



CASE STUDY

AUTOTURN[®]

The Future is Now for California Freeways

Cal Poly Pomona's Civil Engineering students help create the highways of tomorrow.

By Chris Johns, Transoft Solutions

If you want to be a transportation engineer in Southern California, your chances improve dramatically when you have Xudong Jia as your professor. At California State Polytechnic University, Pomona (Cal Poly Pomona), Jia teaches in the Civil Engineering department with classes of students who want to build the roadways of the future. Several years ago, Jia formed a partnership with the California Department of Transportation (Caltrans) to give his students real-world experience. To say it was ground-breaking is an understatement.

"We started the partnership seven years ago," says Jia. "From our early conversations, we realized they couldn't donate cash towards the program but they said they could donate engineers' time to come down and give us help. Every year, Caltrans gives us a project that they are working on. They want to get some alternative views, so they get our students to work on it."

The students in Jia's CE 222 Highway Engineering class and CE499 Senior Project class use Transoft Solutions' AutoTURN to check their designs. They create modifications to an existing roadway or intersection and provide alternatives that Caltrans hadn't considered. "Once we've finished with the intersection design, we use AutoTURN to check the turning movements, to make sure the radius and the lane width are correct. We always make sure we are matching the Caltrans practices, because Caltrans uses AutoTURN as well to perform those checks. We want to teach our students to follow those

practices. The students learn all the uses of AutoTURN and they also understand the way that Caltrans does business."

Jia continues, "The relationship is really important. The students learn the practices of the consulting firms and the consulting firms know the level of knowledge our students have. It's mutually beneficial."

Every year, Cal Poly Pomona competes in a Caltrans highway design competition with seven other universities in Southern California including UC Irvine, USC, Cal State Los Angeles, Cal State Long Beach and UCLA. "We've taken first prize for the past five years," says Jia, proudly.

As one of the largest government agencies in the state, Caltrans employs engineers in many disciplines. They also work with consulting companies who provide expertise across the engineering spectrum. Jia's students have the opportunity to learn from the people they might work with in their careers. "They can easily get a job in their field," says Jia. "Even though we are still in a recession and the job market isn't great, the majority of students who finish the senior project have a job. A big part of it is that they see how Caltrans works. I open the door for them, but the students have to do the work to prepare for a future job," says Jia.

Jia appreciates the relationship with Caltrans, as one of the leaders in engineering in California. As part of the course

curriculum, he tries to bring industry experts in to talk to his students. "Sometimes we invite consulting firms to come and talk to the students. Caltrans has a lot of consulting firms working for them, so it's easier for the consultants to come down to us. When Caltrans asks them to come and help us, they can't really say no!" laughs Jia.

AutoTURN is the world's leading software for vehicle swept path analysis. Transportation engineers have relied on it for decades to accurately visualize turning radii, transition curves, super elevation and lateral friction in all types of roadway, highway and site design projects. Because AutoTURN is based on the AASHTO standards, there is virtually no guesswork when it comes to final designs. AutoTURN ensures the standard for safety and reliability Caltrans requires is met.

"We use almost everything within the program," says Jia. "We go through all of the tutorials in AutoTURN. The program itself is easy to follow and easy for the students to learn."

The relationship between Cal Poly Pomona and Transoft Solutions goes back close to ten years, when Xudong Jia started his teaching career. As Margaret Gochngbok, regional account manager for Transoft says, there is a shared desire to see the students succeed. "The educational mandate comes from our president and co-founder Milton Carrasco. We're empowered to offer licenses for AutoTURN for educational purposes as a way of 'paying it forward'. We want to see



Single Point Urban Interchange Stage 8

students with the tools to succeed in their chosen field and prepare the best way possible for the workplace," Gochngbok continues.

The SmartPath tools within AutoTURN help the Cal Poly Pomona students and Caltrans engineers alike visualize



"The relationship wouldn't work if it was only them donating their time to us. We give them some insightful ideas. We learn from Caltrans but Caltrans also learns from us too."

Xudong Jia

how vehicles move within their design drawings. From arc and corner path simulations to over-steering visualizations, AutoTURN is an indispensable tool for highway design. With an established interstate highway system in place, Caltrans is always looking to make freeways more efficient.

"This quarter, I have ten students working on a project on I-15 at Cajalco Road (in Southern California) and we are working on the design of one of the interchanges. We are involved in modifying the interchanges and we do this to increase the capacity. Or we do it to reduce the congestion of traffic. This usually involves re-aligning the existing interchange," Jia explains.

It's actually a common practice for one of Jia's classes to influence or change one of Caltrans' big freeway or interchange projects. "It happens all the time," says Jia. "In fact, it's happened seven times in a row. Sometimes they look at our alternative design a little too late and the project is already under construction. Here's one example: the consultant has provided three alternatives to improve a highway. My class also provides three alternatives. Sometimes our alternative is better than theirs. The Caltrans engineers might say 'there are a few small things we can do to improve the design.' We provide them with another set of eyes to look at the problems and it gives Caltrans something else to consider."

Future freeways, off-ramps and intersections throughout the state of California are in good hands with Xudong Jia's classes at Cal Poly Pomona turning out successful graduates. As Jia says, "The relationship wouldn't work if it was only them donating their time to us. We give them some insightful ideas. We learn from Caltrans but Caltrans also learns from us too." ■