AutoCAD Civil 3D 2008
Visualisation Techniques in Civil 3D 2008
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S8-3 INFRASTRUCTURE CIVIL 3D

Course Summary:
Creating realistic visual models is an important part of your site presentation. In this session you will learn how to create sites from line work and create multiple surfaces with render materials. We’ll cover the proper methods to select, edit and apply materials. We’ll even have a look at best practices for render and environment settings with the use of 3D content, placement and adjustment, and visualise with Camera to create still-renderings and drive- and fly-through animations.

Instructor:
Highly-experienced in all aspects of civil design, Jack is Autodesk’s AutoCAD Civil 3D application engineer for UK and Ireland. In this role he has been heavily involved in the development of the product, ensuring its suitability for the UK and Irish markets and developing the country kit. His job also entails supporting the local reseller network, using his expertise to guide them and their customers on their civil engineering projects. Before joining Autodesk, Jack worked as a design engineer for a number of consultants and local authorities where his work spanned designing landscaped surfaces to major road design schemes working with AutoCAD and other civil engineering design products. During this time, he was involved in the tendering process on many occasions and also provided site supervision on a number of projects.
Introduction

There usually comes a time in any project when an engineer has to prove their design to the client - or to the general public. This can instill fear in even the most experienced of designers. It can be a time-consuming exercise and difficult too. Usually there isn't enough budget. If there is, it may get passed on to specialists but this can prove costly – and once again take up a lot of time. This session will consider how you can take a AutoCAD Civil 3D model and, with only a couple of additional steps, create a high quality visualisation with still images and videos. This paper will take you through these simple stages and demonstrate that this task is not actually as daunting as it first appears by using the basic settings within Civil 3D.

Prerequisites

Dataset and 3D Content, found at https://projectpoint.buzzsaw.com/client/ISDUK/AUGI UK 2007
User Name – AUGI UK Password - Civil3D2008 (case sensitive)
Surface creation

Usually you are probably used to creating one surface for all proposed ground design. This is fine for surface analysis, cut and fill etc. However when it comes to visualisation we need to give a render material for each type of surface.

It is still worth having a surface that has all new design within it as it will prove useful further in the process. (You can always turn that one off and leave in the background)

When creating surfaces there are a couple of things we need to think about.

1. A general context surface around your design, the outside surface where we can simply drape an aerial photograph to put the design into context
2. Edges, to create kerbs, upstands, walls etc we need breaklines
3. Corridors, these can take care of any road design and section based extruded entries
4. Cutting them together

Lets start

The example here is the creation of a site development for new office space, with a access road and a large car park.

First, create the car park asphalt area

Create a new surface called Car Park with the ‘Car Park Area’ surface style and add the channel line as a breakline for the car park area.

Before doing this you are asked for some options.
Name, style and render material, use the options outlined in the image below.
When we add the yellow break line for the channel, there are some options for how to use the line.

Selecting ‘Mid-ordinate distance’, is used to tessellate the polyline arcs from which the breakline is being created.
Selecting ‘Supplementing distance’, is used to add more triangles along straights in the breakline to create a smoother surface.
If you used the defaults you would get

Also add the drainage breaklines to form the surface breaks.

To tidy the triangles around the perimeter add the channel line again as an ‘Outside Boundary’
Repeat for the building pad area, but also include the building outline breakline.
Grading the kerb lines

A way of creating kerb edges is using the grading feature. Create a grading from the menu, called Kerbing
Using ‘Relative Level and Distance’, choose the yellow channel line of the car park and start the grading from the channel of the access road into the car park and also the opposite end.

Use the distance of 0.15m and relative level of 0.125m to create the kerb.

Do the same for the mini roundabout with a different name.

Create a surface top to the mini roundabout from the line creating from the grading kerbline.

**Boundaries**

To cut the site together we need to remove the designed area from the existing ground surface.

**NEVER cut holes from the existing ground surface itself.** You may have other objects referencing it and can cause them not to work.

To form this then we can create a surface with the existing ground surfaced pasted in.

Create a surface called Ground Context. Then under definition, edit and paste. Paste in the existing ground surface.
From the design is a red line around the site. This was created by a mixture of draping the line to existing ground and also extracting polylines from the corridor. Then joining them together.

Add this line to your Context Ground surface as a breakline and then as a hide boundary. Also add the red dashed line around the survey as an outer boundary to neaten up the surface.
Last of all using the green line create a surface called grassed area to fill the area from the car park to the outer boundary.

And add the line as a breakline and as an outer boundary.
**Render materials**

**Surfaces**

These have been taken care of during the creation, but more can be done. The materials now in AutoCAD are very much like in 3DS Max. To access them type ‘Materials’
Here there are setting to change all aspects of a material, from picking a texture from the AutoCAD library, or from a website. To opacity, shiness, tiling and scaling

**Drape an aerial photograph**

In 2008 this process was made very straight forward. In this drawing already exists a photo which has been switched off as it is in 2D.
To drape the photo to our context surface, go to the Surface menu, Utilities and ‘Drape Image’

This then sets the coordinates of the image automatically and how it is applied

**Corridor**

In 2008, corridor rendering got very easy as the ‘Code Set Style’ now included the ability to render the links in the corridor.
Result with Realistic Visual Style and an Isometric view
3D Objects

To build a scene up, rendered surfaces only tell part of the story. Adding 3D objects for trees, cars, street furniture and buildings.

Buildings

This scene is designed for a new office block. Within the dataset is a dwg file from Revit Building of the wall skin. XREF this drawing in at X=361002.7131 Y=405693.5278 with rotation of 347.

Move to 3D.
From Surface menu, Utilities select ‘Move Blocks to Surface’, pick the building pad surface and then the Revit building.

3D Content

Choose the 3D Content palette in the toolpalette.
Pick an object and pick a location in the drawing where you want it and rotate to suit

Use the same technique to move the block to a surface.

Adding large amount of 3D content.

Items such as trees, bollards and lighting are normally placed at regular intervals. Draw a line for the position of the line of features. Drag a block into the scene and list it to get the name of the block.

Type measure and select the line and then ‘b’ for block and then type the name of the block. Give a distance to space the blocks.

Instant trees

Then move them to that surface

You will note that the majority of the tree example are actually crossed images. This is to reduce the size of the models and also more realistic on eye level renderings as you cannot see the crossing aspect of them

Cameras

Standard cameras are a great way to view your model and to sight yourself in an accurate location.
Type camera and pick a location and then a location to look at.
First thing you will see is a camera preview. This however will more than likely be positioned at level 0. Hover your mouse over the surface to get an idea of level. Pick on the camera and go to its properties. Set the camera level and also the target level.
Another good property to change is the Lens length to 28mm (a good setting)

Rather than switching your view to the camera, it is a good working practice to use Viewports in layout space.
Go to layout tab and create a viewport if there is not already one.
Go to View menu and Named Views
Select the camera1

Select an image background (sky.tga)
Set current

To add some simple lighting and shadows. Go to View and Render, Lighting and Edit Sun
Turn the Sun on and also change the Geographic location to a city nearest your site and or type in the coordinates
Camera path animation

Two main camera paths for engineering level visualisation is an orbit of the site and a drive through.

**Orbit cam**

Draw a circle from the centre of the scene to outside. Change its Z level value to roughly 50m above the surface.

Go to View menu and ‘Motion Path Animations’

Pick the circle, then for a target pick a 3D position on the scene in the centre of the circle. This may require a point being placed to snap to.

**Drive through cam**

Draw a line for the path and then one for the eye target, should be 20m distance and can vary Move both lines to the surface by converting to ‘Feature Lines’ and draping to the surface. Then using Feature line level editor move up 1.2m above for driving eye level. Explode back to 3D polylines.

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Video production

Under the camera setting

Frame rate depends mainly on where you are. 25 FPS is Pal format video, which is used in Europe and 30 FPS is NTSC format for the US and other countries. This only comes into play if making a DVD at some point. Next set the time length duration and by simple maths will set the number of frames.

As you can see from this example we need 250 frames to produce 10 seconds. Using rendered will take potentially about an hour. Always test your animation first so that you can see that everything is correct. To do this use ‘Realistic’ visual style and a small resolution as it will make the file within 5 minutes and will have the rendered materials displayed.

Format

There are a number of formats available.
For PC use, use WMV (Windows Media Video)
For DVD use, AVI

Resolution

For quick tests and portable video use 320x240 and for DVD (TV) use 620x480 will be sufficient
The preview button will run through the animation, but not necessarily display the accurate speed.

Then ok to the panel and it will render the scene.

You can cancel at any time and the video will be intact. But on a cancel from this point will actually leave the camera in the scene, so that you can adjust its settings using ‘Named Views’ as outlined earlier to set background image.

When you are happy with the output of the test animation change the visual style to ‘Rendered’
You now will have produced a very realistic video using the basic settings in Civil 3D without being a graphic specialist.

**Acknowledgments**

Many thanks to Wigan Council for their support and providing survey datasets

Wigan Council – Engineering Consultancy

www.wiganmbc.gov.uk/pub/beng/

Also to the Ordnance Survey for the OS mapping data