

# Sydney's Westlink M7 Will Open Soon, Eight Months Ahead of Schedule

**I**t's all over bar the shouting at Sydney's massive Westlink M7 project. If the weather is kind, the job will be complete before Christmas, joining the Hume Freeway in the south to the M2 motorway in the north.

On the verandah of the site office at Eastern Creek, there was at last time for Brett Lehmann to sit in the sun, relax for an hour or so, and reflect on the experiences of the past three years. Brett is the survey manager for the Abigroup Leighton Joint Venture.

## **Eight Months Ahead of Schedule**

This \$1.8 billion project will have been brought in eight months ahead of schedule, a huge improvement of about 20% on the original estimate. Good weather and other factors played a part, but this is clearly another demonstration of productivity gains

accruing from the use of GPS for survey and machine guidance, and related forms of machine control.

When we spoke to Brett at the beginning of the project, he explained that in the planning phase there was never any question of the M7 project using this technology to its maximum potential. That alone tells you how far the road building industry has advanced—five or six years ago, it would certainly not have been a 'given', if it was considered at all.

"The main focus of our planning," says Brett, "was to make the system bulletproof—to put in place a system of redundancy. That is, a fall-back position from Plan A to Plan B to Plan C, to deal with unforeseen issues. With hardly any pegs or strings on the entire forty-kilometre job site, we couldn't afford to have millions of dollars worth of machinery come to a standstill."



## **GPS—All Brands Welcome**

A policy settled at the outset was to make Westlink an 'open' site in the sense that it was not exclusive to a particular brand of GPS, nor did it debar any.

"Leica was chosen for base stations and survey equipment, but for machine control we wanted unfettered access to contractors with an existing investment in this technology," says Brett. "That in itself dictated a careful selection of radios for communication between GPS base stations and machines. Theoretically they can all talk to each other on any given frequency, but not in practice. Our testing showed that Pacific Crest was the best-performing common denominator."

With a range of better than ten kilometres, two base stations



**Brett Lehmann, survey manager for the Abigroup Leighton Joint Venture, constructors of Sydney's Westlink M7 motorway.**



positioned at the ten and thirty kilometre marks could adequately have serviced the forty kilometre-long work site. As part of the safety plan, four heavily overlapping base stations were deployed, and for added security each broadcast on a primary and secondary frequency. Their integrity—that is, whether they were actually in their assigned positions and functioning correctly—was verified around the clock by monitoring software called Spider, supplied by CR Kennedy.

Whilst it was important that base station signals overlapped to give maximum site coverage if one transmitter went down, it also created a challenge that Brett gives full credit to Leica for solving. Put simply, if a machine was midway between two base stations, how did it know which one it was listening to?


### **Time Splitting of Correctional Signals**

The solution by Leica was time splitting. Each transmitter was set to broadcast its correctional data within a quarter of a second. Station

one used the first quarter-second, station two the second quarter, and so on. The receiving equipment was set accordingly to identify the source of the signals. This innovative solution is now available worldwide, having been driven by the Westlink project.

Mission planning software was used to forecast when satellite signals delivered the optimum accuracy: Survey and construction tasks were scheduled accordingly.

The Westlink M7 can be seen from space, and it'll be around well beyond the lives of Brett Lehmann's grandchildren. Deservedly, at the conclusion of such a huge project, the key figures involved in its construction can bask in a good deal of satisfaction. Nevertheless we asked Brett Lehmann whether, with the benefit of hindsight, he would have revised some of his decisions.

"Not really," was the reply. "We think that we adequately predicted the difficult issues. Our systems worked well, and the project has come in ahead of schedule and under budget. We're pleased with what we've achieved." 

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