



University of Cantabria Pushes the Boundaries with AutoCAD Civil 3D

Autodesk software provides value-added link between the traditional and the virtually real

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Nikolas Bokisch, Autodesk EMEA AEC education programme manager

With one eye on their budgets and the other on their credibility, university departments are not the easiest of customers to convince when it comes to new software. They have to balance a healthy scepticism about passing trends with the need to give students the chance to work with the latest products. Getting it wrong could result in courses being sidelined; getting it right means students are well-equipped for the outside world and the department's reputation – and popularity – rises.

It is significant then that Autodesk is seeing a steady rise in demand for AutoCAD Civil 3D from university engineering departments across Europe. As a result, students are learning the many advantages of working with a dynamic 3D model – and, as a growing number use Civil 3D for their final dissertations and research, they are pushing the boundaries of engineering design and visualisation.

This is exactly what is happening at the University of Cantabria, based in Santander, Northern Spain. Here, graduate and teaching assistant, Rubén Arias Fernández, is maximising the benefits of Civil 3D in several ways. Firstly, he is using the software in his teaching of several courses ensuring that his students are highly proficient in 3D civil design and are well aware of its potential.

Secondly Civil 3D has also played a key role in his dissertation – an important piece of original work carried out for Dragados, one of the largest engineering companies in Spain. This project looks set to have strong repercussions – not just in academia, but in the commercial world too.

Pioneering work

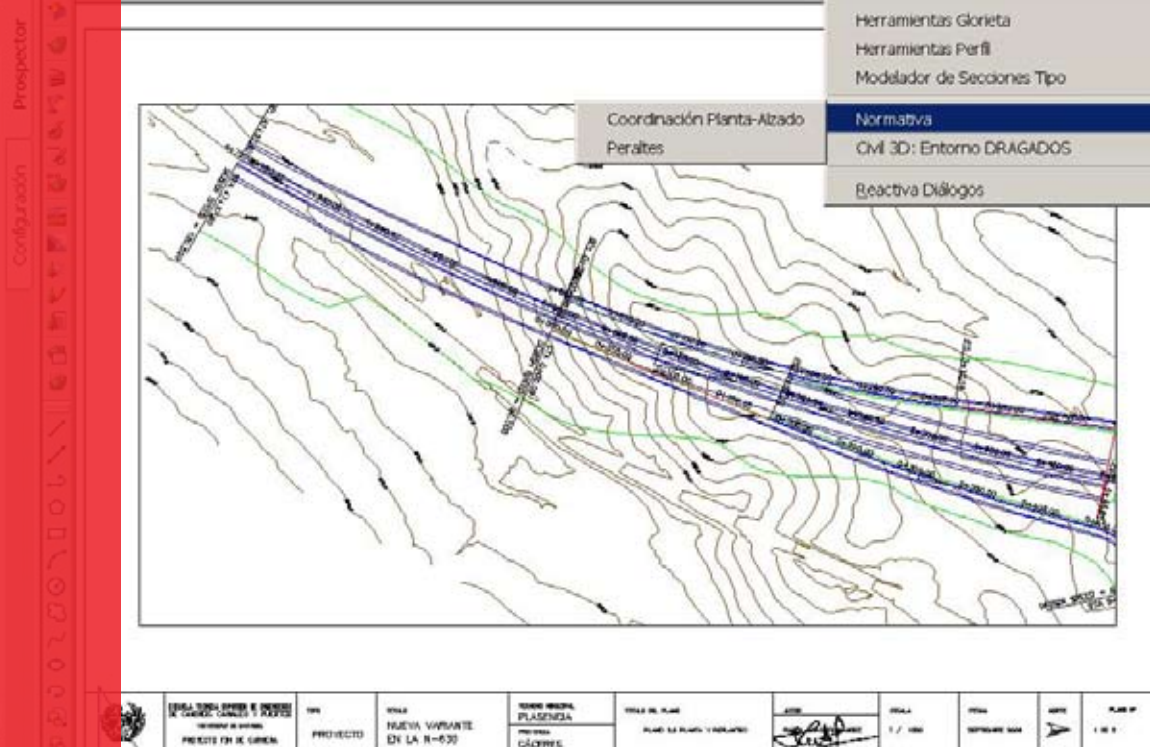
The University of Cantabria, established in 1972, is considered to be one of the top ten universities in Spain. It is particularly renowned for its research facilities and the pioneering work carried out there. As an institution, therefore, it is receptive to the latest ideas and technologies and to trying out new products.

Fernández explains how the civil engineering department had worked extensively with AutoCAD, but decided to upgrade to Civil 3D to ensure students had the opportunity to use tools which gave them the greatest freedom to express their ideas and to experiment to the full.

Civil 3D is based on AutoCAD but has been developed especially for the civil engineering community. At its core is a dynamic model which links design and production drafting. Changes made in any part of the model or documentation automatically ripple through the entire project making it ideal for evaluating multiple design alternatives.

This makes it perfect for students who need to be able to make mistakes and quickly rectify them, play around with “what-if” scenarios and generally learn their skills in a hands-on, intuitive environment.

Because of the flexibility of Civil 3D, Fernández' work also extends to students studying industrial engineering. These use the software for the design of infrastructure including underground cabling and high voltage electricity power lines. “These days it's important for



different disciplines to work closely and often use the same tools," he says. "This shows how the use of Civil 3D is not just restricted to civil engineers."

Fernández has been building up his expert knowledge of Civil 3D ever since his final graduation project. At this time, he was approached by Dragados, one of Spain's largest construction companies.

He was asked to design a detour to an existing roadway using one of Spain's two extensively-used standard road design products, but bringing the design into a highly-advanced, virtual reality program developed by the University of Valencia. In other words, to link for the first time, a rudimentary and traditional 2D drafting solution with a brand new product which provides a compelling way to share designs with the general public and other interested parties.

"As the University of Valencia did not specify which software should be used to create the link, it was up to us to identify the most appropriate product," he explains. "As well as AutoCAD, the department also owned seats of Novapoint from ViaNova and I began the work using this.

"However, Civil 3D was launched around this time. Immediately, I could see that this offered more flexible working and its strong Visual Basic development platform would help me build the interfaces between Civil 3D and the other products."

He explains that the two 2D drafting products offer only fundamental functionality but are easy to use and therefore firmly entrenched across the entire Spanish civil engineering community. But they do have two major drawbacks – firstly, any changes to the design take hours of re-work. Secondly, their arcs, lines and horizontal measurements are not easily understood by non-engineers.

However, when the design is imported into Civil 3D, revisions such as a change in the curvature or a rise in the level of the roadway are easily made. Furthermore, "The University of Valencia's virtual reality program

creates stunning images which will engage the public far more than any flat drawing or rendered model. Therefore, they are ideal for public consultations or sharing with clients. Small adjustments can be made in the virtual reality program, but then the design can be imported back into Civil 3D to make more complex, engineering changes."

Just to make the task even more daunting, the portion chosen as this test sample included every road design challenge possible, from roundabouts and bridges to complex intersections. "The idea behind it was, 'if a solution works on this test project with all these exacting parameters, it will work anywhere and Dragados can use it to move ahead with the whole design'," says Fernández.

Civil 3D proved itself to be up to the task – and particularly useful for creating the intricate layout within the given parameters as the design can be easily manipulated, interrogated and changed where necessary. Fernández has also achieved an industry "first"; an interface between the older and the virtual reality programs with Civil 3D as a valuable intermediary.

"This is a big step forward, not only for the University of Cantabria but for commercial civil engineering too," says Nikolas Bokisch, Autodesk EMEA AEC education programme manager. "When one of Spain's largest companies makes the decision to take up new technologies, the impact on the rest of the industry could be huge. It could mark a new maturity for roadway design in Spain."

Meanwhile, engineering students at the University of Cantabria continue to learn in the most effective way possible – by working and experimenting with the tools they look destined to use in their future professional careers.

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