

Project:
World Square
Apartments, Sydney



Meriton and Grocon build southern hemisphere's largest apartment tower



The residential component of the World Square development in Sydney was a great example of the substantial cost savings available to designers by specifying 500PLUS REBAR.

Located on the north-west quadrant of the site, the World Square apartment block, was developed by Meriton Apartments.

Rising 75 storeys above ground level on George Street, the residential tower provides more than 750 apartments in the heart of Sydney.

The requirement to carry large axial loads, geometrical constraints and congestion in the columns and core walls were identified at the design stage.

OneSteel Reinforcing suggested the use



of 500PLUS REBAR in order to alleviate these problems and the structural engineer, Connell Wagner, designed the columns, footings and core walls using 500PLUS REBAR.

The World Square site had sat vacant for several years, with the abandoned development being used as a car park.

500PLUS REBAR

500PLUS Rebar's greater strength and increased ductility provides for:

- More efficient designs
- Material savings
- Reduced congestion
- Better column design
- Enhanced crack control in slabs
- Design optimisation
- Significant overall savings.

The standard 500PLUS Rebar product range (12-36mm diameters) also includes 10 and 40mm diameters for more efficient designs.



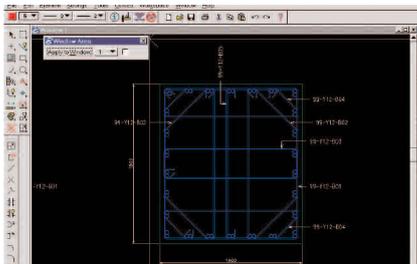
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Before work could commence on the tower itself, new columns were needed. These pass through the existing carpark slabs to the basement.

The suggestion to use 40mm diameter 500PLUS REBAR in association with very high concrete strengths, up to 80MPa, for the five levels of columns to ground level allowed the three essential design criteria to be met.

The use of 40mm 500PLUS REBAR decreased the number of bars to 52.

(An equivalent area of N36 bars would be 67 and, if we multiply this by a

factor of 1.2 to account for the higher yield stress, the number of N36 bars required would have been 80.)

The use of 500PLUS REBAR reduced reinforcement congestion and material wastage, with savings in materials, steel fixing and transportation costs resulting.

It is worth noting also that the column cages were prefabricated five floors at a time, thus eliminating lap lengths for four floors.

The calculation below clearly illustrates the savings this solution provided in the construction of the columns alone.

The typical floorplan to ground level includes 18 columns.

Measuring 1.8x1.8m, the columns were constructed using 80MPa concrete. They incorporate 52 N40 main rebars with N12 ties@150mm centres.

To speed construction, the columns were prefabricated on-site, five floors at a time. Per floor, this equated to around 165 tonnes of main rebar plus 35 tonnes of N12 ties. Lap lengths for N40 would have been between 1400-1700mm.

Prefabricating the columns saved from 730-880kg per lap or 2.9 to 3.5 tonnes per column. The total savings from elimination of lap lengths and design to 500PLUS REBAR was about 62 tonnes.

In dollar terms, this equates to a direct material cost saving of 62 x \$1200/tonne (supply and fix) = \$74, 400.