



CASE STUDY

Melbourne's Streets are Safer with AutoTURN

Client Profile

Evan Boloutis has been a traffic engineer in Melbourne for 30 years. He's seen the city grow to its current size of 5.2 million people and worked on projects to expand the network of roads to handle increased traffic demands. During his career, he has worked with both State and local governments in Australia, and in early 2014, he started his own traffic engineering firm EB Traffic Solutions.

EB Traffic Solutions Ltd has extensive experience in providing swept path analysis diagrams using AutoTURN®. It uses the software to assess the turning implications of a wide variety of vehicle types on road layouts in the early stages of the design process. They use that assessment to inform the design process and deliver a fast and cost-efficient method of designing alternative car park and loading dock layouts, intersections and other roadway types for their clients.

Client Need

Boloutis was looking for software that would do two things for his company: 1) simulate virtually any vehicle manoeuvre scenario with a high level of accuracy and 2) save him time and money.

On any given project, he might need to show how a truck could turn into and out of a loading dock. It might seem simple, but designers need to account for variables like slope and height, and they need to know what kinds of trucks can access the loading dock. Sometimes trucks can tip over if they approach the dock from an odd angle. For Boloutis, traffic engineering has always been about solving problems.

“When I started out, I was always interested in the traffic engineering requirements to provide swept paths to establish whether cars and trucks could manoeuvre into/out of access points, parking spaces and loading bays,” he said.

As Boloutis launched EB Traffic Solutions, he started seeing vehicle swept path reports created with AutoTURN being associated with projects with the local governments and through private consultants. Recognising its potential, he became a user of AutoTURN in 2014. “Since purchasing the software in 2014, it has helped my company deliver similar results,” he said.

Solution

AutoTURN is the vehicle swept path analysis software of choice for transportation engineers, architects, and planners worldwide. Trusted in 150 countries and available in seven languages, AutoTURN is used to analyse roadway projects including intersections, roundabouts, bus terminals, loading bays, parking lots, or any on/off-street assignments involving vehicle access checks and clearances.

As the designers and engineers at EB Traffic Solutions have discovered, AutoTURN is built on tried-and-true engineering principles and an understanding of what happens when the rubber meets the road. Engineers can design with confidence knowing that they can rely on AutoTURN to produce accurate results and generate a clear picture of whether a vehicle can manoeuvre a specific turn.

Boloutis was hired by an architecture firm in Sydney to help them design underground parking for a multi-level residential development. He had to show the Bankstown Council that cars could safely navigate the turns along the internal ramp system and in the parking area. Using AutoTURN, he was able to easily create a traffic report that analyses the swept paths for several types of vehicles.

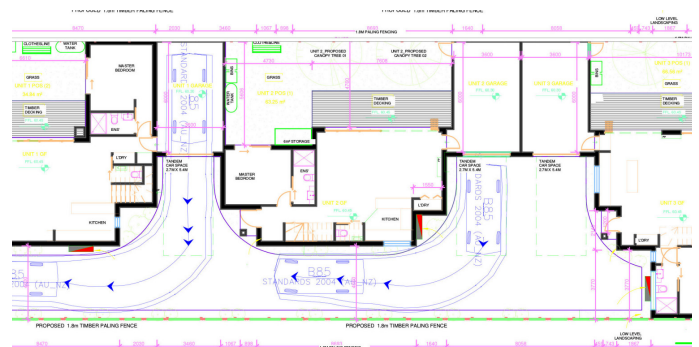
The Bankstown project presented several traffic and turning scenarios that EB Traffic Solutions had to simulate to ensure the safety of the vehicles. Boloutis had to work within strict geometric parameters of the existing car park layout and the tight clearances for some of the designs.

“Basement car parks are often challenging given the constraints of ramp widths, lengths, columns, headroom clearance, ramp systems and trying to accommodate as many parking spaces as possible in a constrained environment,” said Boloutis. “I was able to demonstrate that simulating various vehicle types would assist in providing an improved design that accorded with Council’s requirements,” he said.

An important feature within AutoTURN is the vehicle libraries that are built by Transoft Solutions. Designers often want

to test the “worst case” scenario as part of the project, and Boloutis was able to use the B99 car, which was conveniently already in the library. By using this vehicle, he was able to show the architects where their design needed adjustments.

“The ramp and parking bays adjacent to the base of the ramp required modifications to accommodate the B99 car movements,” said Boloutis. The underground parking garage featured two-way traffic, and there had to be sufficient clearance for two cars to pass and turn safely, side by side.



Implementation

AutoTURN proved invaluable for EB Traffic Solutions in simulating various vehicle types during the Bankstown project. In addition to simulating cars manoeuvring into and out of parking bays in surface and basement car parks, Boloutis evaluated vehicle movements at access points, including access ramps, to identify potential conflict areas.

He was also asked to simulate different types of trucks entering and exiting loading dock facilities in industrial estates. Other important questions he was asked: Could a 9.5 metre truck make the turn into and out of the construction site? Would the trucks make the turn at the beginning of the construction process and at the end? Keeping people and motorists safe was a top priority. This software is now applied to numerous construction projects in Melbourne and Sydney, testing the ability for a range of trucks from small vans to large 25 m long mobile cranes to turn safely into and out of construction sites.

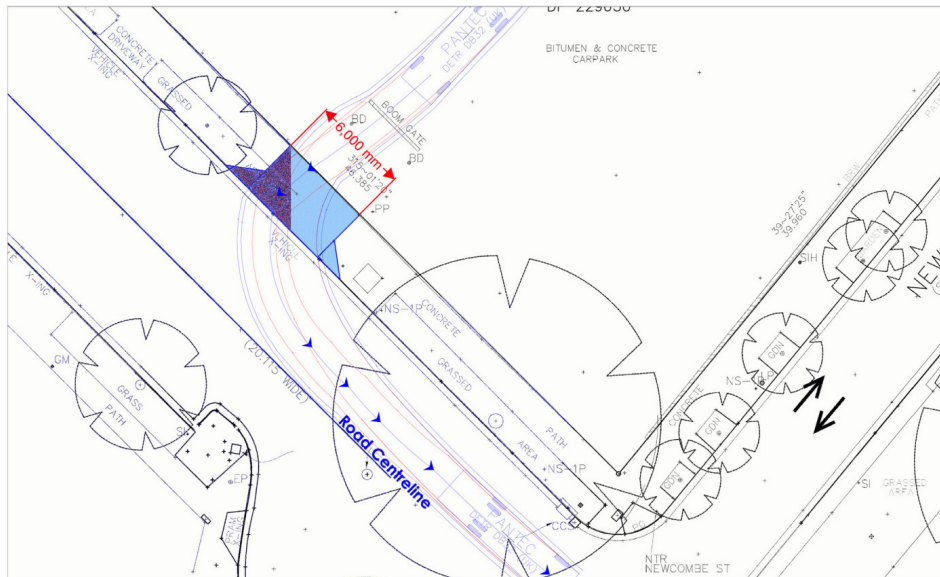
When AutoTURN was created in 1991, quality controls were in place from the beginning to give road engineers confidence that their designs were safe. For the Bankstown project, safety was an important consideration. “I needed

AutoTURN to be very precise and, in this case, literally within centimetres,” said Boloutis.

It’s because of the extensive testing that Transoft does in the field that traffic engineers like Boloutis can trust the software to produce results within centimetres. For example, in 2012, Transoft worked with two clients to test the accuracy of the software. A driving course was built to replicate a specific geometry of a planned access road. GPS receivers were placed at key points on a truck and trailer to record the location of the vehicle as it traversed the course.

Using AutoTURN and CAD software, the swept path of the simulated vehicle was matched against the recorded position of the field test vehicle. The results showed that the software produced accurate results – the maximum differences being seven inches (18 centimetres), which was deemed accurate enough for the scale of the project.

“AutoTURN provides me with a high level of confidence”
Evan Boloutis - EB Traffic Solutions Pty Ltd



Conclusion

One of AutoTURN's greatest strengths is the software's ability to dynamically show how changing one variable can affect the entire design. Vehicle paths can be fine-tuned quickly and easily through the interface, as the software re-calculates all the swept path information as you drag and drop grip points.

The relationship between speed and turning radius is a key aspect that is considered in AutoTURN, and the software allows engineers to simulate multiple vehicle types to achieve the desired results. Boloutis likes the iterative aspect of the software, and when he first started using it, he enjoyed "experimenting with different vehicle types and testing the different settings to gauge the difference in the resultant swept paths."

The software produces vehicle simulations quickly and the interface is intuitive, so evaluating different vehicles in a short period of time is easy. AutoTURN's interface and editing tools dramatically reduces the amount of frustrating trial and error efforts. For Boloutis, "It would have been too onerous and time-consuming to undertake the calculations manually," on this project.

Before Boloutis found AutoTURN, he was using manual templates published by Austroads, the association of the Australian and New Zealand transport agencies. The vehicle libraries in AutoTURN were created to ensure they match the dimensions and turning characteristics of the standard vehicles for regulatory organisations like Austroads, AASHTO 'Green Book,' and many other leading regulatory bodies. The vehicle simulation tools incorporate other elements like speed, super-elevation and friction that influence turning movements.

As any engineer will tell you, manual templates offer limited guidance when checking turns at different angles or during reverse manoeuvres. There are many variables to account for, and mistakes could happen if the calculations are incorrect, resulting in projects not meeting the design standards.

At its core, AutoTURN gives engineers and designers confidence. The geometric calculations are built into the software based on the real-world experience of Transoft engineers and designers. He said, "AutoTURN provides me with a high level of confidence."

With successful projects like the Bankstown residential complex in recent months, EB Traffic Solutions has the tools to bid on many different types of traffic engineering work. Within Victoria and New South Wales, Boloutis is developing an expanding client base of local government councils and planning consultants, architects, construction companies, developers, and lawyers.

"At Transoft, one of our most important design philosophies is to provide design and analysis tools that enable the designer to make their designs safer and more efficient," said Peter McIntyre, Executive Vice President, Sales and Marketing at Transoft Solutions. "Architecture firms and construction companies have to maximize the space they have, and we're always pleased to see our software put to the test and pass with flying colours."