

## Cleaning Your Dirt Data

David Growcott – Spiire

**CI3920**      Surveying: Cleaning Your Dirt Data

### Learning Objectives

After completing the session, you will be able to process additional topographical survey information into a larger surface data set by:

- Taking control of your base survey data.
- Understanding the method of merging models and managing of groups of superseded survey data.
- Processing multiple survey data sources into one model.
- Keeping the total model in a state of correctness.
- Having an effective file management structure to keep track of when and where surveys were done.

### About the Speaker

*David is an experienced Civil Designer/ Surveyor with 20 years' experience using AutoCAD® products, including Civil 3D® for the last five years. He is a senior Civil Designer and the CAD Manager for Spiire New Zealand.*

*My mission statement is that our design teams will be the best Civil Design teams in New Zealand. Clients and others in the industry have given feedback stating exactly that.*

*Now that Spiire is operating within a bigger organization (Downer), it is my responsibility (with the support of my CEO) to ensure that the design skills and expertise expected from Spiire are engrained in the design teams across all our office locations.*

*Dave Growcott*

*Civil Designer and CAD Manager, New Zealand.*

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## Class Summary

- Understand your survey data: keep your total existing surface model (EG) in a state which is dynamic with the ever developing site. This is so that your design team is aware of the status of the model and where the information has come from.
- I will guide you through a project step by step using information and data from internal surveys, external surveys and additional topographical surveys taken along the way. We will be using data Shortcuts, so if you are unaware of how Data Shortcuts work this will be a crash course. For more information on data shortcuts you can download my paper that I did in 2008 “CV400-2L Reference That Data”.

Included are step-by-step instructions on how to manipulate surface and point data with your new topographical survey data, versus your old superseded data.

- How to assess and understand what output is required by the Engineer or Client.
- How to have real and useable data from others; keep it quick and easy to manage your project.

### Base info required:

My existing surface model (EG Existing Ground model) is going to be the base file which all other users know is the current file and it will be updated with data throughout the project. Naming the drawings and the survey data inside is very important. I now use E for ‘existing data’ and N for ‘new data’.

Topographic survey data.

<u>Data point files</u>	<u>*.Dwg</u>	<u>Surfaces</u>
	E-SITE.dwg	EG
	E-POINTS.dwg	
Topo 12-03-03.csv	Topo 12-03-03.dwg	Topo 12-03-03
Topo 12-03-08.csv	Topo 12-03-08.dwg	Topo 12-03-08
Topo 12-06-28.csv	Topo 12-06-28.swg	Topo 12-06-28

*(I would normally keep my survey point data and survey surface in the same CAD file, but to assist in showing this method more clearly I have spilt it up to E-SITE and E-POINTS.)*

We can also load the Civil 3D® design data if we need to show final product. E.g. Road Design.dwg

**Merging Surface data:**

This works by layering data on top of other data. EG is created by the first survey data (Topo 12-03-03) then a merged surface is created by adding new data (Topo 12-03-08) on top and so on.

So the EG surface is built from building brick on brick.

After two site surveys the Survey-brick looks like the below. The top most survey is always the most dominant information as it reflects the latest captured data.

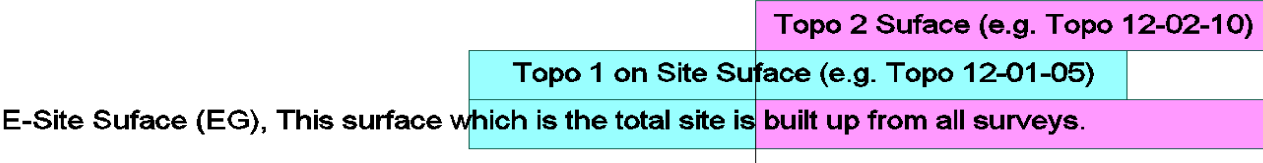


Figure 1

On completion of 5 topographic surveys the EG surface is looking more like a game of Tetris®

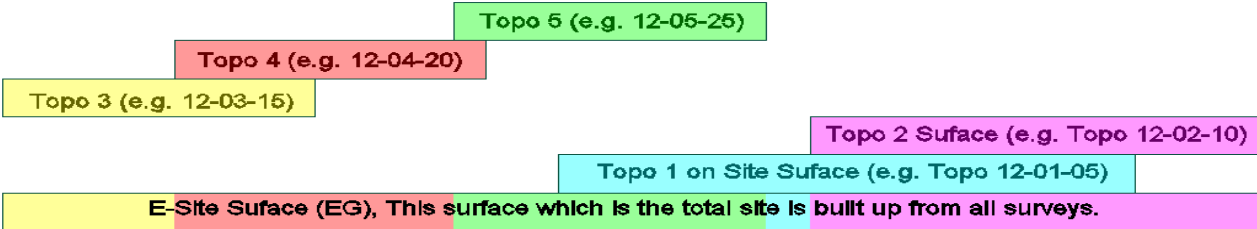
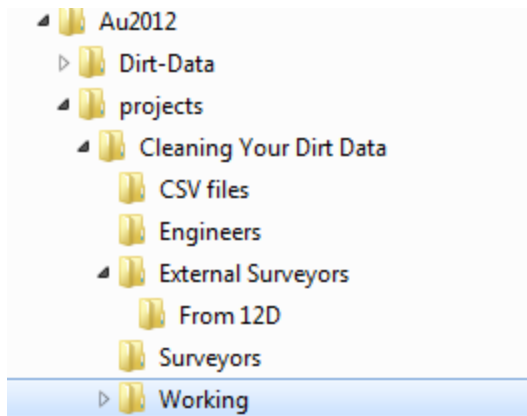


Figure 2

**Project Folder:**

Below is a standard file structure. (As you can see below under 'External Surveyors' in Australia and New Zealand some surveying companies use other software like 12V).



**Surface data in “3d Faces”.** Most surveying and design software can product “3d Faces”; we also send data to Architects who can use their standard AutoCAD® software to view the “3d Faces”.

The great thing about “3d Faces” is that the 3d-triangles reflect what the surveyor working on the project says the site is like. When receiving survey info from external surveys it is always best to have them send you a “3d Faces” drawing, which when reproduced in *Civil 3D*® will be exactly the same.

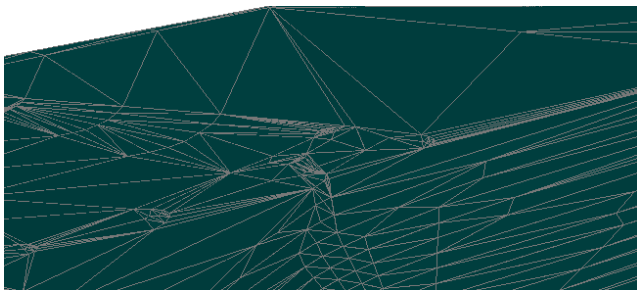


Figure 3 ISO view

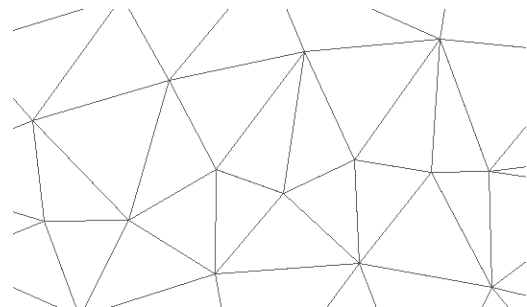


Figure 4 Plan view

**Surface topographic data:** Polylines, line-work and symbols.

**Survey point data:** Output data from the survey as \*.csv files.

## Let's get started:

We need to start a Data Shortcut project.

Change the combo box under the prospector tab in toolspace from “Active Drawing View” to “Master View”.

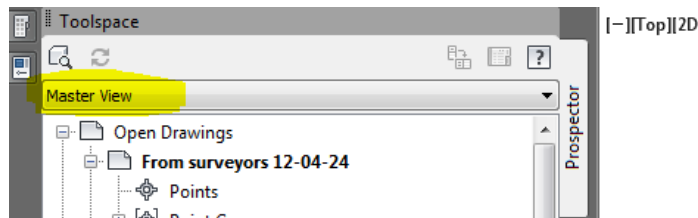


Figure 5 master view

What this now shows us under “Data Shortcuts” is that we have the ability to store and reference data. The more you put into the back end of your file & data shortcut structure, the better your front end will be.

Is adding data shortcuts really that quick? You better believe it!

Now create a new drawing from your standard *Civil 3D*® Template.

### Create a new Data Shortcut File

**Right click on “Data Shortcuts”** (*I will not be showing you how to create and use data shortcuts in this class, you can send me an email request for my data shortcut class*).

**Select “Set Working Folder”** In this Class we will place it under file name “Working”.

**Right click on “Data Shortcuts”.**

**Select “New Data Shortcuts Folder”** (*This will make a new file directory under the working folder to start your project off as pictured in fig.6 below*)

**Type in “Working”.** This will create all the subdirectories that have been set up by your CAD Manager.

Figure 6 Populated Data Shortcuts

Before we can create an EG surface we need to make sure the Topo surveys we are inserting have their own surfaces, (which have been through a company QA). Some of these surface files have already been processed in *Civil 3D*®, and others still need the surfaces to be created in *Civil 3D*®, from the “3d Faces”.

### Creating Surfaces:

The data file for this project came from a sub consultant who uses a software package called ‘12d’, and was outputted into a “3d Faces” file.

We are going to convert this 12D “3d Faces” data file into a Topo *Civil 3D*® surface.

When creating a surface name best practise is to name it the same as the Topographic survey file (Topo 12-04-24.dwg) so name this surface file ‘Topo 12-04-24’.

First we need to build a polyline around the “3d Faces” this polyline will be used as an Outer boundary. Attach this polyline as an outer boundary to the surface file ‘Topo 12-04-24’.

Now we add Drawing Objects, drawing objects are located under the definition heading of the surface file (*by doing this we can delete the “3d Faces” on completion of these steps, which will make our drawing files smaller*). Always tick the “Maintain edges from objects” as this will make the new surfaces “3d Faces” the same as the ones we received from the sub consultant.

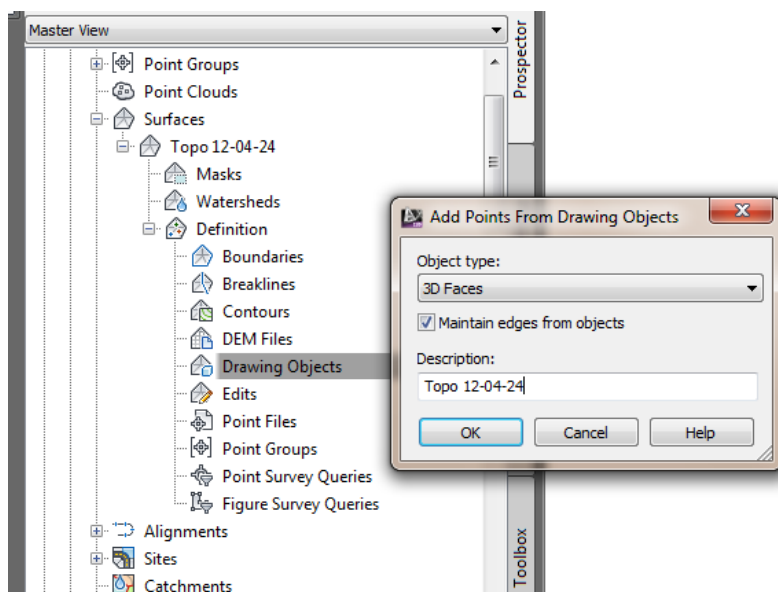


Figure 7 3d Faces

Each time we complete a topo surface we then add it into to our “Data Shortcuts”

**Management of surface data into the EG surface:**

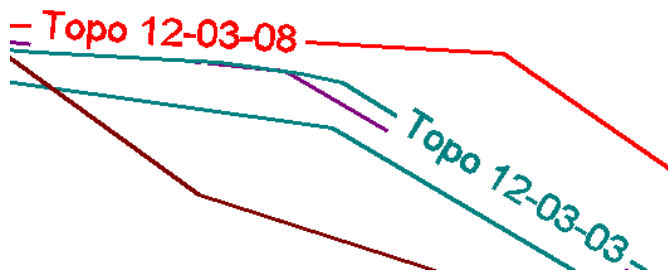
Create a new drawing called EG.dwg for this project.

Each Topo survey has a unique boundary. We will be inserting each boundary into our base drawing so that we know what data came from where. Create a layer to place this on.

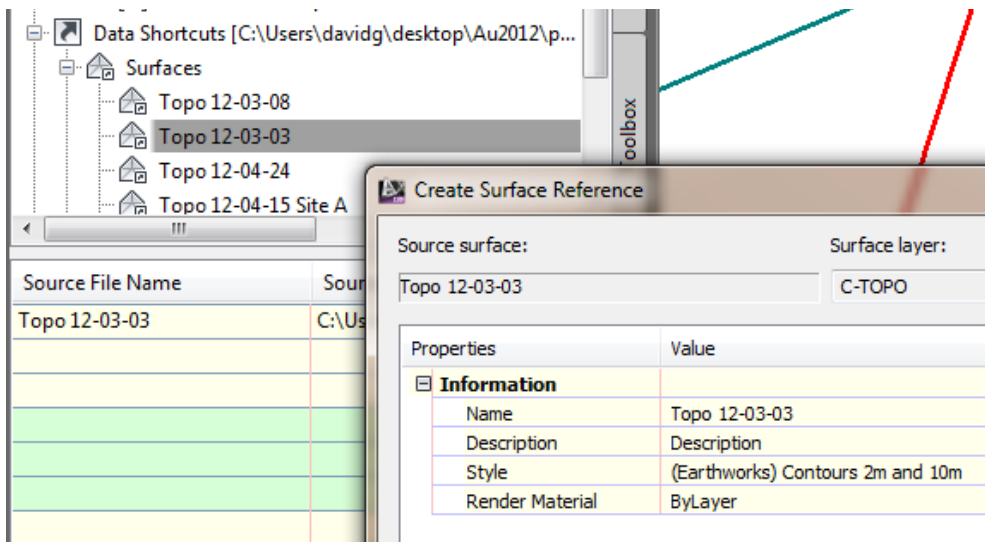
From the topo drawing “topo 12-03-08” we can copy the outer boundary using “Clipboard” “Copy with Base Point” Then in the EG.dwg we paste on the boundary layer “0-topo 12-03-08.



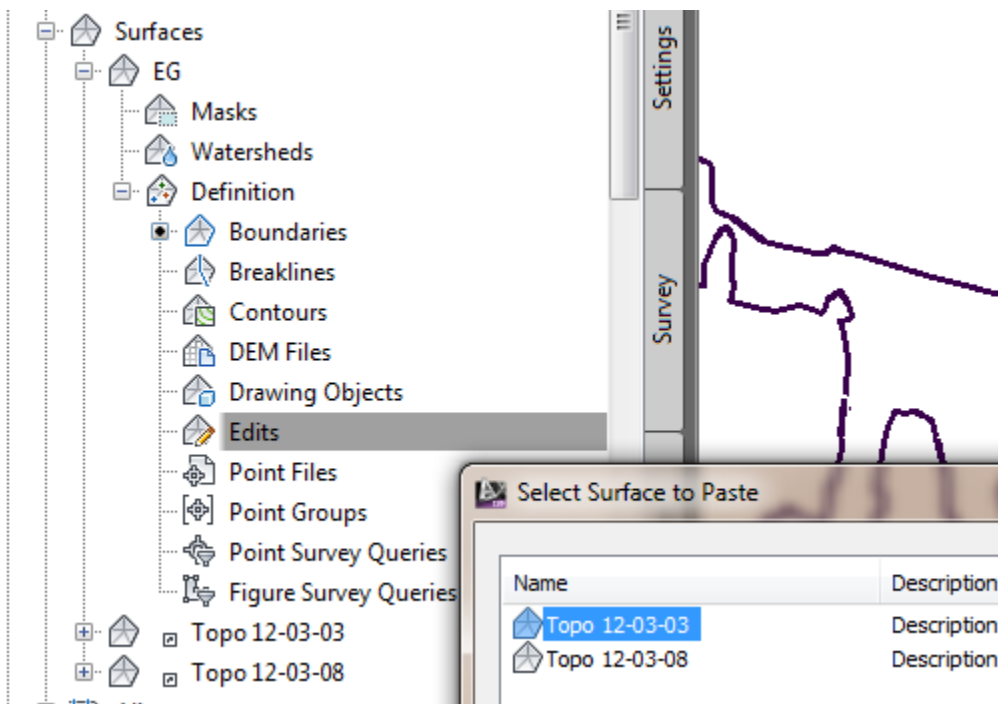
I also create a note on the boundary line to show what Topo data it came from.



Inserting all the topo surfaces into our EG.dwg is easy using data shortcuts. Select the earliest surface in the data shortcuts folder then Right-click and select ‘create a reference’ Inserting the surface into the current drawing.



Now to create the EG surface. We will simply paste each subsequent surface onto. The oldest data first and lastly the newest data.



Now in the EG an see the current drawing has three surfaces, two are Data Shortcuts and the other is a valid surface in the drawing. Is a Valid Surface in this drawing file.  
 a Data Shortcut Surface.

At any time you can promote the data shortcut surface to a valid surface within the drawing.



**NOTE:** Any changes done to the referenced data shortcut surface file will not be updated into this drawing once the data shortcut surface has been set as valid.

***I will now show you more on this in class.***

**Survey Base info required:**

With surveying points this where it becomes messy but also easy.

I'm not keen on renumbering data, but the original Topo drawing has not been changed.

	Renumbered survey data
Topo 12-03-03.csv	1000-1193
Topo 12-03-08.csv	2000-2635
Topo 12-03-20.csv	3000-3593
Topo 12-04-15 Site A.csv	4000-4113
Topo 12-04-15 Site B.csv	5000-5525

Also with the overlap of surface models the point data will also be overlapping.

We will work through this in Class.

I hope you enjoyed this class and that you leave here with a better understanding of what you can do with large survey data files.

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Thanks so much.

