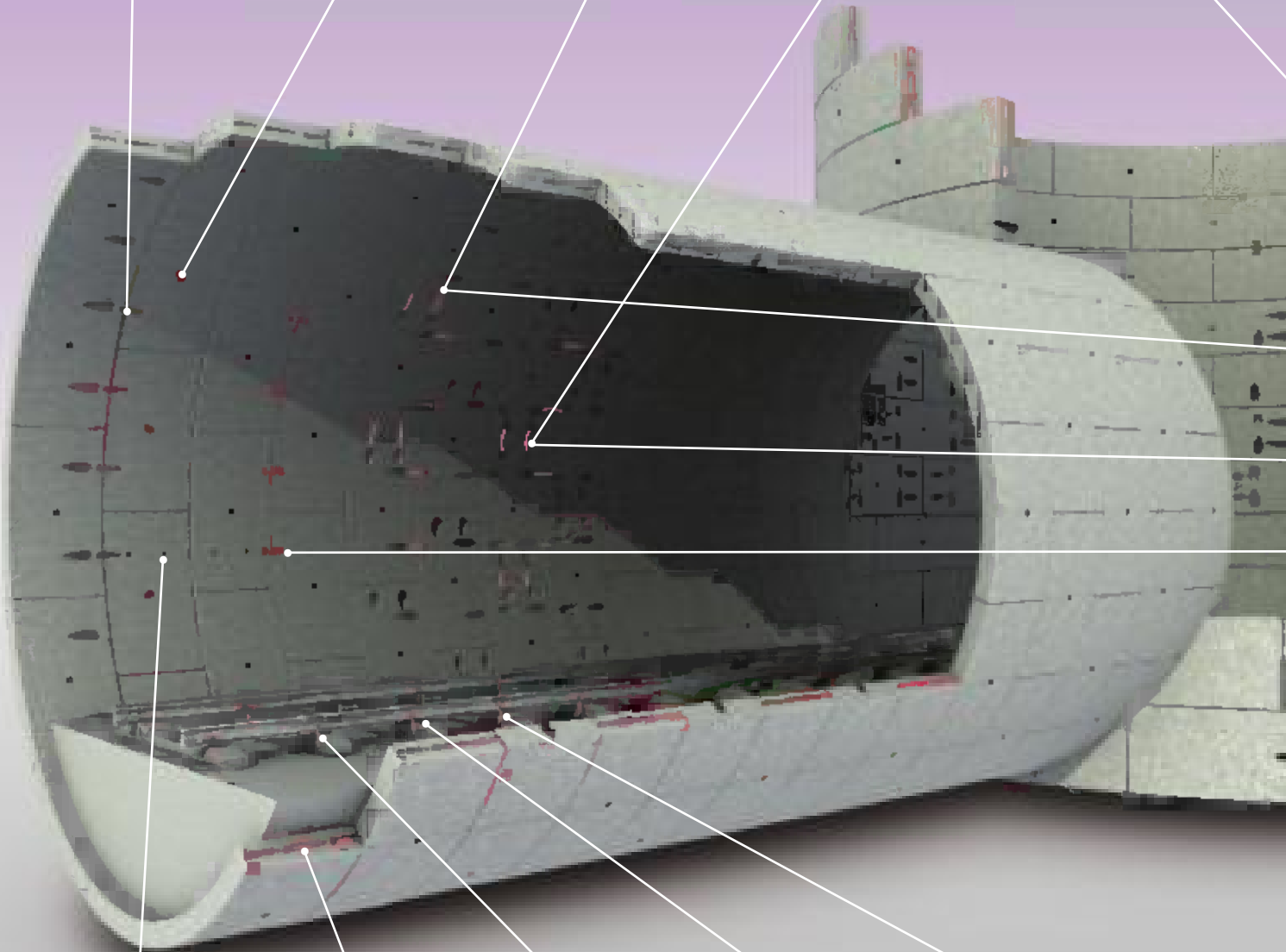
Spear Bolts and Sockets



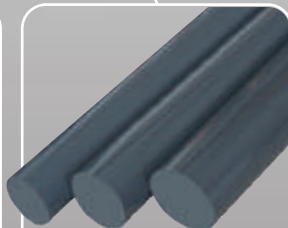
Curved Tunnel Bolts



Dowel Connecting Systems



Segment Spacers and Hole Formers



Guide Rods



Holding Down Studs



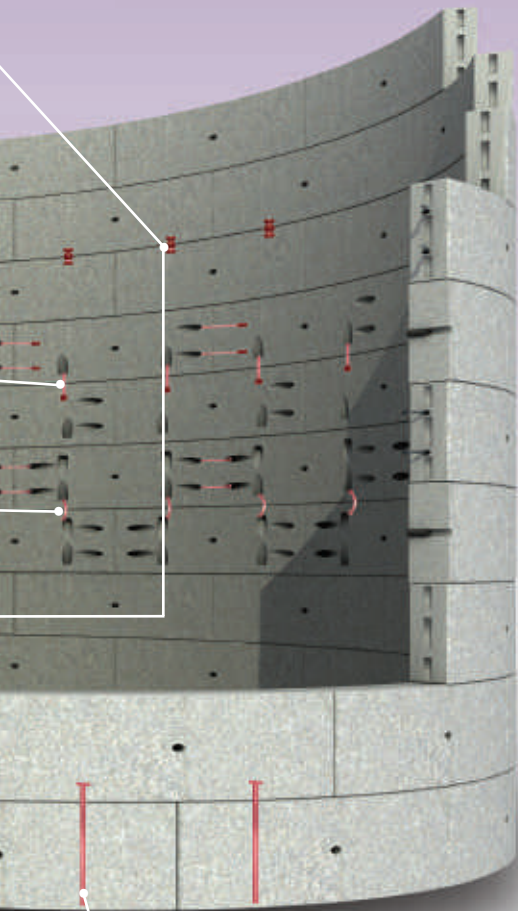
Rail Clips



Rail Fastenings

product portfolio

The following products are just a selection of tunnelling fasteners that Cooper & Turner can offer. The company take a pro-active stance on all of its product offerings and is constantly developing new versions to address the particular challenges of the tunnelling marketplace.



T-Head
Bolts



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Spear Bolts and Sockets

Spear bolts and the accompanying 'cast in' sockets are used to permanently fix tunnel segments together and can be used in both the radial and circumferential joints. The major advantage of the spear bolt is that following installation, only one pocket per connection requires finishing. Cooper & Turner manufacture and supply the complete range of sizes from M16-M30 diameter with lengths to a customer's specification. Other non standard sizes can be made to order. Mild steel 4.6 and high tensile 8.8 grades are standard. Other grades are available on request. Spear bolts are supplied self colour, galvanised or sherardised as standard but once again - other finishes are available where specified.



Curved Tunnel Bolts

Curved bolts are used to permanently fix tunnel segments together through a radius hole. They can be applied to both radial and circumferential joints. A complete range of this product is readily available from M16 to M30 diameters. Length and radius can be made to a customer's specific requirement. Mild steel 4.6 and high-tensile steel 8.8 grades are standard with other grades available on application. Curved tunnel bolts can be supplied in a range of finishes.

T-Head Bolts

T-Head bolts have been specifically developed for use in shaft construction. Typically, they are used when constructing a shaft using the underpin method. These can be manufactured in a range of sizes to suit segment widths. As with all other bolts, T-Head bolts come in a range of finish and grade.

Alignment Dowels

Alignment dowels are used to accurately align tunnel segments during construction. They are used in conjunction with the spear bolt locking system. Typically this product is applied to the radial joints.

Dowel Connecting Systems

Dowel connecting systems are many and varied with new versions constantly in development. The Dowelock system was designed to meet the highest standards of performance demanded by the modern tunnelling industry. It was designed to be the strongest, self-aligning locking dowel system in the world. Dowelock consists of a connecting dowel moulded from high strength, high durability plastic together with two locking assemblies, one cast into each adjacent tunnel lining segment. These patented locking collets allow the dowel to enter with minimum compression force and then lock in place preventing withdrawal. Significantly, the dowel can restrain the forces generated by both hydrophilic and compression gasket types, minimising joint gaps and offsets. Dowelock is uniquely flexible and can be used in all types of tunnel lining including trapezoidal rings whilst the non ferrous quality promotes a long tunnel life.

Threaded Lifting/Grouting Sockets

Threaded lifting/grouting sockets are specially designed to work in conjunction with the tunnel boring machine's segment erection system. They can be utilised for primary or secondary grouting or to anchor additional brackets/services in place. A variety of designs can be supplied to suit all requirements. Optional non-return valves and sealing plugs can be supplied to suit.

Guide Rods

Guide rods are manufactured from re-cycled plastic and are used to align the radial joints of a tunnel. They can be used in conjunction with curved or straight bolts and can be supplied in various diameters and lengths.

Segment Spacers and Hole Formers

Segment spacers are used to safely stack tunnel segments in storage yards. Hole formers are manufactured from a variety of plastics and are cast into the tunnel segments, once removed, they leave a void which can be used later to insert screw bolts once the tunnel ring is erected. These can then be utilised for holding permanent and temporary works in place. Spacers can be easily extracted from holes formed once segments are on site.

Holding Down Studs

Holding down studs come as a complete system and include anchors, nuts, helical springs, washers and sockets. This system is designed to meet the most demanding of performance expectations and is rigorously tested to internationally recognised standards.

Fixed Anchor System - designed for use where permanent anchor fixation is required. The standard fixed anchor range is available in M22, M24 and M27 diameters.

Removable Anchor System - designed for use where it is considered necessary to be able to temporarily remove the anchor from its foundation for access. The standard removable anchor range is available in M22, M24 and M27 diameters. Anchor lengths can be made to suit all applications

Rail Fastenings

Cooper & Turner manufacture a complete range of track fasteners for the rail market. The quality and diversity of this product makes them suitable for the world's railways. Bolts and nuts are produced to BSUIC and other rail standards. Diameters range from M12 ($\frac{1}{2}$ "") to M27 ($1\frac{1}{8}$ ""), with lengths to suit many different applications. Fifty years of manufacturing expertise for the rail market has enabled the company to build up unrivalled knowledge and experience in the supplying of coach screws, track bolts, holding down studs and a comprehensive range of maintenance items that meet the exacting standards of global rail contracts.

Rail Clips

Elastic rail clips are used to provide a resilient fastening of the rail flange. This is achieved by using cast iron or steel base plates or alternatively, by fastening directly to the substructure via a clip housing. Clips can be provided both with and without insulators



Within the broader range of civil engineering projects, Cooper & Turner and sister company McLean Buchanan & Wilson, manufacture and supply a diverse range of industrial fasteners to the rail, tunnelling, wind energy and construction markets.

Indeed, many of these 'off the shelf' and bespoke parts can be seen on some of the world's largest and most ambitious civil engineering projects.

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Added Value Services

Batch Traceability

All fasteners of grade 8.8 and above are totally batch-traceable. Test certificates can be supplied with goods and are retained for a minimum of 10 years.

Innovation

The company has worked hard over recent years to develop services that are of true value to the end user. A number of additional services are therefore available to the civil engineering market that are designed to make the selection and use of these structural fasteners easier:

- *'In house' technical support*
- *Site visits*
- *Instruction in bolt tightening techniques*
- *Training seminars on all forms of bolting*
- *New product development*

If you require any further assistance or technical information, please contact:



CONSTRUCTION | WIND ENERGY | TUNNELLING | RAIL | OEM

Cooper & Turner Limited | Sheffield Road | Sheffield S9 IRS

Telephone +44 (0)114 256 0057 | **Fax** +44 (0)114 244 5529

Email sales@cooperandturner.co.uk | **Website** www.cooperandturner.co.uk

