



AUTODESK UNIVERSITY 2015

CI10901

Basic Data Management for AutoCAD Civil 3D Projects

Jason Ferrelli - Autodesk

Learning Objectives

- Learn how to organize project CAD files
- Learn how to split up larger data into more manageable pieces
- Learn how to effectively use data and external references
- Learn how to make clean drawings of unwanted/unneeded data

Description

This class will cover how to effectively set up an AutoCAD Civil 3D software project. To manage the size and stability of an AutoCAD Civil 3D software project, we will focus on using data shortcuts and external references in a workflow that makes drawings more manageable. This class will also cover basic tips, tricks, and tools to help keep drawings clean throughout the projects longevity.

Your AU Expert

Jason Ferrelli is an AutoCAD Civil 3D software customer support specialist with Autodesk, Inc. Prior to joining his current team at Autodesk, Jason worked for Tetra Tech, Inc., for over 15 years. He spent the majority of that time as their CAD manager, working primarily on Department of Transportation (DOT) projects. With Autodesk, Jason has presented at Autodesk Technical Academy (ATA) regarding topics covering basic workflows and troubleshooting AutoCAD Civil 3D software.

Organize Project CAD Files

File Management

Before beginning a Civil 3D project it is HIGHLY advantageous to have a standard location to place the data, as well as have a solid folder structure to organize the data. File naming can also help keep organization within the decided folder structure. The folder structure should allow enough flexibility to place data of different types and needs.

For large projects this can be a critical decision that should be made before the project drawing file production commences. Not having this setup, could cause loss of time down the road if data needs to be moved, which will break data and external references.

As there are a number of ways this can be achieved, the actual setup might differ between projects. Having a standard however, will encourage good practices and make transitioning from job to job easier and the users will be familiar with the setup and workflows.

Data File Management Options

- **Dedicated Network Server**
- **Local machine**
- **Vault**

Folder Structure

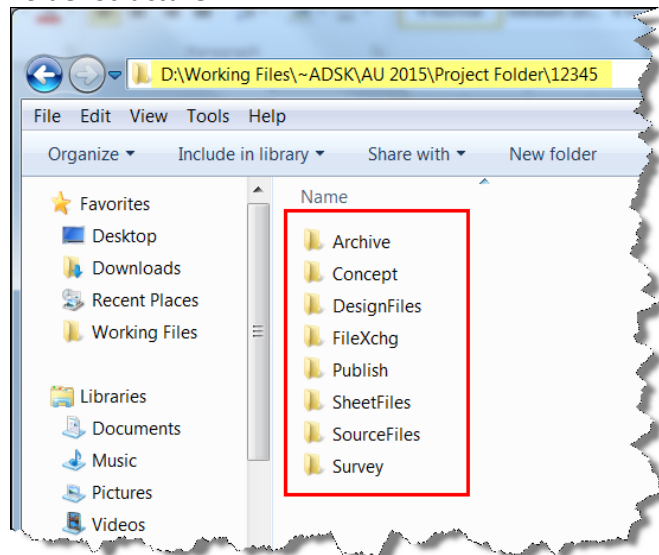


FIGURE : SAMPLE FOLDER STRUCTURE

Large Data Management

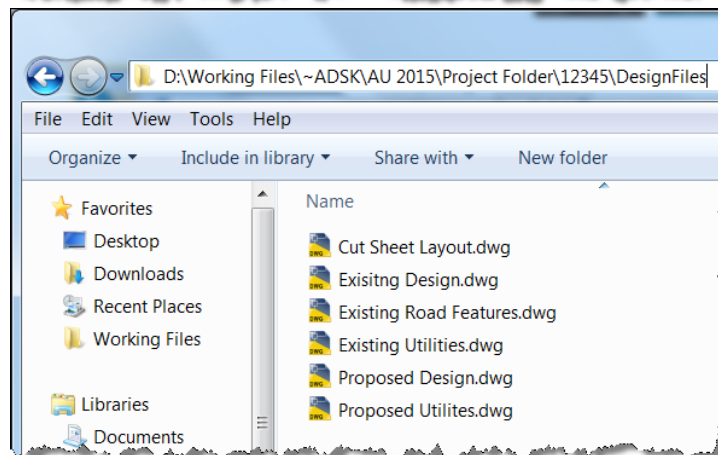
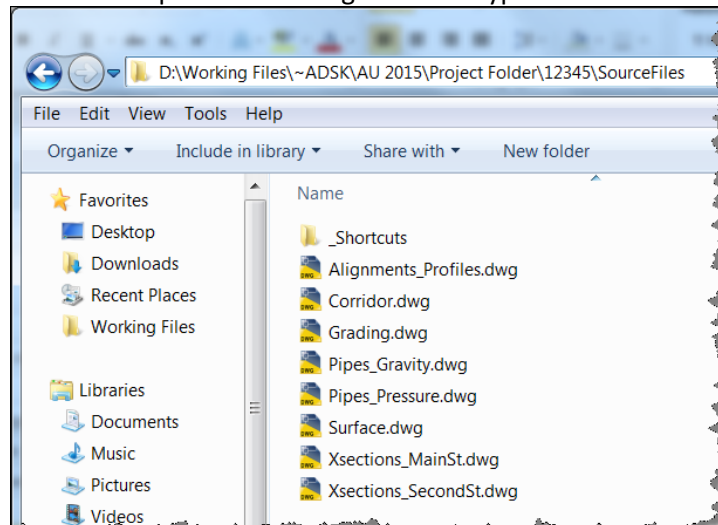
Separating data

Very often when troubleshooting a drawing for a customer, I come across a drawing that has so much data that it causes the drawing to become much slower. An example of this would be a drawing that does not have any references, and has every bit of possible data (Alignments, surfaces, corridors, samples line, etc) in that one file.

Not only can this cause performance issues, it can also potentially cause project issues if that drawing should become corrupt. Troubleshooting issues within a large file could also be a concern as it might be more difficult to pinpoint objects that may have become corrupt.

Suggested Practice

- Make a copy of the original drawing that contains all the data.
- Create multiple new drawings for each type of data to be separated.



- In original file, copy / XML out each type of data to new created drawings.
- Clean up data in new drawing and remove any unwanted data.
(See "Drawing Maintenance" section)



Using Data and External References

Data Reference (Dref) Overview

Data shortcuts provide a direct path to the location of a shareable source object. In a single operation, you can create data shortcuts for multiple objects in a source drawing. The data shortcut is used only for the creation of data references.

A data reference is a read-only copy of a source object, inserted into another drawing. From the Prospector tab, you can select a shortcut for an object and create a reference to that object in the active drawing. The data reference maintains an active link to the source object in the source drawing, without relying on the data shortcut.

On the Toolspace Prospector tab, the Data Shortcuts node displays the path to the active project, where data shortcuts are stored. These data shortcuts can be created from any drawings associated with the active project.

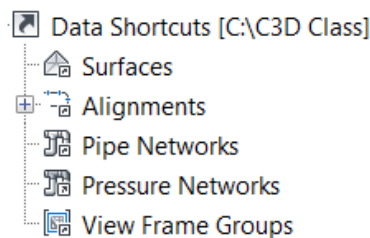
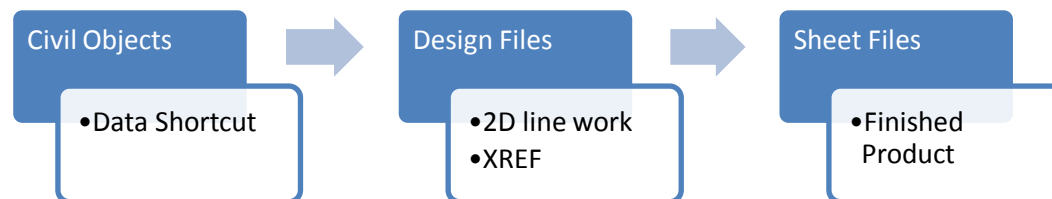


Figure above shows the shortcut folder with “C3D Class” being the active project. If you change the active project, the new project name appears on the Data Shortcuts node, and the subfolders contain only the shortcuts in the new active project.

Suggested Data Shortcut Workflow



The workflow above suggests that the Civil 3D data objects (alignments, surface, profiles etc), be used as source drawings or live drawing databases. This is where your Civil data will reside and be accessed as data shortcuts.

The Design file would be a drawing that does not contain Civil 3D objects, however any static 2D entities. If there is a need to bring in the Civil data for reference, the data would be brought in as a data shortcut.

Lastly the Sheet File is a container and is recommended to have minimum to no actual data (with the exception of annotations). This file would be the finished product and use a combination of External and Data references to populate this file.

Setting up of your Folders

There are two important folder settings that have to be done before you can import or export Data Shortcuts.

1. Set Working Folder
2. Set Data Shortcuts Folder

Working Folder

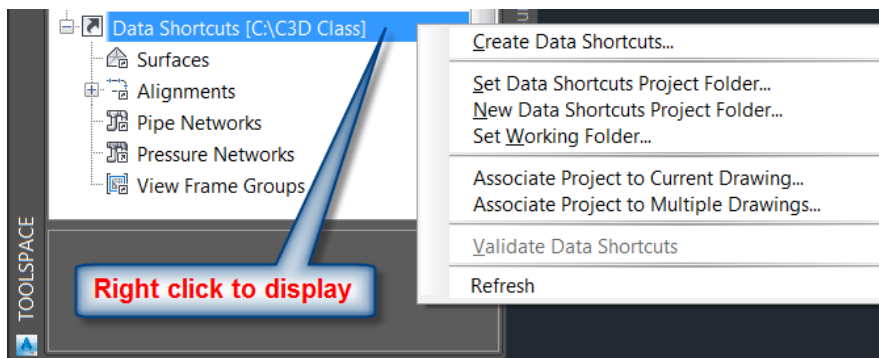
The working folder (Project folder) stores a list of data shortcut folders (projects) that can be set (or added to). It is the data shortcut folder that is the key to all of this.

Data Shortcut folder

Once you have set your working folder, you setup the folder which will store your Data Shortcuts.

Setting the Working Folder

To setup a Working Folder, right-click on the "Data Shortcuts" section in the Prospector Palette in Civil 3D's toolspace. From the menu, select "Set Working Folder".

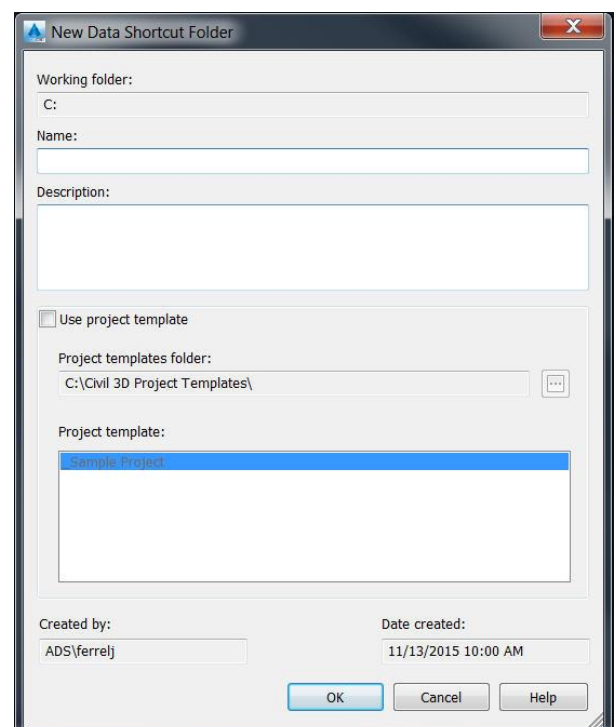


Creating a New Data Shortcut Folder

Once you have set your Working Folder (which is the path to your data shortcuts folder), you setup the folder which will store your Data Shortcuts.

Using the same right-click menu from the Data Shortcuts on the Prospector, you will select to create "New Data Shortcuts Folder". This option will present the dialog box as shown in the figure.

The name of the Data Shortcut folder is the name of the parent folder containing the Data Shortcuts.



Using Project Templates

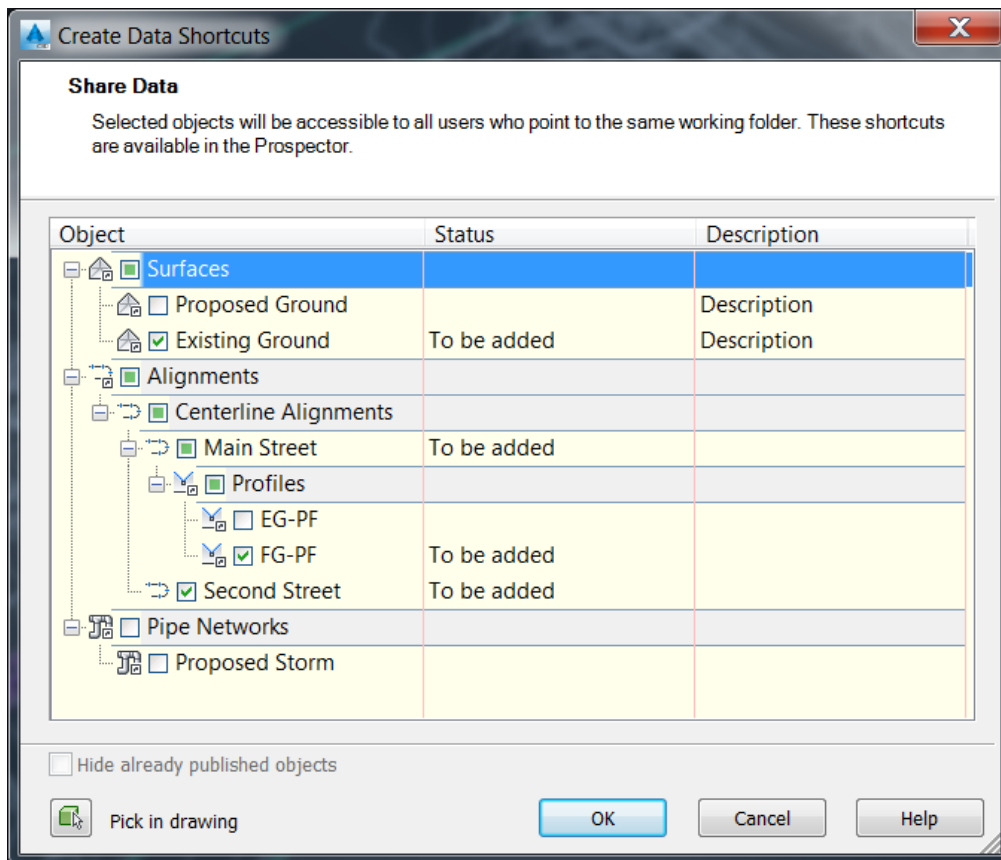
The project templates folder is a path to a location which has folder structures that you use within your company.

Simply select which folder structure template is appropriate for the project that you are setting up. Civil3D will copy not only the folder structure but any default files that exist in the selected project template.

Creating the Data Shortcuts

Once the directory management has been setup, the current data shortcut folder will be displayed in your Prospector. This means that you will be able to create data shortcuts from C3D objects found in your current drawing and have them stored in the current displayed Data Shortcuts folder.

To create the data shortcuts, simply right click on the Data Shortcuts section again in your prospector and choose, "Create Data Shortcuts". You will be presented a dialog box similar to the one shown in the figure.



Here we have decided to make data shortcuts for the "Existing Ground" surface, "Main Street" alignment along with the "FG-PF" (Finished ground profile) and the "Second Street" alignment. Just because we have more objects in the file, does not mean we are required to make data shortcuts for all this data. We take what we need and leave the rest in the source file to be used as needed later.

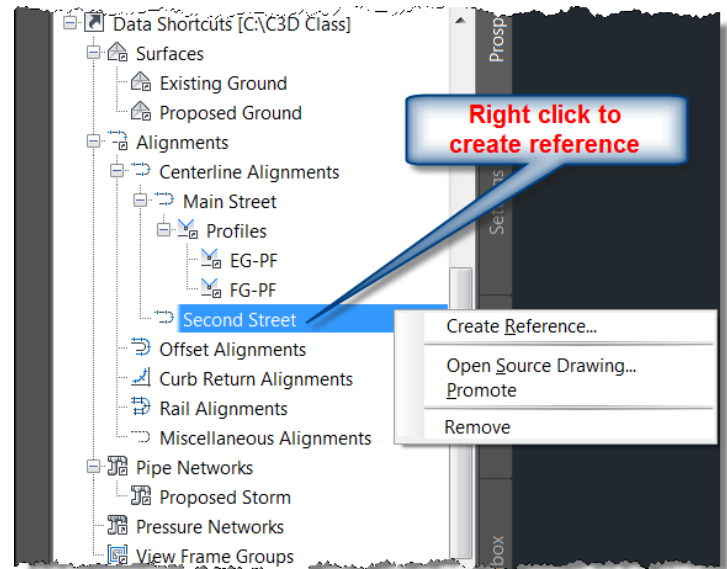
Referencing Data from Data Shortcuts

Once you have created the Data Shortcuts for the objects, these will reside as pointers to where the C3D objects are located.

To reference these objects into another drawing, simply set your data shortcut folder, select the object you wish to reference and right-click to Create Reference.

When you select to create the reference, the prompts will act as if you are creating a new C3D object (surface, alignment, profile, etc.). However, you are creating a referenced version of a C3D object.

This reference allows you to set all the display properties of the object within the current drawing without affecting the source parameters of the object.

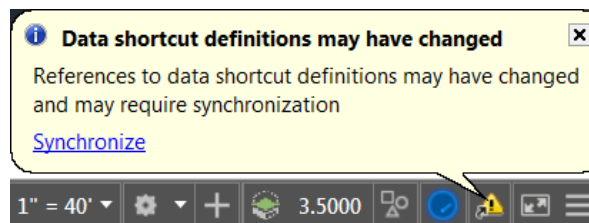


Synchronizing, Promoting, and Validating Data References/Shortcuts

In working with data shortcuts, you will come across phrasing that you may not be familiar with. Three phrases you will need to understand are synchronizing, promoting, and validating your Data Shortcuts. Let's review each phrase and what it means.

Synchronizing a Data Reference

Working in a drawing where a referenced object exists, the reference is constantly checking to see if the source drawing where the actual C3D object resides has been saved. If the dref (short for data reference) is out of date, then you will receive a notice along your status bar. Simply click "Synchronize" to update this reference.



Promoting a Data Reference

When you promote a data reference, you are making the object referenced as a permanent object in the drawing and breaking the link or reference. The object now resides in that file and will not update if there are changes to the original source drawing.

Validating your Data Shortcuts

Validating a data shortcut is checking the path and making sure it can find the object listed in the data shortcut. This is done if there is a need to repair the path to the drawing file containing the object or the object itself has been deleted.



External Reference (Xref) Overview

You can attach an entire drawing file to the current drawing as a referenced drawing (xref). With xrefs, changes made in the referenced drawing are reflected in the current drawing. Attached xrefs are linked to, but not actually inserted in, another drawing. Any changes to a referenced drawing are displayed in the current drawing when it is opened or reloaded. Therefore, with xrefs you can build drawings without significantly increasing the drawing file size.

By using referenced drawings, you can

- Coordinate your work with the work of others by referencing other drawings in your drawing to keep up with the changes being made by other designers. You can also assemble a master drawing from component drawings that may undergo changes as a project develops.
- Ensure that the most recent version of the referenced drawing is displayed. When you open your drawing, each referenced drawing is automatically reloaded, so it reflects the latest state of the referenced drawing file.
- Keep the names of layers, dimensioning styles, text styles, and other named elements in your drawing separate from those in referenced drawings.
- Merge (bind) attached referenced drawings permanently with your current drawing when the project is complete and ready to be archived.

A drawing file can be attached as an xref to multiple drawings at the same time. Conversely, multiple drawings can be attached as referenced drawings to a single drawing.

Attaching Xrefs

You can use several methods to attach an xref:

- Click View tabPalettes panelExternal References Palette.
- Click Tools menuPalettesReference Manager.
- At the Command prompt, enter EXTERNALREFERENCES.
- At the Command prompt, enter XATTACH.

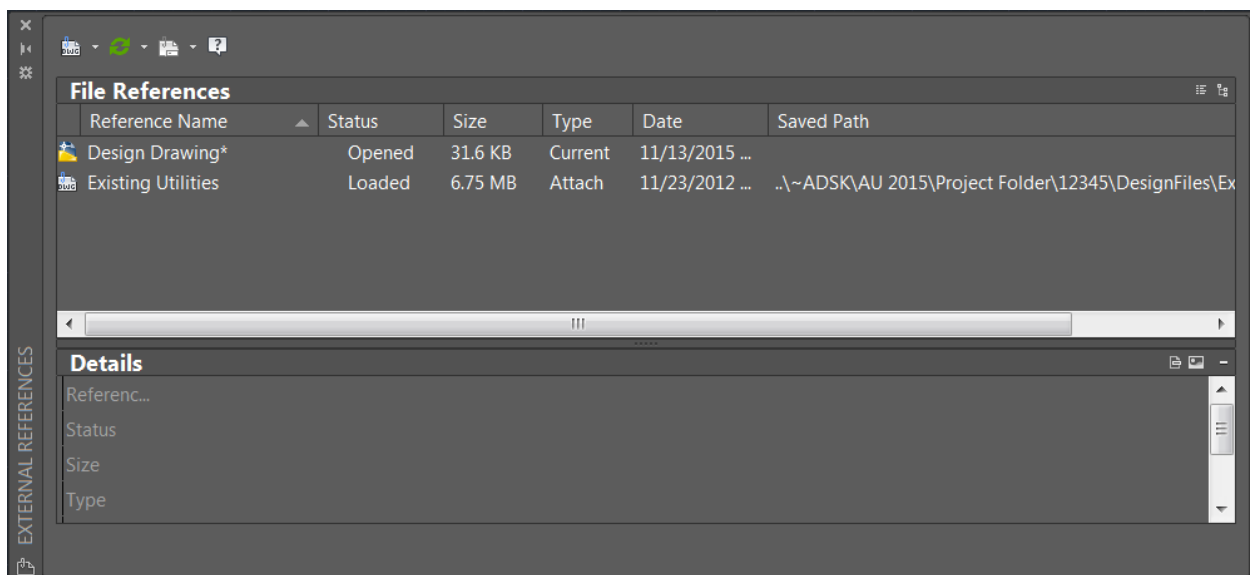


FIGURE: EXTERNAL REFERENCE DIALOG BOX



Drawing Maintenance

Purge and Audit

Keeping drawings free of unneeded data is a necessary task to prevent drawings from becoming too large and or possibly corrupt. There are a variety of reasons that AutoCAD users would need to clean up drawings.

Many times, users will clean up drawings only when they have to, such as for errors (crashing drawings, inability to import in to other applications), or files being too big to email, etc. By keeping the cleanup process simple and automating as much as possible, it is more likely to get done on a regular basis.

AutoCAD has some built-in tools that can help make the drawing cleanup process much easier. These tools can be used individually to handle certain cleanup tasks, or they can be used in conjunction with others to handle larger cleanups.

Purge

Removes unused named objects from a drawing. You can only remove one level of reference at a time. Repeat the command until there are no unreferenced, named objects.

Note: The PURGE command will not remove unnamed objects (zero-length geometry or empty text and mtext objects) from blocks or locked layers.

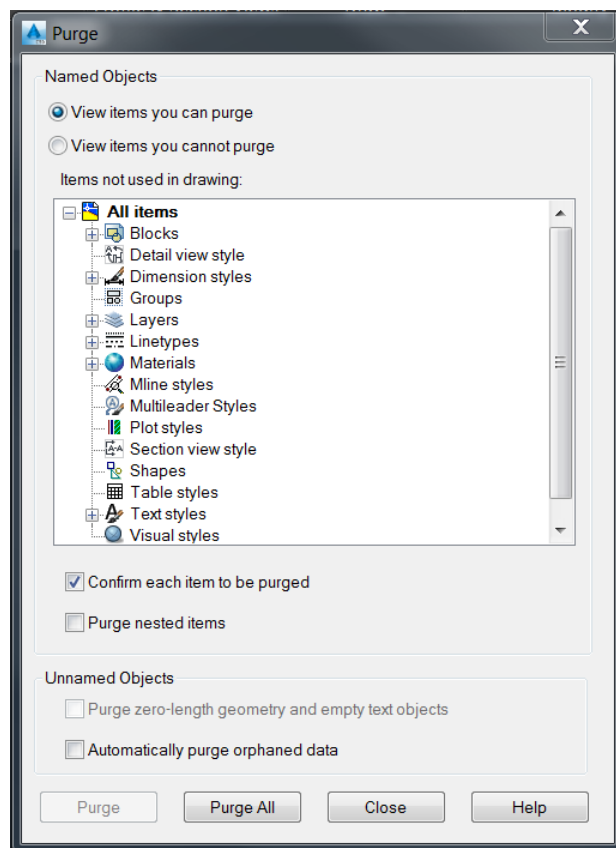


FIGURE: PURGE DIALOG BOX



Audit

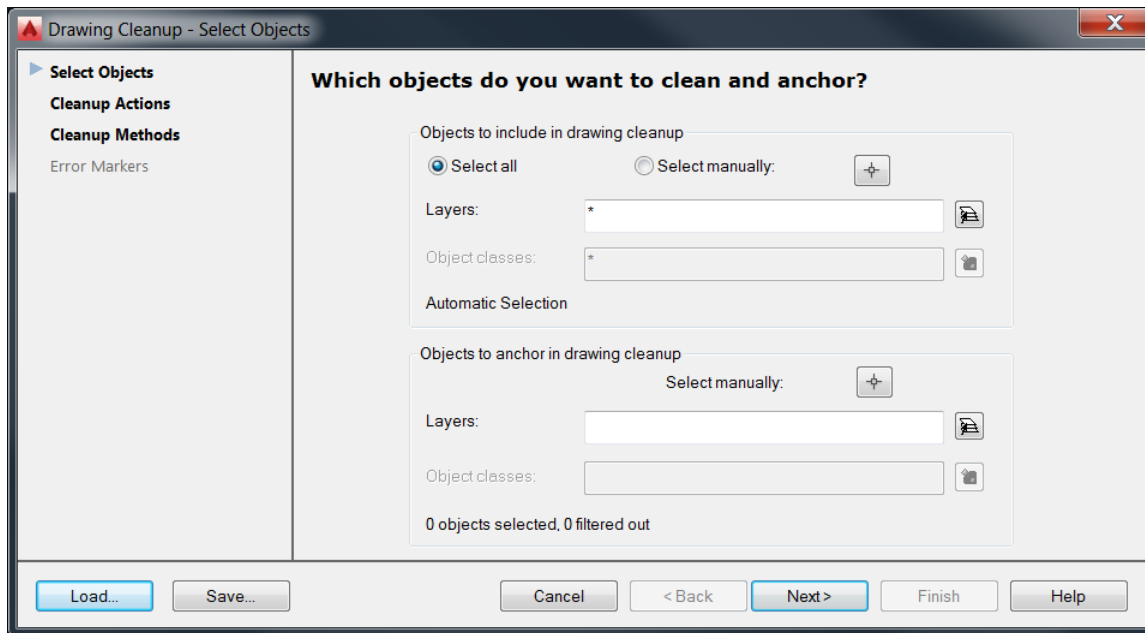
Audit places the objects with errors that are in the current space into the Previous selection set. If the AUDITCTL system variable is set to 1, a text file with an ADT file extension is created that describes the problem and the action taken. If a drawing contains errors that AUDIT cannot fix, use RECOVER to retrieve the drawing and correct its errors.

Audit is a command line tool. Following are the prompts and options.

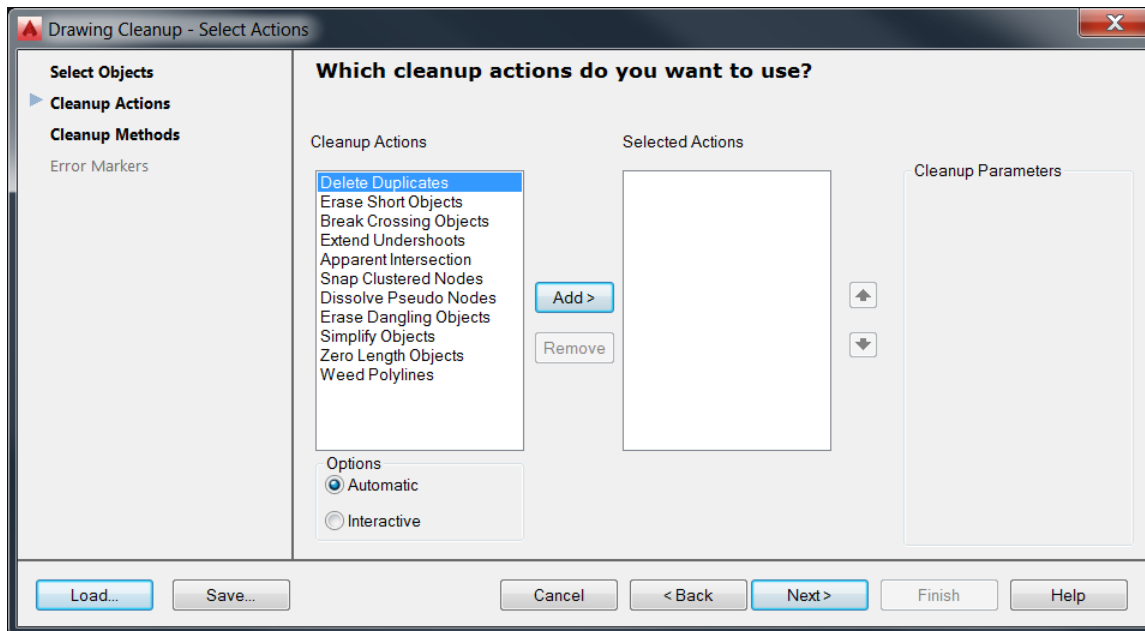
- Type “Audit”
- The following prompt is displayed.
 - Fix any errors detected? [Yes/ No]. You would typically choose “Yes,” unless you’re just looking to see if the drawing has errors.
- When the routine is done it will give you a status report of how many objects it audited and how many errors it found and corrected. Running Purge prior to an Audit will often reduce the overhead of auditing items you do not intend to keep anyway.

Drawing Cleanup (MapClean Command)

A powerful utility developed for AutoCAD Map 3D is also included with AutoCAD Civil 3D. It enables you to delete duplicate objects, weed polylines, and do many other cleanup actions. You can set several parameters to control each action.

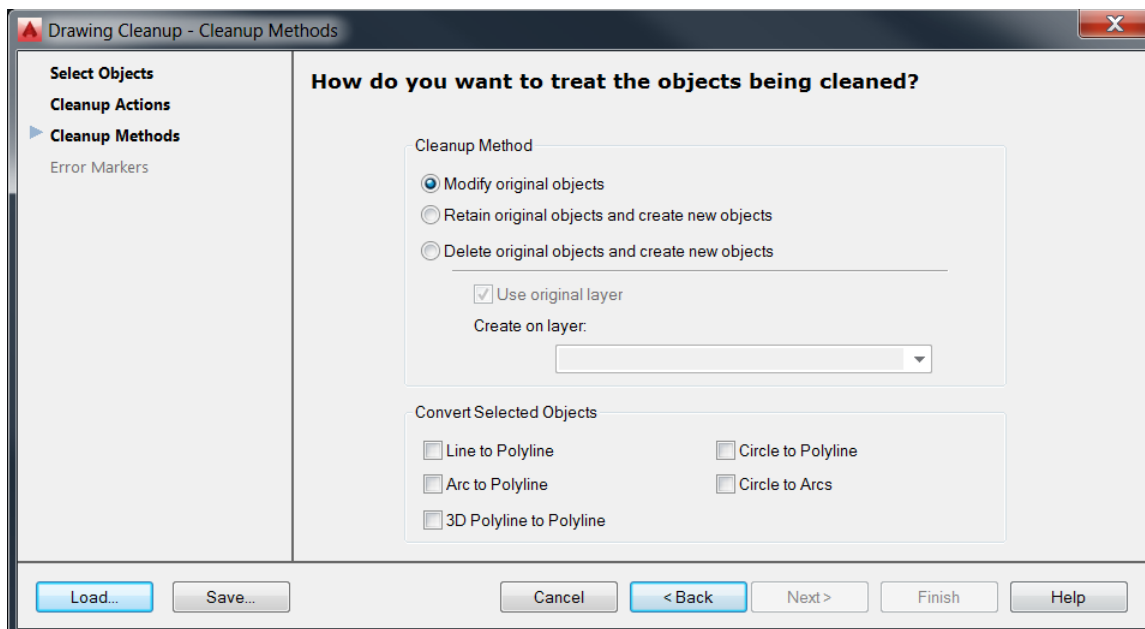


Use the “Select Objects” dialog box to select the objects to include in the cleanup process and the objects to anchor. If you have previously saved your drawing cleanup settings in a profile file, click Load to reload those settings.



The “Cleanup Actions” dialog box allows you to select the cleanup actions to perform and the parameters to use. Specify whether to review errors in Interactive mode or have AutoCAD Map 3D automatically correct errors.

You can perform multiple cleanup actions simultaneously, but it is better to perform only a few at a time so you can track changes. Run the Simplify Objects and Weed Polylines actions by themselves—not with other actions.



Lastly the “Cleanup Methods” dialog allows you to specify what to do with the original objects after the cleanup process is complete.

