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Theo van Niekerk
Theo van Niekerk & Associates
Midrand, Gauteng

“We’re committed to using Autodesk Revit to streamline our interaction with other engineering disciplines and have taken on additional Autodesk Revit-trained resources to take us forward.”

Don Midgley
Ritchie Midgley
Midrand, Gauteng

Streamlining collaboration

Midrand-based civil and structural engineering firms, **Theo van Niekerk & Associates** and **Ritchie Midgley Consulting Engineers**, are spearheading a drive to streamline collaboration between the engineering and architectural disciplines, using the building information modelling technology, **Autodesk Revit**.

“Working in isolation from one another on the same basic project infrastructure, we often duplicate efforts, wasting time, money and valuable resources,” says Don Midgley. “It’s also frustrating to re-do work, because you’ve been using out-of-date information.”

The value of the Autodesk Revit model lies in its project data, which can be revised in real time, benefiting a firm in terms of accelerated project delivery and efficient utilisation of project resources, while the visualisation capability of the software aids the delivery of a superior engineering service.

The biggest project on which Theo van Niekerk & Associates and Ritchie Midgley have used Autodesk Revit is a three-level, 30 000 m² taxi holding facility and three level, 25 000m² retail shopping centre, which make up part of the Pan Africa Node, an integral element of the Alexandra Renewal Project. (ARP).

The holding facility has 960 parking bays for 15-seater vehicles, while the shopping centre provides two taxi ranks, a banking mall, a conventional retail level, parking and space for informal trading.

The structures are linked by two bridges, with taxis dropping shoppers and commuters at a shuttle rank on the shop level of the retail mall. The vehicles then cross one bridge to the holding facility, and circulate back across the second bridge to a rank on the roof level, where they pick up new fares. There are also drop off and collection points in the holding facility, which is designed primarily for longer distance operators. Drivers can also park, maintain and clean their vehicles in the holding facility during off-peak times.

Autodesk Revit played a fundamental role in helping get the project off the ground.



“The project had been dragging on and after 12 months and there was still be no finality among project stakeholders about its design,” says Theo van Niekerk, who collaborated with Ritchie Midgley on the project under the lead civil engineering company, Phumelela Africa.

Role players in the project included funders, the City of Johannesburg, the Gauteng provincial government and New Heights Developments. Other stakeholders included taxi associations and operators, hawkers and the local community. The project was overseen by the Alexandra Renewal Project.

“After liaison with the Johannesburg transportation planning and management department, we built a model for presentation at the taxi association’s monthly meeting,” says Van Niekerk.

“It was the first opportunity that members had to visualise the proposed project and as soon as they saw the Autodesk Revit model and various walk-throughs and fly-arounds, the taxi associations’ members gave the scheme the green light.

“We received recognition from the city for our presentation’s role in getting the scheme approved.”

The Theo van Niekerk & Associates and Ritchie Midgley team faced a number of engineering challenges with the taxi holding facility project.

Firstly, the level of the interconnecting bridges was out of the engineers’ control. The height of the bridges was dictated by the clearance requirements of the vehicles using Third Street, which runs between the holding facility and retail complex. Secondly, the structure was located on a steeply sloping site and as a result, there is a two-and-a-half metre sloped floor section on each level. This allows the building to follow the terrain as much as possible, optimising the shape of the site. The floors are also sloped to facilitate drainage.

“By modelling the building in the context of a three dimensional space, we could see the impact of our engineering decisions on the space as a whole,” says Van Niekerk.

“Working on a slope was particularly challenging. However, with Autodesk Revit we could ensure that the interface of the beams and floors were all at the correct angle. We were able to visualise the design and be certain that all the elements worked well together.

“We could ‘see’ the impact of our decisions. As several of the elements were interlinked we could also see the domino effect of engineering decisions on all the elements. We could see when ramps were too long, or too steep and we could see when decisions left entrances and exits out of sync with the feeder roads, which would have been very difficult to identify on a 2D drawing.”

The integrated building information modelling (BIM) came into its right when the team started receiving design revisions from other engineering disciplines.

“The speed and convenience of ‘A Change Anywhere Is A Change Everywhere’ saved massive amounts of time and resources. We were able to update and re-issue our designs in record time”, says Van Niekerk.

“You can make a change very easily and there’s such peace of mind knowing you don’t have to make the change to 30 other drawings.”

“Creation of construction drawings would have required extra resources if we’d still be using AutoCAD. Now, we can rest easy knowing that generating drawings is going to take a fraction of the time it would with a conventional 2D program.”

Theo van Niekerk & Associates and Ritchie Midgley are supported and trained by the Gauteng Autodesk reseller, Cadplan.

