

MSCad

DTM and Volume Calculations

Session Outline

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

10.0 Review of Session 1

- 10.1 Getting around the software
- 10.2 Configuration settings
- 10.3 Data extraction
- 10.4 Visualize surface and error checking
- 10.5 Contouring
- 10.6 Volumes
 - 10.6.1 Surface method
 - 10.6.2 Area method

11.0 Lab 1a - Contours

- 11.1 Surfaces and contours.dwg

12.0 Lab 1b – Surface Volumes

- 12.1 Surface volume.dwg

13.0 Lab 1c – Area Volumes

- 13.1 Mill volume demonstration
- 13.2 Volume by area.dwg
 - 13.2.1 Problems with lab
 - 13.2.2 Realworld viewing

14.0 Questions

15.0 Review of Sessions 1 and 2

- 15.1 Configuration settings
- 15.2 Visualize surface and error checking
- 15.3 Volumes
 - 15.3.1 Surface method
 - 15.3.2 Area method

16.0 3D Cad drafting techniques – Culdesac.dwg in Session 2 material

- 16.1 Entity properties
- 16.2 2D mode in System Toggles
- 16.3 Convert 2D lines to 3D
- 16.4 Elevation variable to control z value of input
- 16.5 .xy filters to prompt for manual entry of elevations
- 16.6 polylines vs. 3d polylines
- 16.7 Draw a 3D Curve
- 16.8 3d offset
- 16.9 Drape 2D to create 3D
- 16.10 Flatten

17.0 Design Default Settings

18.0 Autosite Design – Culdesac.dwg in Session 2 material

- 18.1 AutoSite Menus
- 18.2 Create site using 3D nodes and 3D Curve
 - 18.2.1 Check coarseness
 - 18.2.2 Close
 - 18.2.3 Create centerline using 3dPoly
- 18.3 3D offset
 - 18.3.1 No vertical surfaces allowed
- 18.4 Autosite design
 - 18.4.1 Defaults
 - 18.4.2 Set to use nested polylines
- 18.5 Surface volume
 - 18.5.1 Compare cut/fill
 - 18.5.2 Change elevation of entities using move or .xy filter
 - 18.5.3 Report copied into drawing
- 18.6 Drape and flatten over new and original surface
- 18.7 Islope routine for same results

19.0 AutoRoute Exercise – new drawing to be created

- 19.1 Save frequently!
- 19.2 Create a new drawing and 'Generate Terrain'
- 19.3 Viewing Surface operations
- 19.4 AutoRoute Menus
- 19.5 Designing an alignment in plan view
- 19.6 Editing POTs by adding or editing curves
- 19.7 Editing POTs by moving
- 19.8 Designing a cross section template
- 19.9 Extracting a ground profile
- 19.10 Designing a vertical alignment
- 19.11 Surface Volumes report
- 19.12 Editing Vertical alignment
- 19.13 Labelling
- 19.14 Extract Cross Sections (change scale)

20.0 Questions and Comments

21.0 Lab 2a – Holding Tank Design Exercise

21.1 Review of tank design

21.1.1 Instructions

21.1.2 Demonstration

21.2 Class to complete

21.2.1 Balance volume

22.0 Lab 2b – Trail Design Exercise

22.1 Review of process

22.1.1 Through to instruction 6 before save

22.1.2 Through to instruction 13 before save

22.1.3 Through to instruction 18 before save

22.2 Class to complete stage by stage as above

23.0 Additional techniques

23.1 General Cross Sections from route design

24.0 Review of course

24.1 Configuration settings

24.1.1 MSModeling

24.1.2 MSDesign

24.2 Contours

24.3 Volumes

24.3.1 Surface Volumes

24.3.2 Area Volumes

24.4 Auto Site Design

24.5 Auto Route Design

24.5.1 Step by step with saves

24.5.2 Routine required

24.5.3 Limitations

25.0 Lab 2c – House pad and access

25.1 Tasks as shown on Site Design.dwg

26.0 Questions and Project presentations