



Cutting Costs, Time and Use of Resources with AutoCAD Civil 3D

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Damien Turner, Technician, Skanska UK.

“British engineering with a touch of Scandinavian flair” is how Skanska UK describes itself. As the UK arm of the third largest construction services group in Europe, it combines Britain’s world-renowned engineering skills with the best in Swedish innovation and design.

One of its contractors, technician Damien Turner is certainly keeping to the ethos behind these claims. Working from the company’s UK headquarters at Rickmansworth, Hertfordshire, he is combining traditional knowledge with the latest civil engineering technology, AutoCAD Civil 3D.

This approach is bringing new efficiencies to the re-development of land prior to building a large new school on a brownfield site. “Volume calculations calculated from 2D longsections are now done from building 3D models and comparing the proposed and existing surfaces. This gives much more accurate volume than the assumptions of the longwinded 2D method. Not only does this reduce project time and costs – it also ensures the statistics are highly accurate.

“Plus, perhaps most importantly, it also enables me to keep cut and fill to a minimum - which means fewer unnecessary expensive man-hours on-site, less extra material needed and reduced use of excavation machinery, so cutting further overheads,” says Turner.

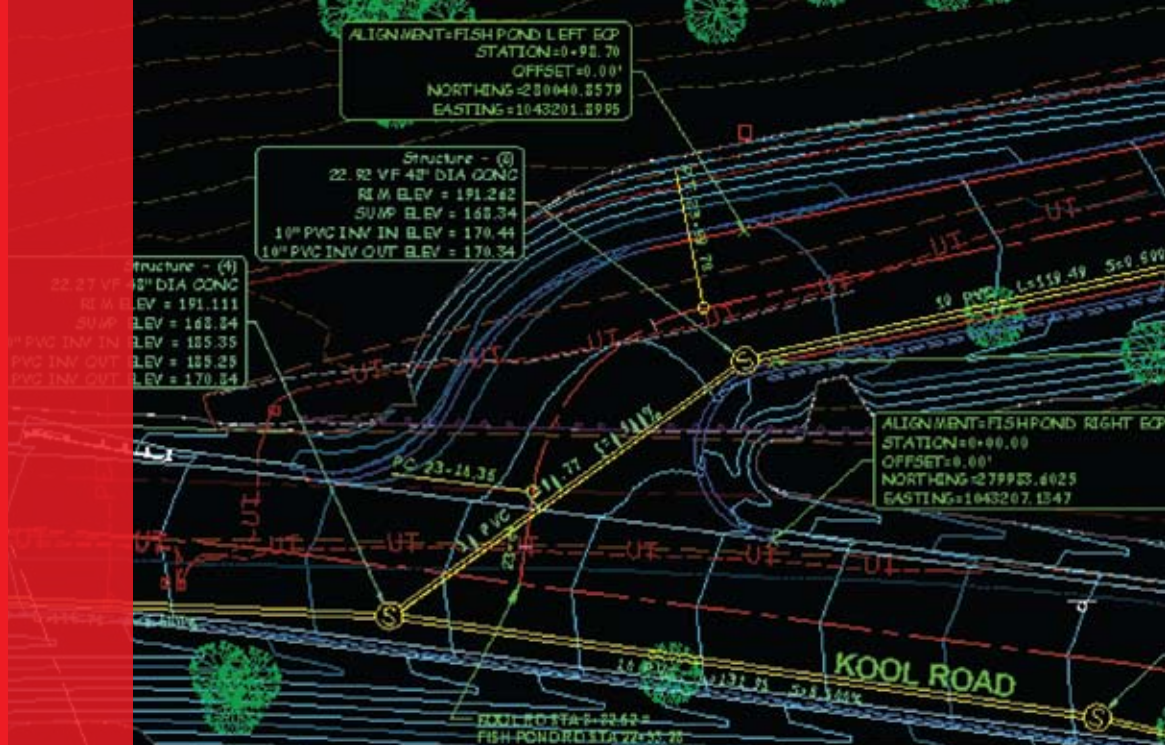
Maximising resources

It is usually accepted that earthworks are one of the most expensive parts of a civil engineering project. And apart from costs, there are the environmental considerations of shifting vast quantities of earth from one location to another and potentially wasting both energy and physical resources.

However, it’s a process that can’t be avoided. At Skanska, Turner had the complicated task of designing the redevelopment of urban land for new schools. He explains, “The land was terraced and irregular – and it was my job to balance the cut and fill in phased construction. The old school has to be kept open whilst the new school is being constructed. This made the earthworks very difficult to balance as there would be limited storage area for excess material and no way of taking excess cut from Phase 2 for Phase 1.

“Civil 3D helped this process with its ability to calculate different volumes for various level ideas. Once a car park or building layout has been entered you can raise or lower the surface and get instant volume results to compare.”

Originally Turner was working on AutoCAD, but recognised that to do the necessary volume calculations in the traditional way would take an



inordinate amount of time and it would take days – or even weeks – to manually enter the data.

“Someone in the office had read about AutoCAD Civil 3D and we decided this may be the answer. I contacted the Autodesk reseller 3 Ways Design who reassured me that, as an AutoCAD user, I would find it easy to learn and use and that I could be up and running on it quickly. I got stuck into Civil 3D after one day of training and was able to use the basic features with relative ease. When I started to use the more advanced features 3 Ways were very helpful with solving any problems I encountered”

AutoCAD Civil 3D is not the only civil engineering solution to calculate material volumes, but as it does it automatically, using a single, intelligent computer model, it is certainly faster and more accurate. According to early adopters of the software, the solution's method for volumetric calculation has helped raise productivity by a significant percentage.

The key to this, as well as countless other design issues, is the creation of a dynamic 3D model representing the design project as it exists in reality. This model creates relationships between objects so design changes update without further intervention. In other words, a change to one part of the design – or model – propagates throughout the entire project.

As Turner explains, “AutoCAD Civil 3D's parametric technology means changes are no longer the headache they once were. Because of this you have the time to spend optimising the design. One small change may make all the difference and because all other figures are updated to take this into account, it's straightforward to just try and see.”

In this case using AutoCAD Civil 3D, Turner was able to design a level site by re-profiling the material already there, eliminating the need to order extra and reducing as far as possible the amount that needed to be excavated and put back elsewhere.

“In the short amount of time I have been using AutoCAD Civil 3D it has already brought big benefits. Of course, the ability to explore different concepts has helped with other aspects of the design as well as cut and fill analysis.

“For example, it creates intelligent relationships between design objects such as points, surfaces, parcels/plots, roads and grading. Tables, object labels and various analysis displays derive from the model, so if any part of the model changes, all associated parts are instantly and dynamically updated,” he says.

“AutoCAD Civil 3D is actually very versatile with multiple tools within the product offering different techniques for various types of volume calculation. For example, it can calculate surface volumes indicating the border between different materials or the volume of linear objects that follow an axis or alignment such as dykes or levees,” Rob Hartwell of 3 Ways Design points out.

But for now, Turner is pleased to have produced high quality landscaping which has made the most of the resources available. “It's a case of thinking slightly differently,” he says. “But it certainly works – and it can make amendments quickly.”

For more information

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