

M1 Concrete Slab Replacement:

62% Cost Saved, 70% Time Saved



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The M1 is a motorway in Brisbane, QLD Australia that plays a central role in connecting to important roads.

Particularly the Pacific Highway (between Tugun and Eight Mile Plains), Bruce Highway (between Bald Hills and Coorpy), and Gateway Motorway (between Eight Mile Plains and BaldHills). It's also the key route between Tugun near the New South Wales-Queensland border to the Sunshine Coast hinterland.

The M1 also connects to the national highway and is a key motorway that helps motorists save time and money to get to their needed destinations. The M1 is known for boosting road safety for motorists and stands out for its well-built and eco-friendly structure that has helped reduce air, noise, and water pollution in the area.



the Project

An M1 slab section had fallen below standard and needed replacement due to heavy trafficking. The project had a total of 22 slabs, with some of them being adjacent to each other, while others were placed in independent locations. Each slab had the approximate dimensions of 4.2m, an overall width of 3.6m, and an approximate average depth of 250mm.



The Problem

To ensure road safety, the M1 motorway was in desperate need of repair. There were serious damages to the concrete pavement such as cracking, spalling, settlement, and faulting. Roadtek directly engaged Antoun, to rehabilitate these sections of pavement and to be ready for trafficking at 04:00 EST.



Challenges

One of the main challenges of the repair project is that it had to be completed with the least amount of traffic disruption. There was also no design or procedure that existed at present in TMR (Department of Transport and Main Roads), which focused on the rehabilitation of concrete pavements in detail. One of the needed requirements for the rehabilitation project was that a compression strength of 15mpa had to be achieved, while considering all 22 slabs had to be repaired and replaced.

The Solution

To address these challenges, Antoun worked on setting up a program to repair all 22 slabs through the following key steps.

Step 1	Saw cutting was done after seeing the need for it the previous night. Antoun had to then demolish and replace up to a maximum of 3 slab sections within an 8-hour time frame, including all establishment and demobilisation.
Step 2	Concrete sections were demolished and slab sections were placed into steel bodied trucks for carting and disposal. The existing lean mix was then swept free of any remaining debris. The demolition took place using the efficient, clean method of lifting plates with concrete screws for each sawn panel section. Slabs were drilled post demolition and lifted. The existing adjacent slab faces parallel to the flow of traffic were then to be drilled using a 16mm diameter drill bit, 300mm deep. The slabs perpendicular to the flow of traffic had to receive a 38mm diameter hole 225mm deep into the existing adjacent slab faces.
Step 3	Dowel pins & tie bars were drilled and an SL82 Mesh was placed, in which all adjacent slabs received a coat of emulsion. Each hole had to be doweled using a 900mm long, R12 bar, a chemset at a depth of 300mm, and a 450-mm long galvanised N32 dowel chemset at a depth of 225mm. Reinforcement mesh (SL82) was then placed, lapped and tied at 250mm with a clear cover of minimum 50mm from all adjoining faces. A plastic bond breaker was then installed spanning the full length and width of the slab to be replaced. Any additional plastic was cut away with all additional plastic lapped. Reinforcement mesh (SL82) was then placed, lapped, and tied at 250mm with a clear cover of a minimum of 50mm from all adjoining faces, N36 dowels etc. This was required as the aforementioned slabs are classified as a 'repair' as opposed to a 'new pavement'.
Step 4	CTS Rapid Set Cement production, placement & finishing was done and the concrete was then installed as per best practice, with no radius on the adjoining edges and a tine finish across the carriage way. Post saw cutting then commenced as soon as possible, with all joints saw cut as needed. Finally, all teams scheduled to clean up the site were brought up and the lanes were finally opened at 03:30EST.

The Results

At any one shift, Antoun was able to deliver impressive results.

Antoun were able to replace up to a total of seven slabs within an 8-hour time frame including all establishments, saw cutting (post installation), and demobilisation.

Antoun were able to achieve a 26MPa compressive strength in 3 hours when only a 15MPa compressive strength was needed, which meant Antoun delivered and even exceeded expectations. Throughout the course of the works, Inspection Test Plans (ITP's) were completed. This is a crucial part of our Quality Assurance system. The results proved to be excellent with an opening strength of 24MPa prior to allowing traffic on the carriage way.

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Cost Comparison / Value for Money





The Antoun Excellence in Infrastructure Projects

In every mission-critical project, you need a solutions partner that ensures concrete replacements are delivered within the scheduled time and budget, with as little downtime and disruption as possible.

The M1 motorway repair project highlights Antoun's stellar record in M1 concrete slab replacement, which has led to better cost savings and time saved for the stakeholders involved. Antoun continues to stand out today for its exceptional record of delivering high-quality infrastructure projects across different sectors in Australia, from airports, roads, ports and marine, education, government and defence.

With Antoun, you can be assured the job gets done right the first time.

<u>Get in touch</u> with Antoun to ensure the successful delivery of your next concrete project.



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