

8 CHIFLEY

A REVOLUTIONARY CRANE SOLUTION FOR SYDNEY'S ICONIC 'SKY VILLAGE'

AT A GLANCE

CLIENT	MIRVAC
PROJECT	8 CHIFLEY
LOCATION	SYDNEY, NSW, AUSTRALIA
SECTOR	CONSTRUCTION
DATE	APRIL 2011 – MAY 2013

CRANES	1 X M860D, 1 X M230DSX
ENGINEERS	1 DESIGN ENGINEER, 3 DESIGN VERIFIERS 2 FEA ENGINEERS
INSTALLATION CREW	8
MAINTENANCE CREW	2

When internationally renowned architects Rogers Stirk Harbour + Partners teamed up with the Lippmann Partnership to design 8 Chifley by Mirvac, they created the vision for Australia's first 'sky village' concept. The iconic tower design also inadvertently created an engineering challenge that would even test Marr's unwavering belief that anything is possible.

THE CHALLENGE

When the new premium grade landmark commercial building for Sydney was opened in 2013 it was heralded as "a truly evolutionary workspace in the very heart of the City". The 34-storey building's innovative workplace design – including its distinctive external bracing with a five-storey public space at its base, seven unique vertical villages, two exclusive terrace areas including a dramatic three-story space on the 18th and uppermost levels – required some very heavy lifting on behalf of the construction partner, Mirvac.

Mirvac had a construction methodology that they wanted to implement and came to us for a crane solution to make it happen.

The design required twelve 40 tonne steel beams to be lifted as high as 100 metres above street level onto a construction site within Sydney's busy CBD. For that, Mirvac needed at least one heavy lifting construction crane. With our fleet of big cranes that issue was easily solved, but the real challenge was how to do the heavy lifting on the project when there was nowhere to put the crane.

One of the unique features of the building's design was that with the large public space at its base, the rest of the building could extend right to the boundary. But when the public footpath was in the heart of the city and not an option to erect the crane on, Mirvac had a problem on their hands.

OUR SOLUTION

We had a longstanding working relationship with Mirvac, which gave them the confidence to make their problem our problem.

Mirvac had conceived a solution that best suited their construction methodology and wanted to build a crane that would hug the external face of the building as it climbed, but needed an innovative solution to erect the base within the site perimeter. We engineered an offset grillage solution that we believed would do the job – but it was not without its challenges.

The main challenge was that we intended to put the largest tower crane that had ever been used on an Australian CBD construction site on a counter-levered grillage on the edge of one of Sydney's busiest intersections. So we had to get the engineering right.

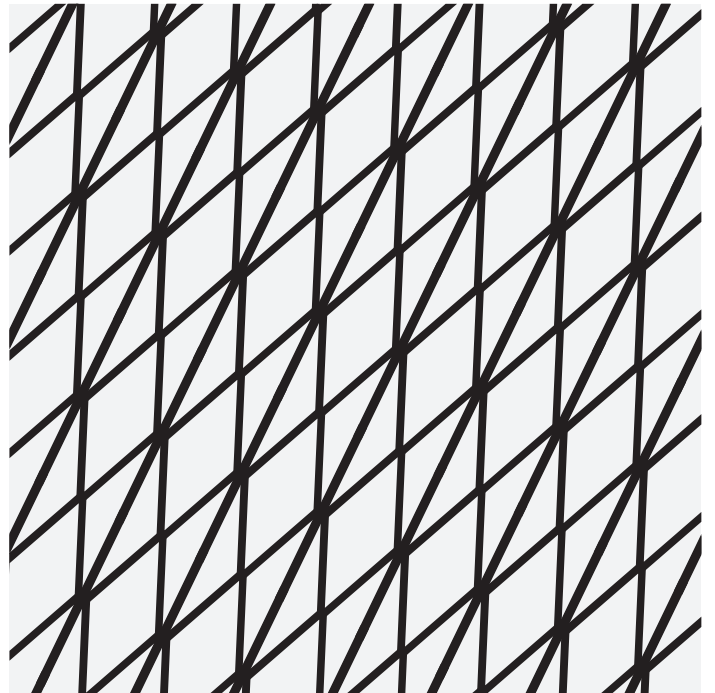
We embarked on an engineering process to find a workable solution, which we then double-checked and triple-checked through independent design verification and a finite element analysis (FEA) to confirm our engineering solution would work.

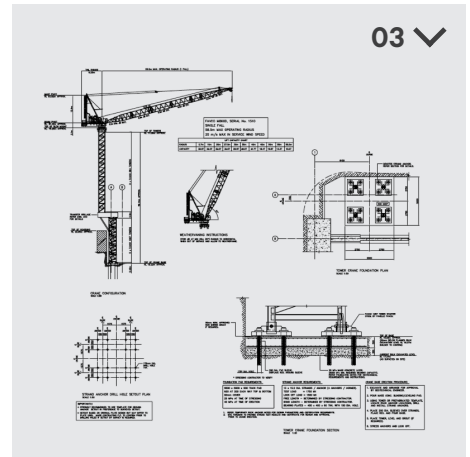
From the 3.5m x 3.5m M1280D crane base sitting inside the boundary of the building, we built a customised offset grillage between the lower and upper parts of a M860D tower crane. It allowed the centre line of the crane foundation to be offset 5 metres from the centre line of the crane tower. This effectively allowed the crane to come out from under the building at the ground-to-fifth-storey level and then go up again.

We also had an M230DSXF installed in the building's lift core to support general lifting requirements on site.

THE RESULT

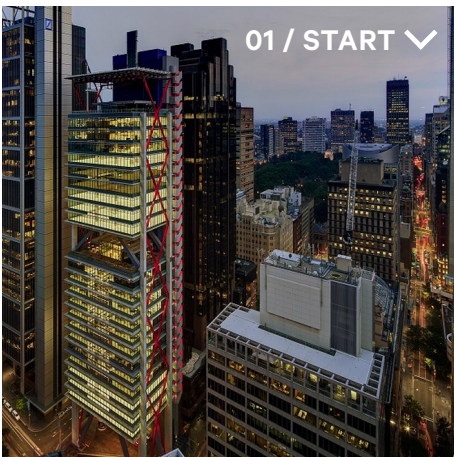
In October 2011 the crane was installed and the job was completed in exactly the way Mirvac had imagined it. Two years later the job that 'couldn't be done' became another world first solution for Marr.





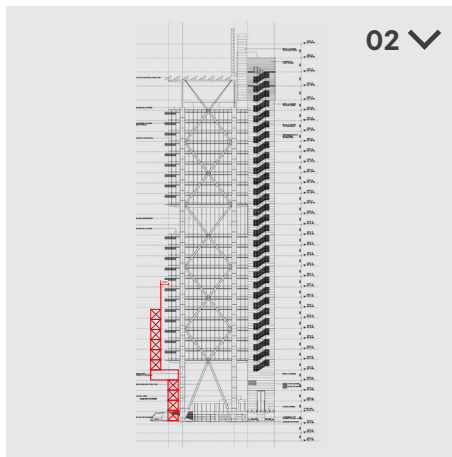
03 ✓

Mirvac wanted to build a crane that would hug the external face of the building as it climbed and needed an innovative engineering solution to do it. We engineered an offset grillage solution that we believed would work – but it was not without its challenges. After an independent design review and rigorous finite element analysis to test the engineering solution, we were given the all clear to install the crane.



01 / START ✓

2011: As the developer of Australia's first 'sky village' concept, 8 Chifley in the heart of Sydney's CBD, Mirvac was faced with a number of engineering challenges. They had a construction methodology to apply to building the iconic 34-storey building, but needed our help to develop a crange solution to achieve it.



02 ✓

The building extended to the boundary of the site, but without being able to establish a tower crane from the street frontage or footpath, the task of lifting the twelve 40 tonne steel beams that made up the distinctive external bracing of the building was seemingly impossible without putting the crane through the building structure.



04 ✓

From the 3.5m x 3.5m M1280D crane base sitting inside the boundary of the building, we built a customised offset grillage between the lower and upper parts of a M860D tower crane. It allowed the centre line of the crane foundation to be offset 5 metres from the centre line of the crane tower. This effectively allowed the crane to come out from under the building at the ground-to-fifth-storey level and then go up again to a final freestanding height of over 60 metres.



05 / FINISH —

As the crane climbed the tower it was 'tied' to the side of the building. **2013:** Two years later the job that 'couldn't be done' was completed as Mirvac had imagined and the Marr's team had another world first to our name.