

New PMB interchange wins SAICE award for Technical Excellence

Pietermaritzburg's recently completed Dr Chota Motala Interchange is the city's first multi-level flyover and is a winner with motorists and the civil engineering fraternity alike.



The South African Institution of Civil Engineering (SAICE) Pietermaritzburg branch chose the intersection, which was reconstructed to eliminate stressful traffic jams, for an award in the Technical Excellence category.

Making life easier

The new flyover bridge over the N3 has made life much easier for motorists coming from the northern part of the KwaZulu-Natal capital city with three lanes each way. An additional exclusive right turn lane on the outbound side, allowing access to the N3 Durban-bound, has further eased congestion.

Before construction work commenced, motorists using the N3 off-ramp up onto Dr Chota Motala Road had to endure traffic backed up all the way to the Liberty Midlands Mall. This lane has been widened to allow smooth flow of traffic.

Motorists wanting to join the N3 north now use the flyover bridge without having to turn right. This has eliminated a stop that previously resulted in traffic back-ups during morning and afternoon peaks.

The long-awaited improvement goes back six years when the South African National Roads Agency (SANRAL) identified the Dr Chota Motala interchange as one requiring an upgrade to deal with greater volumes of traffic going through Pietermaritzburg.

SANRAL and the Mzunduzi Municipality appointed the Iliso/Aurecon Joint Venture for the detailed design of the upgraded interchange and associated roadworks, with Aurecon responsible for the design of all bridge work. Construction work was carried out by Group Five Joint Venture in consortium with Phambili.

Extensive construction

The work entailed the following:

- Construction of a new seven-span, incrementally launched, "free flow" directional ramp bridge;
- Demolition and reconstruction of the existing four-lane bridge over the N3 due to its limitations for clearance, traffic volumes and load capacity;
- Construction of a new continuously reinforced concrete five-span bridge across an adjacent feeder road;

- Construction of two additional lanes on both carriageways of the N3 between Chota Motala and the adjacent Sanctuary Road interchanges;
- About 19,000 cubic metres of continuously reinforced concrete pavement overlay;
- Widening of Chota Motala Road between the interchange and Otto's Bluff Road in the east (including widening of the road-over-rail bridge), and also the widening of the Dorpspruit River crossing in the west linking into the Pietermaritzburg CBD;
- Construction of major earth retaining walls;
- Construction of pedestrian facilities along Chota Motala Road;
- Construction of median barrier walls on the N3;
- Construction and lengthening of ancillary drainage structures, and the relocation of services;
- Raising the Retief Street rail bridge by 800mm over the N3 to achieve the required vertical clearance under the bridge.

Labour-based construction

Logashri Sewnarain, regional manager for SANRAL's Eastern Region Office, said in keeping with SANRAL's commitment to enhancing labour-based methods wherever feasible, the construction method prescribed for the concrete pavement was for conventional labour-intensive methods to be utilised. "In all, 62 workers, a foreman and two site engineers were deployed on the concrete paving works alone.

"Both men and women were involved, with, for example, a woman operating the vibrating screed rollers that compacted the concrete.

"Women were also employed for traffic accommodation and finishing works while men mainly handled the heavier duty functions such as concrete placing," said Sewnarain.

She said various training providers were utilised for the pavement layers and bridge construction with training ranging from basic use of power tools, skills development for construction operations, safety awareness training and life skills training.

An artistic and scientific endeavour

The main determining factor in the design for the bridge was the requirement that any new bridge over the N3 had to be constructed without disrupting or endangering the heavy traffic on the N3 freeway.

"It was for this reason that the incrementally launched bridge building method was used which involved construction of the bridge superstructure section by section and then launching them sequentially into their final position.

"The bridge has also achieved exceptional aesthetics. The project team took a decision that the webs and bottom slab of the bridge be more rounded than usual, and that aesthetic lighting as well as "golf tee" shaped piers be made part of the bridge.

"The result is a bridge which is as elegant as it is structurally sound," said Sewnarain.

SAICE awards are given to promote the art and science of civil engineering. In the Technical Excellence category of the competition, the project should have unique or unusual features and should demonstrate some notable advance in the solution of engineering problems; it should have particular aesthetic appeal;

should display engineering ingenuity in analysis or design and/or in construction technique; and the project should show functional efficiency.

Also, the handling of impacts on the environment should be particularly successful and the project should have been well managed, finished within time constraints and within budget.

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