

Civil 3D Point Cloud Surface Extraction

Civil 3D 2015

Introduction

This white paper is part 3 of a 3 part series in which I will be covering the full workflow for creating a surface from point cloud data. Part 1 examined the preparation of the point cloud in ReCap for use in Civil 3D, with part 2 taking a deeper look into the preparation process including removing noise or unwanted areas. In part 3 we are going to cover the surface creation process in Civil 3D.

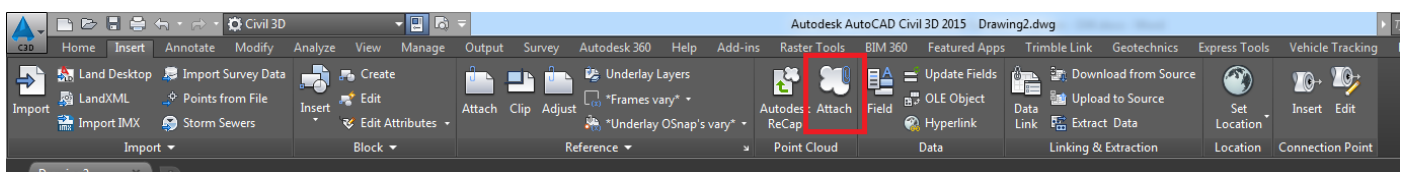
Preparing Civil 3D

In the first two parts of this series we have imported our point cloud into ReCap and used the tools available to us to create relevant regions which we also exported into separate scan files. The remainder of the process in Civil 3D is a simple one and revolves around a wizard. Unfortunately this wizard is not built into Civil 3D and is instead a Product Enhancement, it is called Point Cloud Extraction and is available to customers with Civil 3D or Infrastructure Design Suite Premium or Ultimate on subscription. If you do not already have this tool installed on your computer it is necessary to install it before attempting to continue with this guide.

Attaching your Point Cloud

The first step is to attach our point cloud to our drawing. This can be done by selecting the Attach button highlighted in the red box on fig. 1 below.

Fig. 1

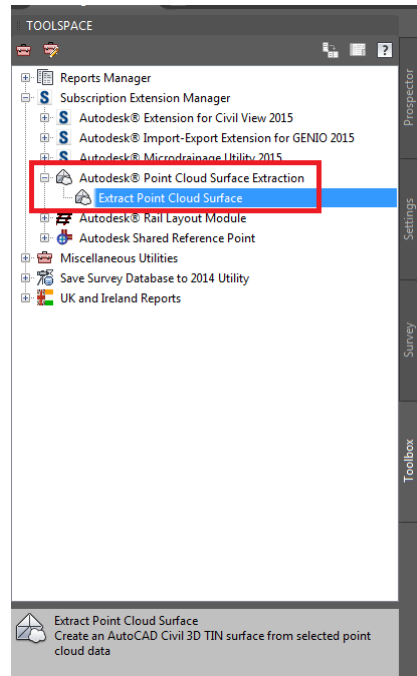


We are presented with a dialog box asking us to select our rcp or rcs file. Having selected our file and chosen open we are presented with another dialog box similar to the one presented when attaching an external reference asking us to confirm the insertion location, scale and rotation for the point cloud object in our drawing. Selecting OK on this dialog box will insert the point cloud object into the drawing. As fast as lightning the object is displayed in your drawing, those of you familiar with the old process for importing point cloud into Civil 3D will appreciate this more than others.

Extracting the Surface

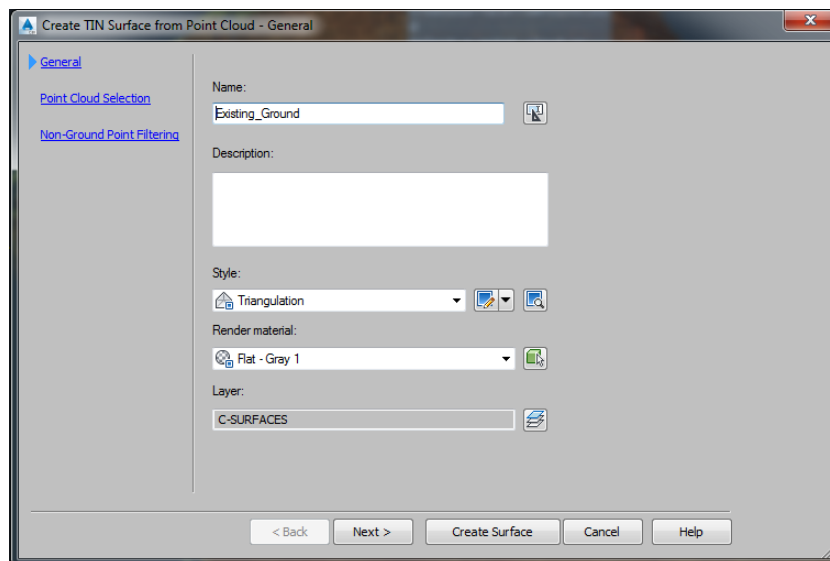
The Point Cloud Surface Extraction product enhancement can be accessed from the Toolbox of the Toolspace in Civil 3D by double clicking on Extract Point Cloud Surface as shown in fig. 2 below.

Fig. 2



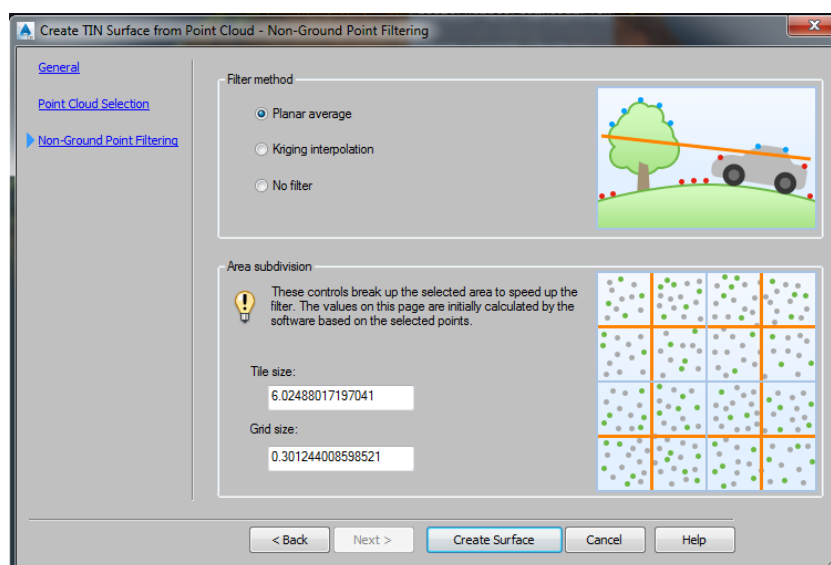
Having started the command we are required to select our point cloud from the drawing and then press enter. Once done we are presented with the dialog box shown in fig. 3 below. The initial screen of the wizard relates to the surface that will be created, it is recommended that you give the surface a good logical name. You may also specify the surface viewing style and render material at this time if you wish.

Fig. 3



Clicking next will allow you to make changes to either the point cloud that the surface will be extracted from, or the area of the point cloud that the surface will be extracted from. The wizard can only utilise a maximum of 800000 points from the point cloud and the only way for us to “control” which are selected is to limit the area of the point cloud being utilised – a process that we have already attempted in ReCap. Due to this limitation it is recommended that you try to keep each point cloud object less than 800000 points if you wish to extract a surface from it. Clicking next will take us to the last section of the wizard before the point cloud is created. This last section of the dialog box as shown in fig. 4 below allows us to select the filtration method, grid and tile size used when creating the surface from the drawing. Available filtration methods are Planar Average, Kriging Interpolation and No Filter. A “preview” of how each of these selects points is shown in the dialog box.

Fig. 4



Selecting Create Surface will start the surface creation, depending on the Filter method that was selected this can be a very short or rather long process. Dependent on the number of points in your point cloud you could end up with a very densely populated triangulation surface and may be prompted to enter Level of Detail display mode. Dependent on the resources available to your machine this may or may not be necessary. You can disable Level of Detail display mode by typing `LEVELOFDETAILOFF` into the command line and pressing enter, you can also re-enable it by typing `LEVELOFDETAIL` and pressing enter. Fig. 5 below contains a screen image of the surface that was created (in level of detail display mode) for me and brings this document to a close. Hopefully you have found the series useful!

Fig. 5

