

Day 3 Table of Contents

Note to Self-Paced Users of the Day 3 Seminar Handbook	i
Notices	1
Quick Reference	2
Seminar Outline	10
Program Overview	13
A Toolbox for Creating Earthwork Models	13
AGTEK Site Modeling Products Compared	14
Should Earthwork 3D Users Upgrade to Earthwork 4D?	16
Start-Up Options Menu	18
AGTEK Data File Maintenance	20
Modeling Subsurface Strata	21
Strata Modeling Overview	21
Sample Strata Bore Map and Logs	22
Strata Layers List Entries	23
Effect on Volume Report	23
Unknown Termination Material	25
Cut Compaction Factors	25
Reversing and Repeating Materials	26
Groundwater	27
More Strata Materials Than Layers List Lines	28
Strata Bore Hole Entries	29
Importing Strata Surface Elevation Data	32

Day 3 Table of Contents (Cont.)

Modeling Subsurface Strata (Cont.)	
Strata Break Line Entries	33
Editing Bore Logs, Break Lines, Strata Layers List	34
Strata Interpolation Options	35
Change Strata Surface Colors	35
Freeze Strata Layers Option	36
Clip Strata Utility	36
Strata Volume Calculations	37
Strata Volume Reporting	38
Strata Volume Report (AGTEK 4D)	38
Rock Undercut Volume (Cut Area Method)	38
Volume Report with Cut Compaction Factors	39
Volume Report with No Compaction Factors	40
Volume Report with Fill Compaction Factor	41
Calculation of Volume-Weighted Fill Factor	42
Strata Volumes and Stripping Areas	43
Strata Volumes with Straight-Slope Interpolation	45
Viewing Strata Cut Maps	46
Display Strata Cut Map as Background Image (Gradework 4D)	46
“Stripping” the Surface Strata Material	48
Volume of a Strata Seam	54
Balancing Onsite Cut and Fill	58

Day 3 Table of Contents (Cont.)

Balancing Onsite Cut and Fill (Cont.)	
Adjustments to Import/Export Volume	58
Raise/Lower Amount per Volume Report	59
Raise/Lower Entire Site	59
Raise/Lower Specific Data Lines	60
Edit Tie-In to Existing Street	62
Identifying Work Areas with Cut-Fill Lines	67
Stripping Area Conflict at Strata Cut	67
Model Subsidence Loss at Fill Areas	69
Stripping Areas by Cut/Fill Depth	72
Waste Areas by Depth of Cover	78
Modeling Vertically-Staged Earthwork	85
Overview of Available Modeling Tools	85
Five Approaches to a Soil Undercut	86
(1) Transfer Subgrade Utility	86
(2) New Surface and Stage Into Utilities (AGTEK 4D)	91
(3) Apply Survey Utility	98
(4) Stage Over-Ex Utility	105
(5) Apply Template Utility (AGTEK 4D)	117
Modeling for Retaining Wall Cut Back	130
Create <i>Diff</i> Calculation Surface with Lowest Surface Utility	130
Create Wall Cut Back Model (AGTEK 4D Method)	134

Day 3 Table of Contents (Cont.)

Modeling Vertically-Staged Earthwork (Cont.)

Modeling for Retaining Wall Cut Back (Cont.)

Apply Template Utility for Wall Cut Back Lines and Staged Wall-Cut Surface	134
Balance Region to Limit Calculation Area	137
Calculate Wall Cut Back and Backfill Volumes	138
Backfill Volume by Vertical Interval Option	139
Measure Wall's Face Area for Backfill Adjustments	140
Generate Wall Profile	141
Rock Undercut Volumes (Subtraction Method)	142
Refusal Rock Undercut Volume	143
Raise/Lower Function	143
Overlying Material Undercut Volumes	144
Delineate Removal Area with Cut/Fill Line	144
Cut/Fill Line as Report Region Reference	145
Import Report Region from One Job File into Another	146
Recap of Undercut Volumes	147
Variable-Depth Removal of Expansive Clay	148
Clay Removal Typical Section	151
Cut-Fill Line for Removal Transition	153
Stage Over-Ex Utility for Partial Surface	155
Excluding Above-Grade Removal Areas	156
Copy/Paste Bottom of Clay Surface	159

Day 3 Table of Contents (Cont.)

Modeling Vertically-Staged Earthwork (Cont.)	
Variable-Depth Removal of Expansive Clay (Cont.)	
Stage Over-Ex Utility to Merge Surfaces	160
Enter Balance Region to Limit Calculation Area	162
Calculate and Evaluate Volumes	163
Appendix A – How to Get Help, Training, Program Updates	165
Getting Help	165
Getting Trained	167
Getting Program Updates	168
Appendix B – Keyboard Shortcuts	171
Import (CAD Transfer) Mode	171
Edit Mode	173
Entry Mode	178
Profile Mode	182
Planview Mode	184
3D View Mode	187
Volume Report Mode	190
Haul Report Mode	191
Print Preview Mode	192
Appendix C – Download and Use Day 3 Seminar Training Files	193
Appendix D – Catalog of Day 3 Handbook Web Resources	197

Day 3 Table of Contents (Cont.)

Appendix E – Strata Modeling Considerations in AGTEK 3D	203
Strata Volume Report	203
Strata Volumes and Stripping Areas	204
Strata Volumes with Straight-Slope Interpolation	207
Strata Volumes when Existing Surface is Modified	209
Appendix F – Soil Undercut with New Surface Utility in AGTEK 3D	211
Appendix G – Manually Create a Lowest Surface Model	217
Appendix H – Create Wall Cut Back Model in AGTEK 3D	227
Offset Line Utility for Wall Cut Back Lines	231
Edit Cut Back Lines Projected above Cut Back Grade	232
Stage Over-Ex Utility for Staged Wall-Cut Surface	233
Balance Region to Limit Calculation Area	235
Calculate Wall Cut Back and Backfill Volumes	236
Appendix I – “Painting” Balance Regions for Haul Planning	237
Enter Balance Regions	237
Edit Balance Regions	241
Haul Lines and Horizontal Haul Report	242
Horizontal Slice Report	243
Additional Notes & Manipulations	244
Non-Linear Haul Information	245
Strata Volumes at Balance Regions	246
Appendix J – Shrink/Swell Adjustments	249

Day 3 Table of Contents (Cont.)

Appendix J – Shrink/Swell Adjustments (Cont.)

Three Volume/Density States of Soil	249
Estimated Shrink/Swell	249
Soils Report Densities	250
Densities Not Provided	251
Mixed Onsite Fill Materials	252
Measured (Actual) Shrink/Swell	252
Shrinkage on Remove/Scarify/Re-Compact Volumes	253
Subsidence Loss Adjustment	253
Bump the Fill Factor	254
Rule of Thumb Adjustments	254
Compaction Depth Formula	254
Topo Method	255
Haul Swell Adjustment	255
References and Comments	259
About the Author and Seminar Instructor	261
Seminar Attendee Survey	263
Tear-Out Plan Sheet for Modeling Subsurface Strata Exercise	265