



By Joseph H. Bell, LS

Joe Bell is licensed in California and New Mexico. He has been reviewing software for surveyors since 1982.

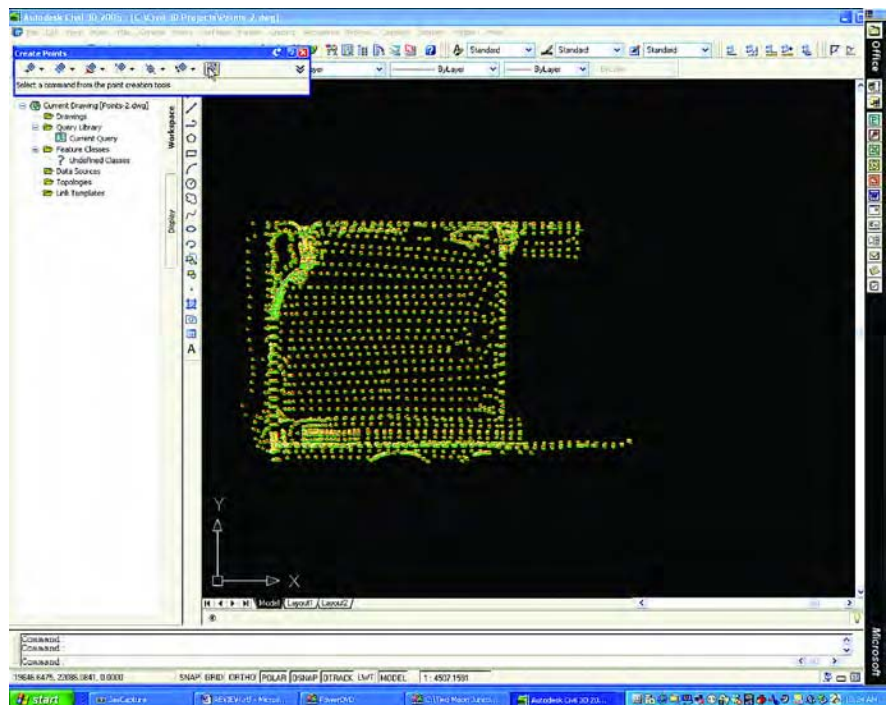
Autodesk Civil 3D 2005

Autodesk has come out with a superior design package, Civil 3D 2005. How is it different from Land Desktop 2004? At first glance, not very. Of course they had to move the commands around just to annoy me but I admit that most changes were improvements. So, if you can do everything in Land Desktop that you can do in Civil 3D, why would you want to change or add Civil 3D?

It has to do with changes! Traditionally, if you were doing miles of road and suddenly had to make a change that caused all of the stations to change, well, you gave it to the draftsman and waited for a week for him or her to change all the drawings. Of course there is never just one change; changes keep the draftspersons busy and delay the project.

What Civil 3D brings to you is something Autodesk calls modeling (actually, parametric 3D model-based design). Points, lines, blocks, and text are no longer separate entities. You might think of it as a relational database, with the relationships of all these items now part of the model. If you change one item, all things related to it are automatically changed as well. Bad news for draftspersons. Good news for the clients.

My first exposure to similar civil design software was MX from Infracore (formally MOSS and now Bentley Systems MX). MX uses something they call "string technology." They used as their selling point the fact that they could send modifications over the Internet with an ordinary telephone modem connection. All of the teams spread all over the world would have the basic design string and could receive the modifications from each of the other teams through a manager team. However, when a change is



made, the project manager must manually rerun all the other design commands used to create the resulting feature strings from the master centerline. Also, subsurface designs are not automated. The subsurface designs must be manually rerun after the surface string is updated. The real drawback of "string technology" is that it has "matured," that is, it has no place to go. There are not likely to be any significant improvements.

Civil 3D is new and developing technology (although parametric 3D model-based design has been around in the building industry for about ten years). What Civil 3D does, it does a lot better than MX (Civil 3D does not yet have every feature of MX, but when it does, it will be far superior). This is perhaps the most interesting thing about Civil 3D. The capabilities have just been

Figure 1

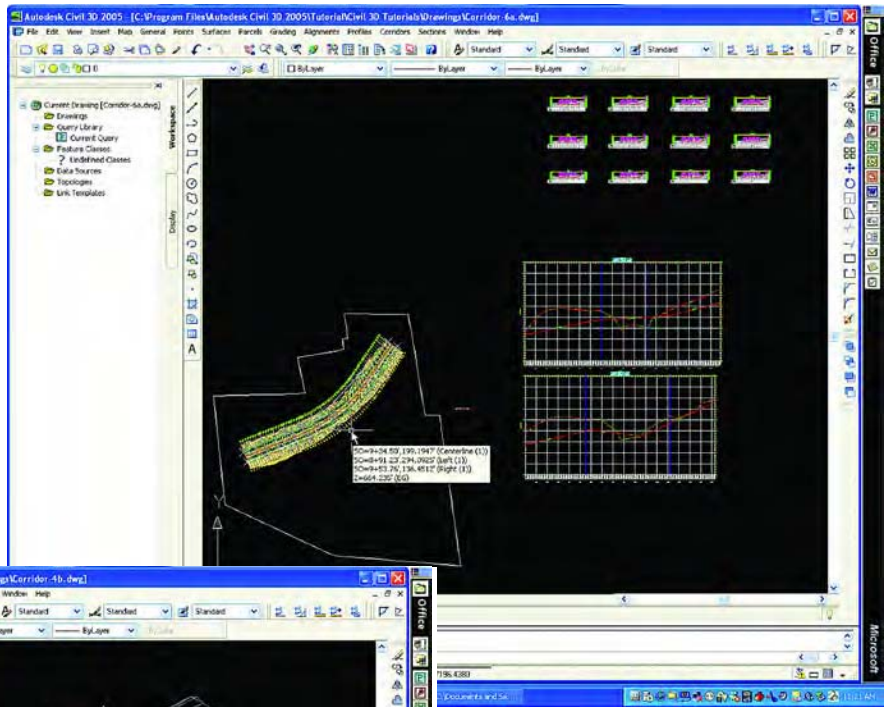
scratched, yet already there is much power to discuss.

Figure 1 shows the screen with the work space displayed. "Points" was selected on the menu bar, and "Create Points" was selected from the drop down. This brought up the icon bar you see at the upper left. The last icon selected was "Import points" resulting in the points you see. One of the nice features is that in addition to all of the usual imports, you can import database files (.mdb) directly. The other icons represent all of the other ways in which you can create points, including such items as bearing-bearing intersection, etc. Moving the cursor over any point displays the point number, northing, easting, eleva-

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 tion and description. This is very useful when the view is at such a scale that you cannot read the point values, and saves a lot of zooming in and out.

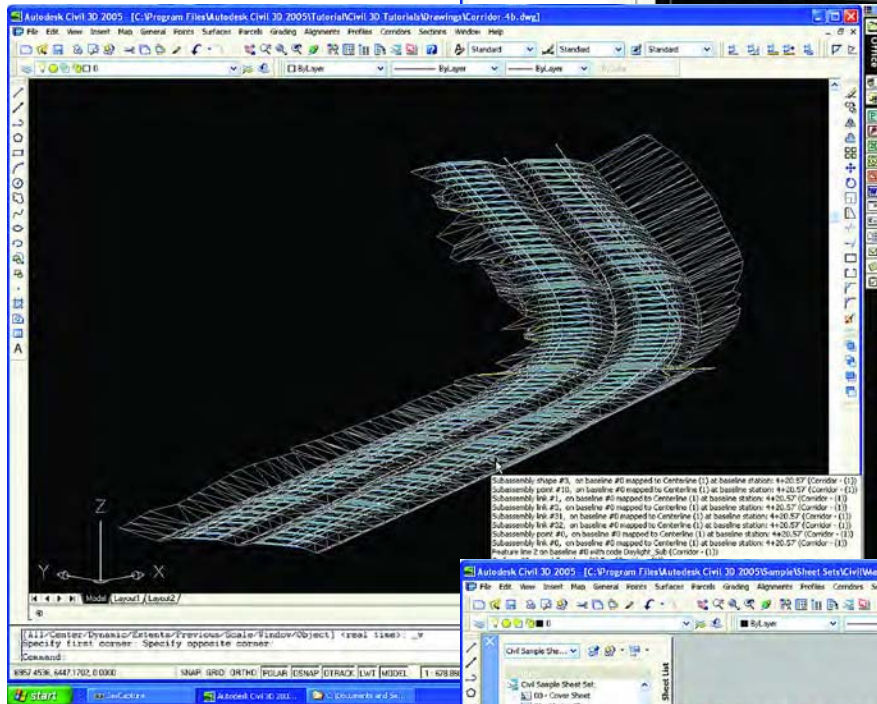
Figure 2 shows the last few cross sections, the profile, and the plan of a dual highway. What you cannot see is that you are looking at a single model through three different views. If you edit the model in any of these views, the editing is done directly on the model and shows up immediately in all views. You are always dealing with the model regardless of the view in which you are editing. Note also that where the cursor is, available information is displayed. This corridor model not only knows about



Top: Figure 2

Left: Figure 3

Bottom: Figure 4

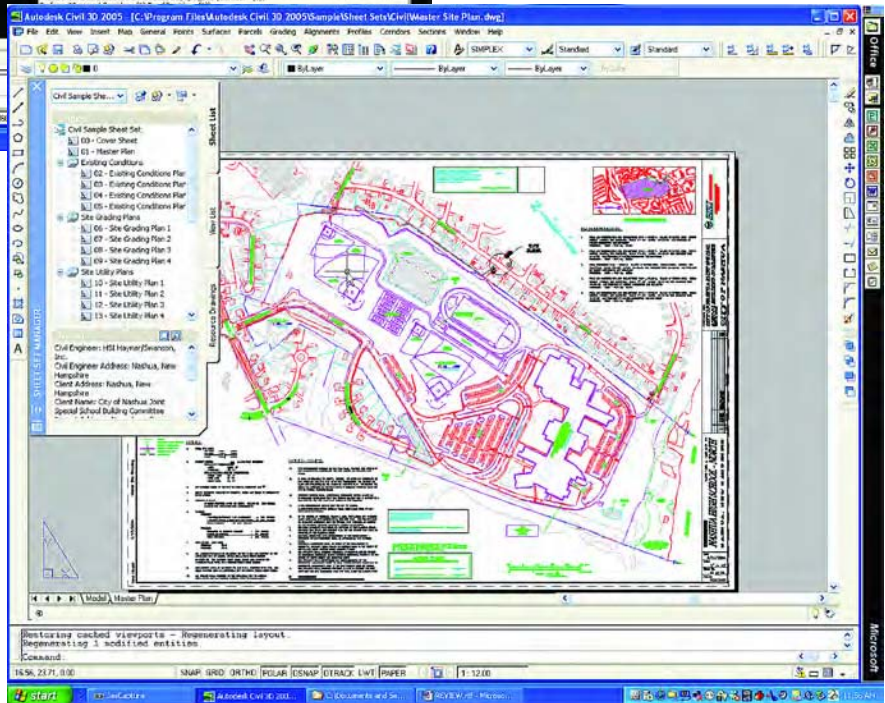


itself but it also knows about the surface model of the existing ground. What that means is that it knows about fill and cut and all the other volumetric items.

Figure 3 shows the same corridor (just another view of one model) of the same dual highway through which the model may be edited directly with instant changes in all views. Again, note that where the cursor is, all available information is displayed. The information is too small to read in the magazine, but it contains a list of the subassemblies and the links, the alignment that they are attached to and the station along the alignment.

Figure 4 shows a master plan and the tools for managing all of the drawings of

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a project; it is a quick index of everything in the project.

All of the design functions, symbols, etc., have been centralized in something Autodesk calls the Design Center. Take, for example, “symbols”: the Design Center shows all of the folders in your computer and can display all of the symbols contained therein. Autodesk also has a Design Center online where you have access to literally thousands of symbols. There are AEC symbols, as well as standard architectural, electrical, manufacturing, mechanical symbols, and 3D architectural symbols. They also have manufacturers’ symbols in all those categories, plus some GIS symbols and website addresses for more.

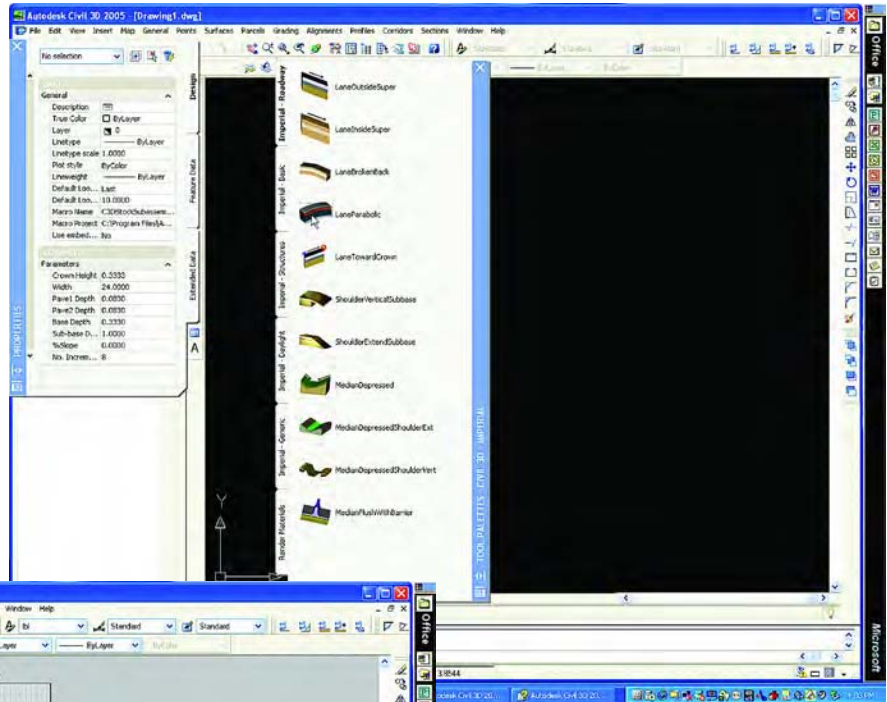


Figure 5

The database is an integral part of the model so that lists and tables created from the models are also updated automatically. This kind of integration makes it possible for the designer to design instead of draft.

Extensive tutorials describe everything from getting started, points, surfaces, project management, horizontal alignments, profiles, parcels, and grading to corridors. In addition, there are 48 drawings to illustrate the text.

A Sweet Task

My wife wanted me to make a floor plan of our house. This is a simple task in an architectural program but somewhat tedious in AutoCAD 2004. I didn't have access to architectural software, so I ended up creating the floor plan with Civil 3D and discovered how useful one of the new tools can be. Autodesk has made hatches trimable. That did not mean much to me when I read it in the documentation. When I drew up the floor plan (Figure 6), you can see how many things needed to be trimmed. Creating a neat drawing was fast and easy, and the symbols from the Design Center made this a sweet task.

If you are a designer who is currently using another design package, even one with string technology, you really need to look at Autodesk's Civil 3D 2005. Find out more at www.autodesk.com.



Figure 5 shows the tool palette for design. The Imperial-Roadway palette is displayed. Once the alignment is created you design the roadway, shoulders, medians, etc. I have selected a lane parabolic for the roadway surface. When I did that, the characteristics of the specific roadway surface popped up on the left. There are default settings which you can edit to your needs. Remember, this is an intelligent sub-assembly which becomes part of the model and is seen in all views and plot sheets. The other tabs listed along the left of the palette are Imperial-Basic, Imperial-Structures, Imperial-Daylight, Imperial-Generic, and Render Materials. If I had selected metric units,

Figure 6 these would come up in metric units instead of imperial units. The building of surfaces, creating volumes, grading, creating alignments and attaching smart subassemblies is easier than it was in the 2004 version. The reason is that in creating an alignment, you are creating a model. The model labels itself automatically. The alignment contains information about the surface, so the existing ground profile is also known. When you add vertical design to the model, it also labels the profile design. Again, you can edit the model from any view and all of the views and text will be updated.