

SWINBURNE UNIVERSITY

MAIN CONSTRUCTION COMPANY : Kane Constructions
PROJECT END VALUE : \$75 Million
COMPLETION : January 2011
ARCHITECTS : H2O Architects
ENGINEER (STRUCTURAL / CIVIL) : W.A.H.W
SURVEYOR : Wilsmore Nelson

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With a number of technical and logistical challenges to overcome on the unique Swinburne University Advanced Technology Centre (ATC), client and superintendant knew they needed a construction company that had the experience and industry excellence to do the job.

Kane Constructions has more than 35 years' experience in the building and construction industry and is a privately owned commercial construction company active in all sectors. With more than 270 employees it also had the depth of knowledge required to complete the intricacies of this particular job.

The \$75 million project was a test of ingenuity and is one of the first buildings at an Australian University designed to achieve a 5-star Greenstar rating under the GBCA Education Tool. It includes many sustainable features such as on site power generation, energy efficient air conditioning and the use of rain harvest water. The ATC will be home to some of Swinburne's key research facilities including a world class PC3 laboratory.

"This has been a very technical project but it was the hidden challenges that made the job one of the most interesting Kane Constructions has undertaken in recent years" said Kane Project Manager Paul Christian.

"There were three interesting structural challenges during construction, overcoming them has been collaborative effort, with contributions from the architect, consultants, sub contractors and the whole Kane team" Mr Christian said.

The first of the major challenge was the re-design, planning and construction of the Level 3 transfer beams located in the North West tower. Providing structural support for the eight floors above, four beams, 2.4m wide and 3.2m deep, spanning an impressive 30m were conventionally formed, contained 1070 cubic meters of in-situ concrete and were then post tensioned.

"The size of the beams and the intricacies required during placement of the concrete were difficult. We poured 1070 cubic meters of concrete, approximately 135 truckloads, during a 16 hour continuous pour, this required the development of a detailed pour plan which included heat monitoring, close supervision and a dedicated team of workers on rotating shifts to ensure we could accommodate engineering requirements and local authorities," Mr. Christian said.

The second challenge was the design and implementation of the formwork to support the cantilever of the Level 5 structure in the North East tower.



"From lower ground to level four, the North East tower was incorporated around an existing university building, then at Level 5 the structure extended north and was suspended over the existing building which was unable to take additional load. To make it work we had to install temporary steel needles which were specifically engineered to support structural loads and to ensure we could remove them after our curing period. This process involved the use of twin 610UB temporary steel beams which cantilevered 3.6m and supported approximately 750Kn of dead load during concrete placement."

The Strong Cell Laboratory is the centre piece of the new ATC and also the third major challenge. Kane Constructions had to initiate and implement a number of strategies to ensure the requirements of the client are met. The Strong Cell Laboratory tolerances of +/- 1mm, meant that construction of steel and concrete in the strong floor had to be built to world standards and that anything outside was unacceptable. This area of the project creates a three way fixing and testing facility for deforming and destructive testing of products from the construction, aerospace, automobile and manufacturing industries.

"We have worked very closely with the client, consultants and outside industry experts to ensure that all requirements are met and although there were intricacies that proved to be problematic, the contributions of all involved has helped to overcome them, ultimately we learned that our tradesmen are the key to its success" Mr. Christian said.

"There is a total of 18,000 square meters of floor space in all four buildings and with Swinburne University at the centre of technology based learning, it was always going to be a very complex yet rewarding project."

