



## **THE BAMTEC CRCP SYSTEM**

### **Frequently Asked Questions**

**Q. Who is ONESTEEL REINFORCING ?**

- A. OneSteel Reinforcing is a market leader in developing and marketing a dynamic range of steel reinforcing solutions for building, construction, mining, rural and industrial applications. With a network of service centres and distribution partners, OneSteel Reinforcing stretches across the breadth of Australia.

From Rebar & mesh solutions to construction systems development and complete supply and fix packages, OneSteel Reinforcing is dedicated to Reinventing Reinforcing and finding new and better ways to design and build all types of reinforced concrete infrastructure.

**Q. Who is OK STEELEX ?**

- A. OK STEELEX is a major contract steel fixing operation, that has successfully carried out reinforcement fixing on the largest civil infrastructure projects undertaken in Sydney. In recent years, notably the M7 toll road, Eastern Distributor toll road + tunnel road linking the Sydney Harbour Tunnel with direct access to Sydney Airport.

At OK STEELEX the directors John O'Reilly and Len Beyers are committed to providing a competent, expert professional steel fixing operation. Their focus is on promoting and developing new methods of improving the speed and efficiency of reinforcing steel installation.

**Q. What is BAMTEC ?**

- A. 500PLUS BAMTEC® is a patented, steel reinforcing system, which is as easy to place as a roll of carpet. Developed in Germany, BAMTEC is a revolutionary approach to placing steel reinforcing in a wide variety of slabs and decks, greatly improving speed, quality and safety of construction.

BAMTEC involves prefabricating reinforcing steel "carpets" to virtually any shape or size. Individual 500PLUS Rebar steel reinforcing bars are welded to flexible steel straps, which can connect up to hundreds of bars together. When a carpet has been completed, it is rolled up for handling and transport. When needed on site, the carpet is simply lifted into place and unrolled - generally onto continuous bar chairs.

**Q. In the past, how has CRCP steel been placed ?**

- A. The OK STEELEX mechanical jig & truck mounted work platform was designed to increase the daily production of steel fixing in CRCP applications, improve Occupational Health & Safety and allow the CRCP steel fixing to keep well in advance of concrete paving operations.

Bundles of steel are loaded onto the mechanical jig for both the longitudinal and transverse CRCP steel. The longitudinal bundles of steel are opened and distributed across the platform. The transverse bundles are placed transversely underneath the wire tying & work area.

The longitudinal bars are then placed in slots, lapped with the previously fixed longitudinal bars and pulled through the slots through the forward movement of the truck & trailer. The transverse bars are lifted up under the longitudinal bars and wire tied. Using the jig's slotted guides provides a neat evenly spaced product quickly and efficiently.

The entire operation is located on the trailer with its truck position on the roadway guided by a pointer to locate it from the edge of the concrete sub-base. A rolling guide on the trailer locates the pavement edge and sets the required cover to the edge of the CRCP.

Plastic bar chairs are clipped onto the transverse bars as per project specifications. A typical scenario might have every second transverse bar chaired with a chair spacing of around 700mm along the bar.

Not only is production much improved over manually laying CRCP, OH&S is greatly improved through rotating workers through the various activities. This jig method won WorkCover's 2005 Award for Best Solution to a Workplace Manual Handling Hazard.



*The OK STEELEX Mechanical Jig & Truck Mounted Work Platform in action laying CRCP steel for the M7 Tollway. 10,000 tonne of steel was installed on the Project using this method.*

**Q. What is THE BAMTEC CRCP SYSTEM ?**

A. The BAMTEC CRCP SYSTEM utilises a re-engineered mechanical CRCP jig & truck mounted work platform to install BAMTEC reinforcing carpets for both the transverse and longitudinal CRCP steel, with plastic bar chairs subsequently clipped onto the transverse bars. The system combines the quality, speed and precision bar spacing of the BAMTEC system together with all the attributes of the mechanical CRCP jig to provide a safe, fast and efficient steel installation and fixing system.

The BAMTEC CRCP SYSTEM's major advantage over previous CRCP installation techniques are a significant reduction in on-site steel fixing resources – up to 50% which provides increased reliability and performance on site together with continued improvements in OH&S. All of the above combines to ensure steel installation is kept well in advance of concrete paving operations.

**Q. How does THE BAMTEC CRCP SYSTEM work ? Does it lay both the transverse and longitudinal steel ?**

A. Multiple rolls of transverse CRCP steel BAMTEC carpets are loaded transversely into the mechanical jig below and adjacent to the wire tying and work area. The first of these carpets is placed on a specially designed arrangement of wheels which provides both vertical support to the carpet and allows it to rotate when required. The other transverse carpets placed within this area sit behind the first, such that when the first carpet has been unrolled (installed), a replacement carpet can be easily pushed into position onto the wheel arrangement without the need for additional crantage or downtime.

Following the transverse carpet loading and initial CRCP setup, the longitudinal CRCP steel BAMTEC carpets are then loaded onto the top of the work platform and wire tying area, unrolled into position across the top of the mechanical jig and lapped to a previously fixed and installed longitudinal carpet. A sample lapping pattern is provided below.

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As the mechanical jig and truck mounted work platform is moved forward, the transverse carpet is unrolled and the bars mechanically guided into position underneath the longitudinal steel carpet. The two carpets are then tied together as the next longitudinal carpet is loaded into position and the operation repeats itself.

Note that as the BAMTEC incorporates the steel straps welded to the bars at the desired spacing, the amount of on-site wire tying is greatly reduced.

Plastic bar chairs are clipped onto the transverse bars as per project specifications. A typical scenario might have every second transverse bar chaired with a chair spacing of around 700mm along the bar.



***BAMTEC carpets for longitudinal steel are unrolled into position across the top of the mechanical jig and lapped to previously installed longitudinal carpets. As the truck mounted platform is moved forward, the transverse BAMTEC carpets are unrolled, bars mechanically guided into position and wire tied to the longitudinal bars.***

**Q. By way of comparison, how does the indicative speed of the mechanical CRCP jig laying CRCP steel supplied as loose bar compare to the BAMTEC CRCP SYSTEM ? What is the indicative difference in the labour required to achieve this speed ?**

A. The indicative speed of the CRCP jig laying CRCP steel supplied loose is around 500m per day. The speed of the BAMTEC CRCP SYSTEM is anticipated to be the same - around 500m per day. However, as the steel as been prefabricated into BAMTEC prior to it's arrival on site, the on-site labour component is expected to be reduced by around 50% or from approx 16-18 steel fixers to 8-9 steel fixers.

**Q. Are there any geographic limitations with regard to where THE BAMTEC CRCP SYSTEM can be obtained?**

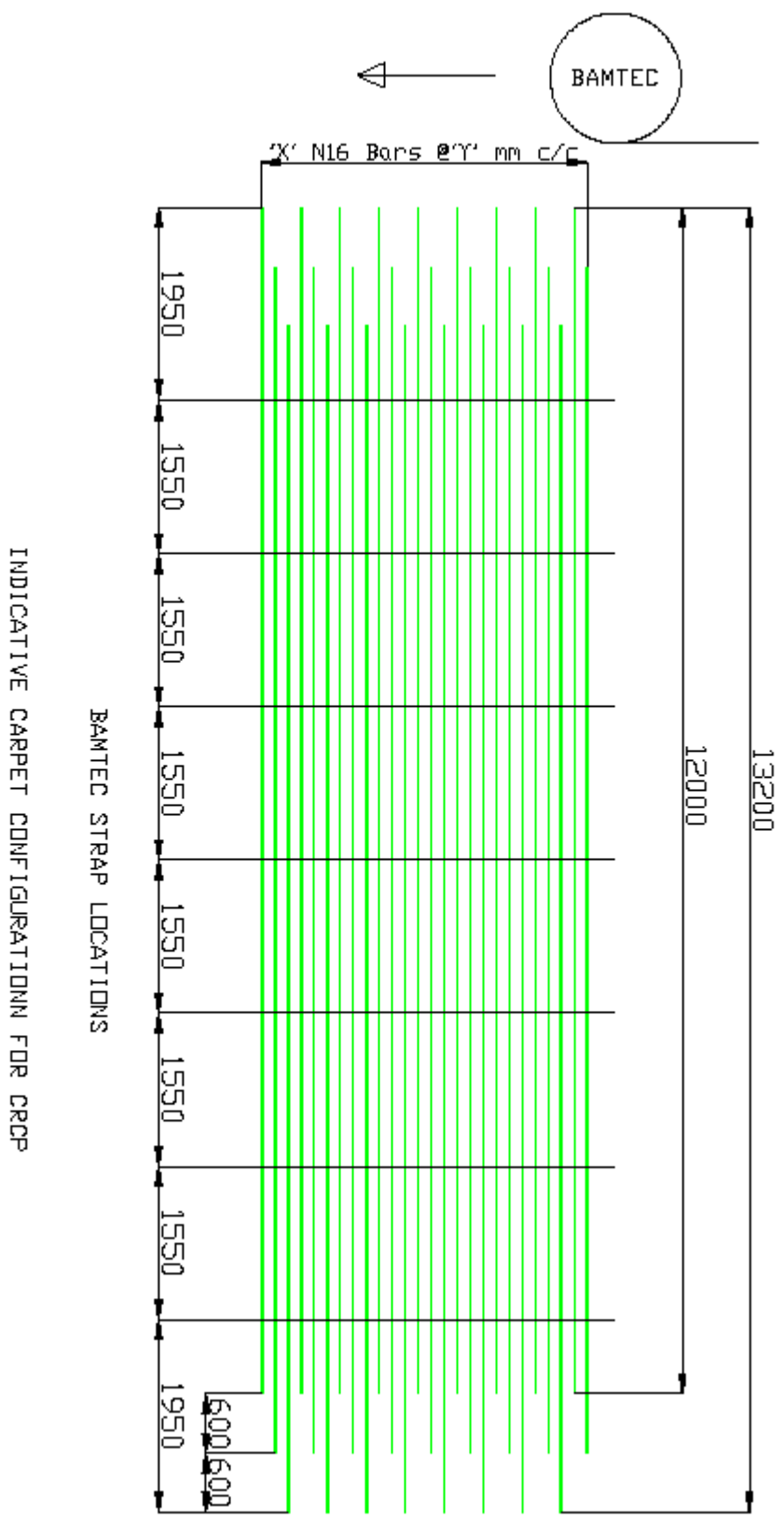
A. Generally speaking, the system is ideally suited to medium to large scale road projects and has the mobility to relocate to suit the geographic location of these projects.

**Q. In terms of the BAMTEC carpet, what sort of flexibility exists in terms of bar spacing and layout ? Are the carpets required to have square ends or can they accommodate a staggered lap arrangement ?**

A. The BAMTEC system can provide extensive flexibility in both carpet layout and bar spacing at a high level of precision. As the process of manufacturing the carpets is automated, machine settings can be adjusted to suit a variety of project requirements.

Carpets can accommodate a staggered lap arrangement as shown in the diagram over the page for longitudinal CRCP steel. Other patterns may be also be accommodated.

For further information on carpet layouts, contact OneSteel Reinforcing.



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**Q. Has the mechanical CRCP jig been used previously for major CRCP works ?**

- A. OK STEELEX's most recent mechanical CRCP jig project was the M7 toll road in Sydney. The road was 40km long, dual carriageway 10.5m wide (2 lanes and shoulder) with a total of 10,000 tonne of reinforcement to be placed in a demanding program. In this project OK STEELEX utilized two jig assemblies to keep steel in front of paving operations to install this steel. This approach ensured steel fixing for the project was maintained well ahead of concrete placement operations for the project.

Previous CRCP projects have included the West Charlestown Bypass and Lake George Deviation among others.

**Q. Has BAMTEC been used previously for major CRCP works ?**

- A. BAMTEC is currently being used on the CRCP component of the 9.7km stretch of roadway for the Pacific Highway Upgrade from Bundacree Creek to Possum Brush at Nabitac NSW. The project consists of a divided carriageway with two lanes in each direction. In this case, the BAMTEC reinforcing carpets are used as the longitudinal CRCP steel and are being rolled out onto the transverse CRCP steel which is incorporated with a continuous chair.



*BAMTEC carpets are being used to install the longitudinal CRCP steel for the Pacific Highway Upgrade at Nabitac.*

*The carpets are rolled onto transverse CRCP steel which is incorporated with a continuous chair.*

**Q. How will the BAMTEC CRCP SYSTEM be offered to a given project ?**

- A. The BAMTEC CRCP SYSTEM will be offered by OneSteel Reinforcing as a supply and fix package for all CRCP steel.

**Q. Where can I obtain further information on THE BAMTEC CRCP SYSTEM ?**

- A. For all queries related to any of the above items and related CRCP steel issues, please contact:

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