Workshop Description

Summary

This class, offered at selected survey conferences, examines the creation of Digital Terrain Models, or Surfaces, in AutoCAD® Civil 3D®, with an emphasis on producing highly-accurate models as efficiently as possible from survey data. Since the Civil 3D Surface is also the basis for contouring and analysis within the program, better surfaces yield better contouring and analysis as results.

The class reviews the data types for terrain modeling – point, breakline and contour data - and how their use is facilitated with survey data transferred into the drawing from field work. The class will examine how breakline data can be captured and included in the Civil 3D TIN, using not only Civil 3D tools but from other solutions, including Carlson® and SmartDraft®. The course will examine various strategies for filtering point data for inclusion in the Civil 3D Surface, including Point Groups, Description Keys and other tools. Major topics also include the assessment of surface accuracy and surface editing, techniques for improving the quality of contouring, surface presentation and annotation styles, and the use of surfaces in analysis functions, such as slope and drainage assessment.

Topics and Schedule

Digital Terrain Modeling (DTM) Concepts Overview
- Basic Concept - Interpolation
- DTM in Civil 3D Introduction
- Operational Aspects of Civil 3D Introduction
  - Processing Data
  - Building a Civil 3D Object

Data Types Used in Constructing DTM
- Point Data
- Breakline Data
- Contour Data

Critical Civil 3D Surface Feature Settings
- Civil 3D – Infinitely Customizable Program (Advantage and Disadvantage)
- Settings Control Each Feature or Element
- Critical Surface Feature Settings
- Examining Surface Feature Settings
- Importance of Surface Default Style
- Surface Command Settings
- Triangulated Irregular Networks (TINs) Versus Grid Models
- Building a Surface from More than One Data Type in Civil 3D
- Producing TINs with Exceptionally High Quality
Starting the Surface in Civil 3D
   Methods for Creating the Existing Aerial Surface
   Adding Spot Elevation Data
   Adding Contour Data
   TIN Weeding - Filtering of Vertices on Contours
   TIN Supplementing Factors - Adding Vertices to Polylines
   Options for Minimizing Flat Areas

Adding Breakline Data to the Surface
   Creating Breaklines from Drawing Information
   Civil 3D Interpolation Tool for Producing a 3D Polyline/Breakline
   Adding Breaklines to the Surface

Surface Integrity and Data Security
   Surface Editing
   Adding Boundaries to Suppress/Show/Hard Clip Data
   Processing the Boundary as a Non-destructive Breakline
   Locking to Protect from Accidental Editing

Continuing with Additional Field Data
   Creating Breaklines – and Exception
   Point Data Requirements
   Layer Considerations
   Isolating Display of Points for Breaklines Options
     - Point Group Display Order
     - Layer Management
   Drawing the Breaklines
   Alternative for Creating Breaklines
   Creating the Surface
   Adding Breakline Data to the Surface
   Adding Point Data to the Surface
   Adding the Surface Boundary
   Pasting Surfaces

Pasting Surfaces to Create the Existing Combined
   Copying the Aerial Surface
   Pasting the Road Sections Surface

Surface Status Indications in the Prospector

Contouring Surfaces

Surface Labeling
   Setting Styles and Creating Contour Labels
   Placing a Spot Elevation Label
Learning Objectives

1. Participants will be able to describe the process for building surfaces in Civil 3D from survey fieldwork as illustrated using the sample survey project used in the course.

2. Participants will be able to describe surface display and annotation controls exercised by Civil 3D styles as illustrated using the sample survey project used in the course.

3. Participants will be able to describe the process for building breakline data for surface creation, either through field-to-finish processing or manual construction within a drawing, as illustrated using the sample survey project used in the course.

4. Participants will be able to describe methods for assessing surface accuracy and performing surface editing as illustrated using the sample survey project used in the course.

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