

MSCad

DTM and Volume Calculations

Session Outline

February 21, 2017

1.0 Introduction of software

- 1.1 Introduction of instructor and experience
- 1.2 Discussion of software (QuickSurf, Intellicad, Cogo)
- 1.3 Review of access to commands
- 1.4 Access to Help topics
- 1.5 Questions

2.0 Modelling surfaces

- 2.1 What are they
- 2.2 How are they expressed in MSCad
- 2.3 What are they best used for

3.0 Configuration Settings – Hole 16.dwg

- 3.1 Full print of all settings
- 3.2 Demonstrate all model settings
- 3.3 Saving configuration and resetting to default
- 3.4 Test

4.0 Data extraction – Points and Breaks.dwg

- 4.1 Extracting points
- 4.2 Extracting breaks
- 4.3 Extracting using ACE
- 4.4 Temporarily showing TIN
- 4.5 Changing colour of TIN
- 4.6 3D Orbit
- 4.7 Render TIN

5.0 Visualizing the Surface for Verification – Hole 16.dwg

- 5.1 Create layer and show/draw TIN.
 - 5.1.1 Move around TIN with PAN
- 5.2 Discuss Surface Operations information
- 5.3 Track Z
- 5.4 3D orbit
- 5.5 Locate and remove bad point in surface
- 5.6 Render TIN
- 5.7 Test

6.0 Display smooth contours – Stock Pile.dwg

- 6.1 Extract to surface
- 6.2 TIN model surface
- 6.3 Create boundary
- 6.4 Show contours
 - 6.4.1 Adjust interval
 - 6.4.2 Adjust colours
- 6.5 Draw contours
- 6.6 Change major contour linetype and set LTgen to true
- 6.7 Label major with wipeout and minor with trim
- 6.8 Smooth contours
- 6.9 Test

7.0 Surface Method Volume – Stock Pile.dwg

- 7.1 Extract bottom and top to two layers using ACE
- 7.2 TIN bottom and top and render each
- 7.3 Verify using Surface Operations
- 7.4 Surface Volume routine
 - 7.4.1 Future minus past
 - 7.4.2 Create report
- 7.5 Some checking by using datum

8.0 Area Method Volumes – Area Method Demo.dwg

- 8.1 Create surfaces from the two TIN models
- 8.2 Drape polygon onto both surfaces
- 8.3 Add draped polygon to each surface
- 8.4 Re-TIN both
- 8.5 Area volume routine with Surface 1 minus Surface 2
- 8.6 Error checking
 - 8.6.1 Cut/Fill report
 - 8.6.2 Volumes and average elevations
 - 8.6.2.1 Check area of polygon
 - 8.6.3 Volumes to Datum and difference
- 8.7 Test

9.0 Questions

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Session Outline

February 28, 2017

1.0 Review of Session 1

- 1.1 Getting around the software
- 1.2 Configuration settings
- 1.3 Data extraction
- 1.4 Visualize surface and error checking
- 1.5 Contouring
- 1.6 Volumes
 - 1.6.1 Surface method
 - 1.6.2 Area method

2.0 Lab 1a - Contours

- 2.1 Surfaces and contours.dwg

3.0 Lab 1b – Surface Volumes

- 3.1 Surface volume.dwg

4.0 Lab 1c – Area Volumes

- 4.1 Mill volume demonstration
- 4.2 Volume by area.dwg
 - 4.2.1 Problems with lab
 - 4.2.2 Realworld viewing

5.0 Questions

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Session Outline

March 7, 2017

1.0 Review of Sessions 1 and 2

- 1.1 Configuration settings
- 1.2 Visualize surface and error checking
- 1.3 Volumes
 - 1.3.1 Surface method
 - 1.3.2 Area method

2.0 3D Cad drafting techniques – Culdesac.dwg in Session 2 material

- 2.1 Entity properties
- 2.2 2D mode in System Toggles
- 2.3 Convert 2D lines to 3D
- 2.4 Elevation variable to control z value of input
- 2.5 .xy filters to prompt for manual entry of elevations
- 2.6 polylines vs. 3d polylines
- 2.7 Draw a 3D Curve
- 2.8 3d offset
- 2.9 Drape 2D to create 3D
- 2.10 Flatten

3.0 Design Default Settings

4.0 Autosite Design – Culdesac.dwg in Session 2 material

- 4.1 AutoSite Menus
- 4.2 Create site using 3D nodes and 3D Curve
 - 4.2.1 Check coarseness
 - 4.2.2 Close
 - 4.2.3 Create centerline using 3dPoly
- 4.3 3D offset
 - 4.3.1 No vertical surfaces allowed
- 4.4 Autosite design
 - 4.4.1 Defaults
 - 4.4.2 Set to use nested polylines
- 4.5 Surface volume
 - 4.5.1 Compare cut/fill
 - 4.5.2 Change elevation of entities using move or .xy filter
 - 4.5.3 Report copied into drawing
- 4.6 Drape and flatten over new and original surface
- 4.7 Islope routine for same results

5.0 AutoRoute Exercise – new drawing to be created

- 5.1 Save frequently!
- 5.2 Create a new drawing and 'Generate Terrain'
- 5.3 Viewing Surface operations
- 5.4 AutoRoute Menus
- 5.5 Designing an alignment in plan view
- 5.6 Editing POTs by adding or editing curves
- 5.7 Editing POTs by moving
- 5.8 Designing a cross section template
- 5.9 Extracting a ground profile
- 5.10 Designing a vertical alignment
- 5.11 Surface Volumes report
- 5.12 Editing Vertical alignment
- 5.13 Labelling
- 5.14 Extract Cross Sections (change scale)

6.0 Questions and Comments

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Session Outline

March 14, 2017

- 1.0 Lab 2a – Holding Tank Design Exercise
 - 1.1 Review of tank design
 - 1.1.1 Instructions
 - 1.1.2 Demonstration
 - 1.2 Class to complete
 - 1.2.1 Balance volume

- 2.0 Lab 2b – Trail Design Exercise
 - 2.1 Review of process
 - 2.1.1 Through to instruction 6 before save
 - 2.1.2 Through to instruction 13 before save
 - 2.1.3 Through to instruction 18 before save
 - 2.2 Class to complete stage by stage as above

- 3.0 Additional techniques
 - 3.1 General Cross Sections from route design

- 4.0 Review of course
 - 4.1 Configuration settings
 - 4.1.1 MSModeling
 - 4.1.2 MSDesign
 - 4.2 Contours
 - 4.3 Volumes
 - 4.3.1 Surface Volumes
 - 4.3.2 Area Volumes
 - 4.4 Auto Site Design
 - 4.5 Auto Route Design
 - 4.5.1 Step by step with saves
 - 4.5.2 Routine required
 - 4.5.3 Limitations

- 5.0 Lab 2c – House pad and access
 - 5.1 Tasks as shown on Site Design.dwg

- 6.0 Questions and Project presentations