New Items in 3d-Dig*Plus* Version 3.4

This Version of 3d-Dig*Plus* contains important upgrades, additions and bug fixes in each of the 3d-Dig*Plus* Modules.

The description below lists only major upgrades and new items. It applies to changes from Version 3.3 of 3d-Dig*Plus.* Bug fixes can be found in the file “readme.txt” in the 3d-Dig*Plus* install folder. The list of new items in Version 3.3 is repeated below this list.

Generic (Base) Program

New Option Terrain/Features/Rarefy

This functionality has one parameter named "Deviation". This parameter controls the degree of rarefaction of a feature. It sets how far the middle point of three points can deviate in x,y distance from a line drawn through the two "outer" points.

So if the points in order are P1, P2 and P3, a line is drawn through P1 and P3 and the 2D distance of P2 from this line is calculated. If this distance is greater than the "Deviation" parameter, the point P2 is kept, if less then P2 is discarded.

This test is applied to all points in the feature in order to rarefy the feature. Duplicate points are discarded separately as part of the rarefaction.

Rarefaction also applies to groups of selected features. In that case, each feature is rarefied separately.

Current Plane Used Directly for Excavation

The Current Plane can now be used for binding inner polygons and excavating, without having to save it separately to an inner surface. Previously trying to use the Current Plane directly for Excavation resulted in a crash.

“More Feature Types” Enhanced to Show in Different Windows

The "More Feature Types" functionality has been enhanced to allow Feature Types to be shown in some terrain graphics windows and hidden in other windows. This gives greater flexibility in use of these Feature Types.

Feature Items Added to Right-Button Popup Menus

Menu items Terrain/Features: Break, Copy Parallel, Copy Parallel Whole, Project Parallel, Project Parallel Whole have been added to right-button popup menus on individual Surface Features and Data Features.

Window Sub-Title Added to Terrain Windows

A new Window Sub-Title has been added to the General Page of he Window Appearance Dialog box. This adds a text to the title of each Terrain Window, after the "Terrain View #".

Improved Interface for Contours on Rendering

An improved interface for changing settings of Contours shown on Rendering has been added to the Render Page of the Terrain Appearance dialog box.

Automated Excavation & Dump Module

Lifts Generated in Single Pass Situation

In auto-generation of Subsequences, lifts can now be generated for the situation where there is only one Pass. Previously, this was impossible.

Single-Step Dragline Simulation Module

“Boom Dump” Added to Single-Step Dragline Simulation

The Boom Dump has been added to Single-Step Dragline Simulation. Previously the Boom Dump was available only in Automated Dragline Simulation. All of the Boom Dump functionality is not yet implemented in this Version.

To access the Boom Dump in Single-Step Dragline Simulation:

(a) Bind the Dump Template to be used for the Boom Dump to the dragline on the Single Step page of the Dragline Simulation Settings dialog box. For this, select the "Bind to Dragline" check box.
(b) Select the Highwall and Lowwall toes on the Single Step page of the Dragline Simulation Settings dialog box.
(c) On the Dump Type page of the Dump Settings dialog box, choose the "Dragline or Other Dump" as the setting for the Dump Option.
(d) Then on the Dump Type page of the Dump Settings dialog box, choose "Dragline Boom" as the Dragline or Other Geometry setting.
(e) On the Boom Dump page of the Dump Settings dialog box, choose the settings for the Boom Dump.
Note the "Show Help" button on the Boom Dump page, which explains many of these settings.

The Boom Dump will behave very similarly to a General Line Dump. Its Dump Template should be bound to the dragline and the Boom Dump will then move with the dragline wben the dragline is moved using "drag and drop". As the dragline is moved using "drag and drop", the Boom Dump is recalculated using the Highwall and Lowwall toes.

"Arc Area Dump" Added to Single-Step Dragline Simulation

This version 3d-DigPlus adds the Arc Area Dump to Single-Step Dragline Simulation. Previously the Arc Area Dump was available only in Automated Dragline Simulation.

To access the Arc Area Dump in Single-Step Dragline Simulation:

(a) Bind the Dump Template to be used for the Arc Area Dump to the dragline on the Single Step page of the Dragline Simulation Settings dialog box. For this, select the "Bind to Dragline" check box.
(b) Select the Highwall and Lowwall toes on the Single Step page of the Dragline Simulation Settings dialog box.
(c) On the Dump Type page of the Dump Settings dialog box, choose the "Dragline or Other Dump" as the setting for the Dump Option.
(d) Then on the Dump Type page of the Dump Settings dialog box, choose "Dragline Arc Area" as the Dragline or Other Geometry setting.
(e) On the Arc Area Dump page of the Dump Settings dialog box, choose the settings for the Arc Area Dump.
Note the "Show Help" button on the Arc Area Dump page, which explains many of these settings.

The Arc Area Dump will behave very similarly to a General Area Dump. Its Dump Template should be bound to the dragline and the Boom Dump will then move with the dragline wben the dragline is moved using "drag and drop". As the dragline is moved using "drag and drop", the Arc Area Dump is recalculated using the Highwall and Lowwall toes.

Binding of Multiple Excavation and Dump Templates to a Dragline

This version 3d-DigPlus allows binding of multiple Excavation Templates and Dump Templates to the dragline in Single-Step simulation mode. The excavation polygons, dump lines and dump areas used these Templates move with the dragline. Binding and un-binding is done in the Dragline Simulation Settings Dialog Box, on the Single Step page.

Automated Dragline Simulation Module

"Update Raw Sequence" Functionality Added

This Build of 3d-DigPlus completes a first version of the "Update Raw Sequence" functionality. This is accessed on the "Staging" page of the Excavation Settings Dialog box. It is only availble in Automated Dragline simulation. The idea is to add elements to the Raw sequence without affecting a first Raw Sequence and Sub-Passes.

New Items in 3d-Dig*Plus* Version 3.3

This Version of 3d-Dig*Plus* contains important upgrades, additions and bug fixes in each of the 3d-Dig*Plus* Modules.

The description below lists only major upgrades and new items. It applies to changes from Version 3.2 of 3d-Dig*Plus.* Bug fixes can be found in the file “readme.txt” in the 3d-DigPlus install folder. The list of new items in Version 3.2 is repeated below this list.

Generic (Base) Program

Extended Feature Types Added

Any number of “More Feature Types” can now be added to Surface Features through the More Feature Types dialog box. This dialog box is accessed through the “More Feature Types” button on the Features& Block Lines page of the dialog box opened through “Terrain/Window Appearance” menu item.

At present these additional Feature Types will appear in all Terrain Windows. Future versions will allow Feature Types to be shown in some selected Terrain Windows and not shown in others.

Surface Traces Appear on All Surfaces

Surface Traces will now appear on all surfaces. When a surface (accessed through Terrain/Surfaces/Edit) has the "Show Trace on all Surfaces" flag turned ON, its trace will appear on all surfaces where the surface has a trace.

Feature Operations Have a “Whole” Option

Feature functionality accessed through "Terrain/Features" now has a "Whole" option for each operation. These operations are "Copy Parallel Whole ", "Project Parallel Whole ", "Drape Whole " and "Project Whole ". These “Whole” options apply to the full feature. In this case users do not have to select the portion of the feature to be processed, they only need to nominate the feature.

New Surface Area Utility

A new utility "Surface Area" has been developed. This is located under "Utilities/Surface Area".

Users select an existing polygon and the "Plan View" and "Actual" Surface Areas are reported to a dialog box.

Adjustable Block Line Label Positions

Block Line label positions can now be adjusted. In "Terrain/Window Appearance..." on the “Features&Block Lines” page, users can set a "Label Position Along Block Line" as a % of block line length. Trial-and-error can be used to find the optimum setting so the Block Line labels do not obscure other important information.

Show Block Lines Only for Active Pit

Display of Block Lines can be set to show only the Block Lines of the Pit set in the active Excavation Template. This setting is the check box called “Active” located on the Features&Block Lines page of the Terrain Window Appearance dialog box in the Block Lines group.

The Active Pit is set in the Excavation Settings dialog box, Constraints Page, “Pit Name” field.

Dump Limit Features and Polygons Customized

Dump Limit Features and Polygons can be customized for name, colour and thickness. These properties can be changed through Right-Click and choosing “Customize” from the pop-up menu. Feature and polygon names can now be of any length.

Coutour Setting for Contours on Rendered Views

Contours shown on Rendering can now be changed. Contours on Rendering are set through a “Show Contours” check box on the “Rendering” tab of the Terrain Window Appearance dialog box.

The Contour settings are taken from the Contours section on the Frame tab of the Terrain Window Appearance dialog box. Settings are taken from Mono Color Contours.

A two-step operation is needed to change the contour settings on Rendered View:

1. Change from Rendering to Frame/Contours, Mono Color in the Terrain Window Appearance dialog box. Then set the contour parameters and press “Apply”.
2. Change back to Rendering on the General Page of the Terrain Window Appearance dialog box and press “Apply”.

The new contour settings will then appear on the rendered view.

Dip Angles Displayed in Degrees, %grade or Ratio

Angles of dip on cross sections and on the bottom line when moving the terrain cursor, can now be displayed as “Degrees”, “%grade” or “Ratio”. The units to display dip angles are set in the Settings dialog box, accessed through the “Options/Settings” menu item.

Meaning of the units are shown on the status bar when standing on one of these items.
%grade is 100*Vert/Horiz displacemet, while Ratio is Horiz/Vert.

Delta-Coordinates Shown on Status Bar

Delta-coordinates (change in E, N and Z from last fixed cursor position) are shown in the status bar when moving the terran cursor over the terrain.

Reversing Terrain Sections

Terrain Sections can be reversed i.e. shown in the reverse sense in cross-section windows. This is done through a new “Reverse” option on the popup menu that appears after right click on the section.

Network “Floating” Licenses

A Network License option is available with 3d-DigPlus Version 3.3. This allows 3d-Dig*Plus* Base and Modules to be used by computers on a Local Area Network. For details please contact 3d-Dig*Plus* distributors.

Single-Step Dragline Module

Bind Excavation Polygons to Dragline

This Build of 3d-DigPlus allows binding of an excavation polygon to the dragline in Single-Step dragline mode. This is done through a "Bind to Dragline" check box on the Single Step page of the Dragline Simulation settings dialog box.

When the dragline is moved through "drag and drop", the bound excavation polygon moves with the dragline.

When the Active Excavation Template is changed, either throught the Single Step page or through the “Set Active” option after right-click on an excavation Polygon, the excavation polygon of the new active template is then bound to the dragline.

Binding of multiple excavation polygons will appear in upcoming Versions of 3d-Dig*Plus*.

Dump Limit Polygons Added, Dump Limit Features Customized

Dump Limit Polygons are drawn on the terrain surface using a new icon in the Dump group on the Toolbar and a new item in the Dump menus (Dump, Create Limit Polygons).

Dump Limit Polygons form a separate list on the Constraints page of the Dump Settings Dialog Box, next to the Dump Limit Features list. As for Dump Limit Features, the Dump Limit Polygons applied in the given Dump Template are selected through check boxes.

Dump Limit Features and Polygons can be customized through a right click on the feature/polygon. The customization allows change of name, colour and thickness. The names of features and polygons appear in the interface of Dump Limit Features/Polygons. Feature and polygon names can be of any length.

Application of Dump Limit Polygons behaves as follows:

(a) As for Dump Limit Features, when material dumped on a point outside a Dump Limit Polygon begins to cross the Dump Limit Polygon, this leads to the dumping on that point stopping and moving on to other dump points.

(b) No dumping can occur within a Dump Limit Polygon. So any points within a Dump Limit Polygon cannot have material dumped on them

Automated Dragline Simulation Module

Simulation Map

A Simulation Map display is now available. This is accessed through the menu item “Simulate/Simulation Map”. It shows the current (or default) Dragline Simulation and its supersequence. Other Supersequences are shown after this.

Dumps assigned to Subsequences in Automated Excavation & Dump Simulations and in Truck/Shovel Simulations are also shown.

Step-by-Step Simulation Mode

A new step-by-step mode has been added to the Automated Dragline Simulation. This mode is always available. It can be turned ON and OFF through the keyboard.

Start of Simulation

By default Automated Dragline Simulation starts in CONTINUOUS mode.

The simulation can be started in STEP-BY-STEP mode by checking the "Start in Step-by-Step Mode" flag on the Automation Results page of Dragline Simulation Settings dialog box.

CONTINUOUS Mode

In CONTINUOUS mode:

(i) The simulation can be switched to STEP-BY-STEP mode by holding down the BACKSPACE key.
(ii) To EXIT the simulation, ***hold*** the Esc key.

(*holding is important as the program only checks for a key press at the start of each step*).

STEP-BY-STEP Mode

In STEP-BY-STEP mode:

(i) The next step is executed by pressing the Enter key.
(ii) To switch to CONTINUOUS mode press the Spacebar.
(iii) To exit the simulation, press the Esc key.

Arc Area Dump

A new dump type “Arc Area Dump” has been added to the Auomatic Dragline Simulaion.

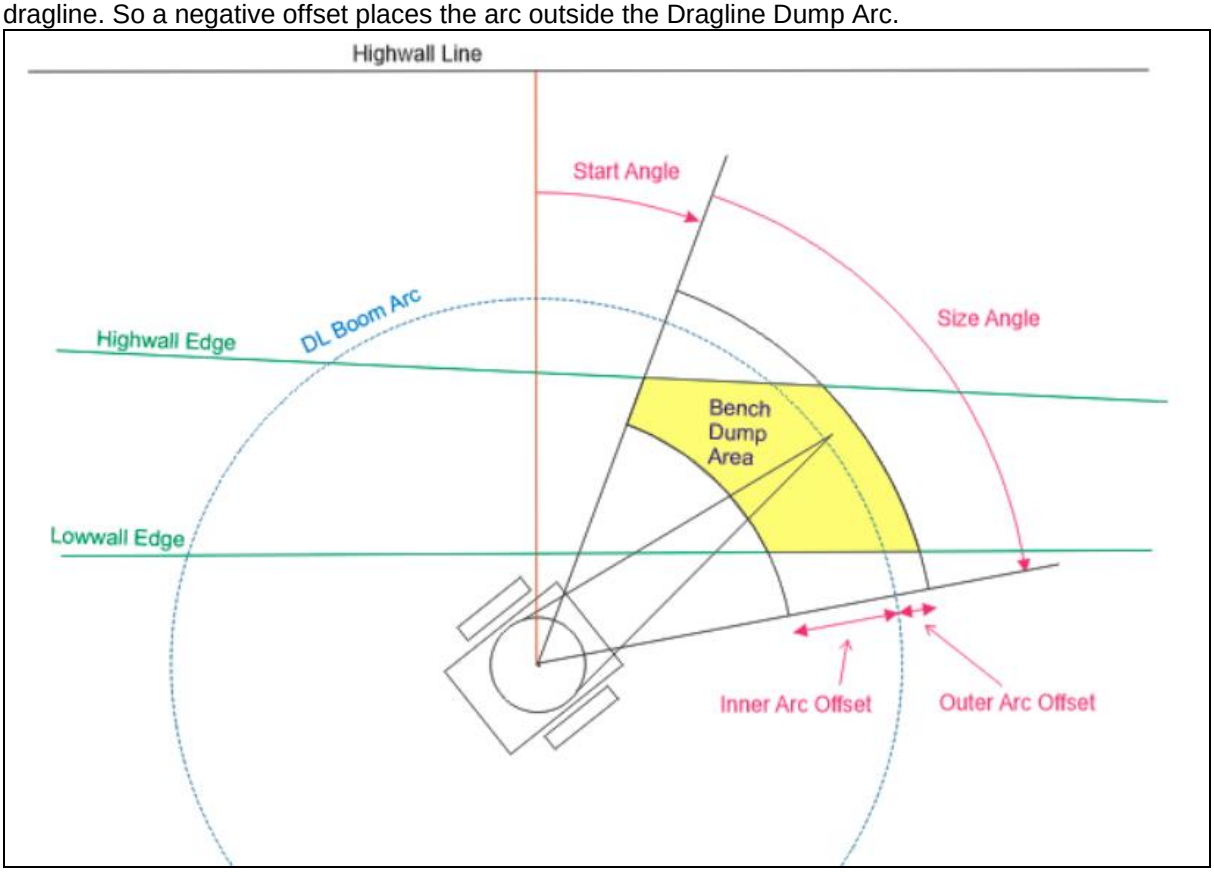
This new dump type is set as another type of Dragline Dump on the Dump Settings Dialog Box, Dump Type page.

The Arc Area Dump has a geometry similar to the Boom Dump. For this reason, the **Start Angle, Size Angle,** and Reference **Swing Direction** (Clockwise or Anticlockwise) parameters are the same as in the Boom Dump.

The Arc Area Dump is applied to a segment slice between two circles. The position of the two circles relative to the Dragline Boom Arc is defined by two parameters: the **Inner Arc Offset** and the **Outer Arc** O**ffset.** In addition, the Arc Area Dump is optionally clipped by two Bench Edge Features: the **Highwall Edge** and the **Lowwall Edge**. A **Bench**

Fill Direction defines whether the Arc Area Dump is filled Clockwise, Anticlockwise, from Outer Arc to Inner Arc or Inner Arc to Outer Arc. The Arc Area Dump shape and parameters are shown in the diagram below.

The Inner Arc Offset and Outer Arc Offset are both measured from the Dragline Dump Arc with positive towards the dragline. So a negative offset places the arc outside the Dragline Dump Arc.



Multiple Draglines

Automated Dragline Simulation works with different draglines assigned to different subpasses.

Extended Feature Types Added

Extended Feature Types are available in the Base Program. As they are very useful for Automated Dragline Simulation, they are also described here.

Any number of “More Feature Types” can now be added to Surface Features through the More Feature Types dialog box. This dialog box is accessed through the “More Feature Types” button on the Features& Block Lines page of the dialog box opened through “Terrain/Window Appearance” menu item.

At present these additional Feature Types will appear in all Terrain Windows. Future versions will allow Feature Types to be shown in some selected Terrain Windows and not shown in others.

Dump Limit Polygons Added, Dump Limit Features Customized

Dump Limit Polygons are drawn on the terrain surface using a new icon in the Dump group on the Toolbar and a new item in the Dump menus (Dump, Create Limit Polygons).

Dump Limit Polygons form a separate list on the Constraints page of the Dump Settings Dialog Box, next to the Dump Limit Features list. As for Dump Limit Features, the Dump Limit Polygons applied in the given Dump Template are selected through check boxes.

Dump Limit Features and Polygons can be customized through a right click on the feature/polygon. The customization allows change of name, colour and thickness. The names of features and polygons appear in the interface of Dump Limit Features/Polygons. Feature and polygon names can be of any length.

Application of Dump Limit Polygons behaves as follows:

(a) As for Dump Limit Features, when material dumped on a point outside a Dump Limit Polygon begins to cross the Dump Limit Polygon, this leads to the dumping on that point stopping and moving on to other dump points.

(b) No dumping can occur within a Dump Limit Polygon. So any points within a Dump Limit Polygon cannot have material dumped on them

Automated Excavation and Dumping Module

Simulation Map

A Simulation Map display is now available. This is accessed through the menu item “Simulate/Simulation Map”. It shows the current (or default) Dragline Simulation and its supersequence. Other Supersequences are shown after this.

Dumps assigned to Subsequences in Automated Excavation & Dump Simulations and in Truck/Shovel Simulations are also shown.

Truck/Shovel Simulation and Optimization Module

Simulation Map

A Simulation Map display is now available. This is accessed through the menu item “Simulate/Simulation Map”. It shows the current (or default) Dragline Simulation and its supersequence. Other Supersequences are shown after this.

Dumps assigned to Subsequences in Automated Excavation & Dump Simulations and in Truck/Shovel Simulations are also shown.

Reshaping and Transport Analysis Module

New Surface Area Utility

A new utility "Surface Area" has been developed. This is located under "Utilities/Surface Area".

Users select an existing polygon and the "Plan View" and "Actual" Surface Areas are reported to a dialog box.

Angles of Slopes Displayed in Degrees, %grade or Ratio

Angles of slopes in the Reshaping Module can now be set and displayed as “Degrees”, “%grade” or “Ratio”. The units %grade are 100*Vert/Horiz displacemet, while Ratio is Horiz/Vert.

The slope units are set in the Slope Units in the Reshape Surface dialog box.

Coutour Setting for Contours on Rendered Views

Contours shown on Rendering can now be changed. Contours on Rendering are set through a “Show Contours” check box on the “Rendering” tab of the Terrain Window Appearance dialog box.

The Contour settings are taken from the Contours section on the Frame tab of the Terrain Window Appearance dialog box. Settings are taken from Mono Color Contours.

A two-step operation is needed to change the contour settings on Rendered View:

1. Change from Rendering to Frame/Contours, Mono Color in the Terrain Window Appearance dialog box. Then set the contour parameters and press “Apply”.
2. Change back to Rendering on the General Page of the Terrain Window Appearance dialog box and press “Apply”.

The new contour settings will then appear on the rendered view.

Dragline/Prestrip Integration Module

Protection Against Ramps Conflict

A protection for conflict between perp. and par. end wall ramps has been added to Dragline/Prestrip Integration.

New Items in 3d-Dig*Plus* Version 3.2

This Version of 3d-Dig*Plus* contains the first release version of the Automated Dragline module.

This version also contains the following new items, in each of the 3d-Dig*Plus* Modules. The description mostly applies to changes from Version 3.1 of 3d-Dig*Plus.*

The list of new items in Version 3.1 is repeated below this list.

Generic (Base) Program

Superimpose Contours on Rendered View

An option to superimpose mono-coloured contours on a rendered view of the terrain is now available. This is through a “Show Contours” check box on the “Rendering” tab of the Terrain Window Appearance dialog box.

Contour settings are taken from the Contours section in the Frame tab of the Terrain Window Appearance dialog box.

Options to “Move Observer” or “Move World” for Rotate/Pan

A new setting has been added to give users a choice of moving the observer or moving the world when rotating and panning in Terrain Windows.

This setting is located in the “Settings” dialog box accessed under the menu item “Options/Settings”. This is the group “Rotate/Pan Options” and offers the options “Move Observer” and “Move World".

Offset on Limit Surfaces in Excavation Templates

Offsets have been added to limit surfaces in Excavation Template constraints. This is on the Excavation Settings dialog box (Excavate/Fill, Excavation Templates menu item), on the Constraints tab, table when “Limit by Surface” check box is turned ON. I

Similar offsets have been added to limit surface on the Steps tab in the same Excavation Template. This is for the Automated Dragine simulation. If the same surface appears in both lists, the more stringent constraing (higher offset or less negative offset) will be used.

Eight More Feature Types

Eight more Feature Types have been added to Terrain Surface Features. These feature types are edited through the "More Feature Types" button in the Window Appearance dialog box, Features&BlockLines tab.

New feature types can be named, coloured and their drawing turned ON and OFF. Unlike the existing “Crest”, “Toe” and “Other” feature types, settings for New Feature Types are not window-specific i.e. they are drawn the same way in all windows.

A "Hide All" check box on the "More Feature Types" dialog box lets users turn off display of ALL the new feature types features quickly, and then turn them all on again with the same settings. That helps to get a video capture in one window without permanently losing features display settings.

New Features are drawn according to the Current Feature Type setting on the resulting dialog box. Feature types may also be customized.

Dump Limit Polygons Added, Dump Limit Features Customized

Dump Limit Polygons are drawn on the terrain surface using a new icon in the Dump group on the Toolbar and a new item in the Dump menus (Dump, Create Limit Polygons).

Dump Limit Polygons form a separate list on the Constraints page of the Dump Settings Dialog Box, next to the Dump Limit Features list. As for Dump Limit Features, the Dump Limit Polygons applied in the given Dump Template are selected through check boxes.

Dump Limit Features and Polygons can be customized through a right click on the feature/polygon. The customization allows change of name, colour and thickness. The names of features and polygons appear in the interface of Dump Limit Features/Polygons.

Application of Dump Limit Polygons behaves as follows:

(a) As for Dump Limit Features, when material dumped on a point outside a Dump Limit Polygon begins to cross the Dump Limit Polygon, this leads to the dumping on that point stopping and moving on to other dump points.

(b) No dumping can occur within a Dump Limit Polygon. So any points within a Dump Limit Polygon cannot have material dumped on them

Option to Set Current Plane From Three Points

The Current Plan interface and functionality have been improved. An additional way of forming a Current Plane has been added by choosing 3 terrain points and putting the plane through these points. The X-Y coordinates of these points can be chosen graphically or changed manually. Their elevations can also be changed manually, or set from a surface chosen in the interface.

Construct Inner Surface

Construct Inner Surface (Terrain/Surfaces/Construct Inner Surface...) will optionally over-write the data for an existing surface with the new constructed surface.

Improve Dump Height Limit for Line Dumps

The way the dump height limit is handled for line dumps has been improved. Now when the dump height limit is reached, the last-dumped parcel of material is removed from the terrain and the discrete dump volume is reduced by a factor of 10. Dumping on that same point is then repeated until the dump height limit is again reached. The last-dumped parcel of material is again removed from the terrain and dumping on that point ceases.

This produces a dump which is slightly below the dump height limit. It also gets rid of the “flat top” effect seen with the previous method which “shaved” the terrain to be exactly at the dump height limit.

Roads Undo Fixed, Sharp Bends Improved

This Build also fixes some problems in Undo of Roads Excavation. This Undo should now work correctly. Also messages about overlapping polygons will occur less frequently for sharp bends in roads.

Named Views

This version of 3d-DigPlus fixes a problem with saving Named View to a *.NMV file. View names longer than 15 characters were not saved correctly to file. This has now been corrected.

Material Properties Order

Order of material properties is all places where logs are shown is now consistently shown as "Bank SG, Swelled SG, Swell Factor". Recalculation of these three connected values is now correct when any one of them is changed.

Pass Type Message

A message is shown when Pass Type properties are changed from the Excavate Pass Parameters dialog box (Staging Page of Excavation Template, press Set Pass Parameters and then press Edit/Set Pass Types on the resulting dialog box). The message warns that properties of existing logs (maybe derived from pass types) will not be changed by this operation.

ETI Format Supported in Vulcan 10, Nominate Terrain on Import

The ETI interface allows writing and reading of files with extension *.ETI. Export and Import of ETI files is accessed through the menu items File|Export and File|Import.
Input and output of the ETI format is now supported in Maptek Vulcan 10.

Now any surface imported into 3d-DigPlus through ETI to be nominated as the Terrain Surface. Many surfaces can be imported at once, and one of them is nominated in the interface as the terrain surface.

Currently this library provides a fast way of exporting multiple surfaces from 3d-Dig*Plus*. Since 3d-Dig*Plus* also imports files of this type, this can be used to rapidly move surfaces between design files.

We will add other objects to the ETI Library as the need arises.

Copies of the ETI Library code for use in interfacing with 3d-Dig*Plus* may be obtained from Earth Technology on request.

Dragline Module (Including Released Automated Dragline Simulation)

Most of the effort in the Dragline Module has concentrated on the just-released new Automated Dragline Simulation Module. This module has now been released in 3d-DigPlus Version 3.2.

New Utilities/Dragline Items

These items calculate the Primary Pit Shell, Pass Shell, and Highwall Toes and Lowwall Toes for upper passes. Input includes the Highwall Toe and Lowwall toe for the deepest pass.

Dragline/Generate Primary Pit Shell.

This functionality has almost the same interface as the Dragline Prestrip module. However the settings are applied only to a single strip. The outputs of this function are:
Primary Pit Shell with low wall profile, Highwall Toe, Low Wall Toe.

Dragline/Generate Pass Shell.

This functionality generates a Pass Shell including spoil profile. It also produces a Highwall Toe and a Lowwall Toe as Surface Features with appropriate names.

Dragline/Generate Highwall Toe.

This functionality creates a Highwall toe line as a Surface Feature on the Terrain. This highwall toe is generated as the intersection line between the Pass Surface and the highwall of the Primary Pit Shell.

Dragline/Generate Low wall Toe.

This functionality creates a low wall toe line as the intersection between the non-ramp spoil profile for the Primary Pit Shell and the Pass Surface.

Automated Excavation and Dumping Module

Re-Ordering of Supersequences

This Version of 3d-DigPlus has a new option for re-ordering of supersequences. This is done through the new menu item "Sequence/Reorder Supersequences..."

Raw Sequence Generation to Include All Blocks

This Version of 3d-DigPlus changes the generation of Raw Sequences to include all blocks inside the outline polygon. Previous versions of the Raw Sequence generator would leave out blocks for which no material was excavated.

With this change, even blocks which excavate no material during generation of the Raw Sequence are still included in the Raw Sequence. These blocks are then included in subsequences defined from the generated Raw Sequence.

Truck/Shovel Module

Dump Heirarchies to Use “% of Log To Dump”

Dump heirarchies used in Truck/Shovel simulation have dumped material until each dump is filled, before moving on to the next dump in the dump heirarchy. The dump parameter “% of Log to Dump” (on the Dump Parameters tab) has been ignored in this dumping process.

This change will use this “% of Log to Dump” parameter in dumping to each dump in the heirarchy. So dumping in each dump will stop and move on to the next dump in the heirarchy, when the given percentage of the log has been dumped.

For example, suppose there are three dumps and the “% of Log to Dump” parameter is 50%, 50% and 100% for the three dumps. If there are 1000 cub m in the log, 500 cub m will be dumped in the first dump, 250 cub m in the second and the remainder in the log (250 cub m) will be dumped in the third dump.

Units Errors on Report Files Corrected

Some errors with units in Truck/Shovel Report Files have been corrected.

Dozer Module

Only Regions Completely Within Final Surface Modelled

Dozer simulation will now not model dozer regions in which the complete region is not within the final surface.

Problem With Older Files Fixed

This version of 3d-DigPlus fixes a problem with Dozer Simulation which led to no action on some older files. This has now been corrected.

Reshaping and Transport Analysis Module

Sub-Region Polygon Kept and Information From Sub-Region Exported

This upgrade keeps the Sub-Region polygon persisting and will export information from the sub-region or from the whole TA region,

Centroids Calculated for Transport Analysis

Centroids of the transported material are calculated and reported for Transport Analysis.

Dragline/Prestrip Integration Module

Colour of Strip Line Numbers

The colour of strip line numbers in Dragline/Prestrip Integration is set to Black if a White background is chosen for the Graphics Window in which strip lines are drawn (strip lines are always white, and the colour of the strip line numbers is taken as the graphics window background colour).

Naming Confusion Resolved

The confusion between naming of both Dump Surface and Dump Limit Surface has been resolved.

Dump Limit Surface Settings Not Influence Lowwall Generation

A bug in Dragline/Prestrip Integration was fixed. The Dump Limit Surface settings influenced the low-wall generation, which is incorrect. This has now been corrected.

New Items in 3d-Dig*Plus* Version 3.1

This Version of 3d-Dig*Plus* contains the following new items, in each of the 3d-Dig*Plus* Modules. The description mostly applies to changes from Version 3.0 of 3d-Dig*Plus.*

Generic (Base) Program

1. New Interface ETI Library Implemented

A new interface library for use with 3d-Dig*Plus* has been implemented. This library implements writing and reading of files with extension *.ETI. Export and Import of ETI files is accessed through the menu items File|Export and File|Import.

Currently this library provides:

(a) A fast way of exporting multiple surfaces from 3d-Dig*Plus*. Since 3d-Dig*Plus* also imports files of this type, this can be used to rapidly move surfaces between design files.
(b) A link between 3d-Dig*Plus* and mine planning packages. ETI files are currently supported (reading and writing) in Deswik CAD. We expect other mine planning packages will support this format in future.

We will add other objects to the ETI Library as the need arises.

Copies of the ETI Library code for use in interfacing with 3d-Dig*Plus* may be obtained from Earth Technology on request.

2. Multi-Bench Dump Design

The multi-bench dump design allows users to draw a footprint on the terrain and design a multi-bench dump fitting maximum material within that footprint. Parameters control the design of the dump.

The multi-bench dump design interface contains brief descriptions of the parameters through Help Tips, and a Help file explains use of the functionality and parameter meaning in more detail. It is also described in the 3d-Dig*Plus* Documentation.

3. Graphical 2D Zoom and Pan For Section Windows

Graphical Zoom and Pan functionality has now been implemented for all Cross Section, Longitudional Section and Road Vertical Alignment windows. This new functionality is accessed through the same Zoom, Pan and Fit All icons on the toolbar used for 3D zoom and pan. Instructions are issued on first use of the Zoom In icon.

4. Change of Terrain Surface by Opening a New *.TOP or *.BIT File

Terrain can now be replaced through File|Open using a *.TOP or *.BIT file, keeping all surfaces and simulations in place. The Prime Surface is reset to the Terrain Surface, with the existing Prime Surface being saved to a surface under the name "Old Prime Surface".

As the terrain scaling is left in place when a new terrain replaces an existing terrain, objects such as polygons, machines, roads etc on the "old" terrain will stay at the same coordinates on the new terrain.

The new terrain data (TOP, BIT) is checked for very large coordinate differences from current terrain data. If the coordinate difference from current data is too large, new data cannot be read.

5. Identify Roads Through “Active Road”

Nominating a road as the “Active Road” and display of the "Active Road" is now implemented. This provides a way of identifying roads on the terrain.

Note: A road must be (1) nominated as “Active” and (2) display of the Active Road must be turned on, for this to work.

Nominating the Active Road
The active road is the road selected in the Roads list at the top of the "Create Roads" dialog box. In addition, a right click on the Road in the graphics window will offer the option to apply "Set Active" to this road. This newly-selected road will then appear selected in the Roads list at the top of the “Create Roads” dialog box.

Marking the Active Road
The Roads page of Terrain|Window Appearance now allows users to enable marking of the active road. The active road is marked on the terrain graphics with a symbol "A". The Window Appearance also allows users to select the option of showing only the active road.

6. Multiple Excavation of a Road, Undo of Roads Excavation

This version of 3d-Dig*Plus* changes Road Excavation and Undo/Redo functionality. Roads can now always be excavated, irespective of previous excavation history. This means (for example) that a road can be moved graphically and excavated again in another place.

Undo/Redo of roads excavation is now on the general undo/redo stack.

7. Export of Contours+Grid to DXF in One Operation

Export to DXF of both Terrain Contours and Terrain Grid in one operation has been added as File|Export|Contours+Grid Points.

8. Import of multiple inner surfaces as *.DXF, *.XYZ, *.TOP, *.BIT

Multiple inner surfaces can now be imported as as *.DXF, *.XYZ, *.TOP and *.BIT files. This is accessed through the menu option File | Import Multi Files... . The type of imported file is chosen on the Filer that is offered through this menu option.

9. Construct Inner Surface, Surface Name Kept Constant

The Construct Inner Surface functionality has been changed to keep the same surface number ID after creating a new surface, in cases when the new surface over-writes an existing surface with the same name.

The surface name offered to the user in Construct Inner Surface will now be kept constant within a session, unless the user changes it. Then it will stay at the new name until changed again etc. This allows the same surface to be over-written a number of times while experimenting with different parameter values.

10. Restore Points and New Logs

New logs created after a Restore Point is set are kept, but their contents are now zeroed when the Restore Point is applied.

11. Section Settings Dialog Box, “Select All” and “Deselect All” Surfaces and Layers

The Section Settings Dialog Box is accessed through the menu item Utilities|Section Settings. The Section Settings now have “Select All" and "Deselect All" buttons on Surfaces and Layers pages.

12. Named Views Saved and Read from File

Named views can be saved in *.nmv file (binary) and can be read from this file. (File|Save as... and File|Open... menu options).

13. Default Initial Horizontal Angle

The Default Initial Horizontal Angle has been changed to look North. This will only affect the first creation of a Surface.

14. Creation of Spoil Layer

Creation of a Spoil Layer is now allowed even if there are no layers in existence.

15. "Reorder" Button Added to Dump Settings Dialog Box

A "Reorder" button has been added to the Dump Settings dialog box. This allows users to change the order of full Dump Templates lists shown everywhere in 3d-Dig*Plus*.

16. "Reorder ..." Buttons Added to Edit Surface and Edit Layers Dialog Boxes

"Reorder Surfaces" or “Reorder Layers” button has been added to the Edit Surface and Edit Layers dialog boxes. These dialog boxes are accessed through the Terrain|Surfaces|Edit... and Terrain|Surfaces|Layers... menu items. This allows users to change the order of Surfaces and Layers lists shown everywhere in 3d-Dig*Plus*.

17. “Exaggerated” Option Added to Section Settings

An “Exaggerated” option has been added to the Section Settings Dialog Box. This is on the General page. Users can also enter an Exaggeration Factor. Use of this setting allows users to control the displayed vertical scale of sections.

Dragline Module (Including Upcoming Automated Dragline Simulation)

Most of the effort in the Dragline Module has concentrated on the upcoming new Automated Dragline Simulation Module.

1. Single-Step Dragline Simulation Dialog Box Upgraded

The Dialog Box for the simulation in the Single-Step Dragline Module has been upgraded to include settings relevant to the the Automated Dragline Simulation. Users of the Automated Dragline Module will be able to choose the dragline simulation module from this dialog box. They will choose Single Step (the present Dragline Module) or Automation (the new Module currently nearing completion).

2. New Columns Added to Simulation Report

Some new columns have been added to the Dragline Simulation Report. The report is accessed after a simulation through the menu option Simulate|Simulation Report....

The new columns are Prime Volume Bank, Rehandle Volume Bank, and Total Volume.

3. Export of Selected Columns From Simulation Report (To File or Excel)

The Dragline Simulation Report (accessed after a simulation through the menu option Simulate|Simulation Report...) allows export of selected columns from the report to a file or to Excel.

4. Dragline Bench Design

Context-sensitive Help has been added for the Dragline Bench Design dialog box.

Automated Excavation and Dumping Module

1. Pass Type Settings Added to Passes

New Pass Type Settings hacve been added to Passes. Surface and Layer now has an associated Pass Type. These can be accessed through the Terrain|Surfaces|Edit and Terrain|Surfaces|Layers dialog boxes (Edit/Set Pass Types button).

Pass Type is also accessed through the Staging Page of the Excavation Settings Dialog Box. On this page, press the Set Pass Parameters button. On the resulting Pass Parameters dialog box there is also a Edit/Set Pass Types button.

Pass Type is used in a number of places in Automated Excavation and Dumping and Truck/Shovel Simulation.

Filters for Passes by Pass Type have been added.

A colour has been added to Pass Types. Subsequence display names are colour-coded to this Pass Type. Subsequences belonging to a single pass will optionally be showing with this colour in the Supersequence Editor and in Excavation Templates.

Pass Log material properties are now assigned by default according to a Pass Type's Default Material Properties (Change Logs button on Pass Parameters Dialog Box, accessed through Staging Page of the Excavation Settings Dialog Box, press the Set Pass Parameters button).

Pass Types can now be assigned to multiple passes (Edit/Set Pass Types button on the Pass Parameters Dialog Box).

2. Auto-Generation of Subsequences Extended

Subsequences Auto Generation is extended to 9 Sub-Ranges.

3. Filters in Supersequence Editor

Subsequence Filters to Hide certain Subsequences (by Hide Used, by Pass Name, by Block Range, by Pass Type) have been added to Supersequence Editor.

4. Percent Utilization Added to Preset Productivity

This version implements a percent utilization parameter in calculations of elapsed time (vs digging time) for Automated Excavation and Dump. The percent utilization is specified in Excavator Operating Parameters (for Truck/Shovel Simulation only) and in Preset Productivity Parameters (for Automated Excavation and Dump and for Truck/Shovel Simulation).

5. NamIng Rules For Subsequences Kept When Changing Subsequence Contents

Subsequence names are copied to the naming rules name field when a subsequence is selected and the "Replace Contents of Current Subsequence" flag is ON. Selecting a range of raw sequence will then restore the name generated by the naming rules. This allows users to keep a subsequence name while changing its contents, and also to change the name of a subsequence without altering its
contents.

6. Replace Button Added to Supersequence Editor

Button "Replace" was added to the Supersequence editor.

7. Multiple Digging of the Same Subsequence Allowed

Multiple digging of the same subsequence in a supersequence will now occur.

8. Autogeneration of Subsequences

A rules-based system for Autogeneration of Subsequences has been added. Subsequence Autogeneration operates with a selectable list of passes. It allows selection of passes and lifts ranges. Users can specify block ranges.

Autogeneration limits are remembered between applications of the autogeneration of subsequences.

9. Marking Dumps as “Filled” Only For One Subsequence

Dumps filled in one subsequence and marked as "filled" are now unmarked when the next subsequence is dug. This allows the same dump to be used several times in different subsequences.

10. Hiding Used Elements from Raw Sequence

Now it is possible to hide used elements from a raw sequence during subsequence generation. This is on the subsequence page of the excavation settings dialog box.

11. New “Sequence” Top-Level Menu Item

On user request, a new menu item “Sequence” has been added to the top-level menu. This contains items which allow access to Subsequence and Supersequence operations from one place. The menu item “Run Supersequence” as been moved from the “Simulate” menu to the

Truck/Shovel Module

1. Optimization of Number of Trucks in Each Block

Optimization of number of trucks per block is done. Optimization is done relative to the maximum productivity, which has the excavator fully utilized. Users can specify a minimum percentage of this maximum productivity e.g. at least 90% of maximum productivity. The optimization then tries different numbers of trucks, and finds the number which will just achieve at least this productivity.

2. Excavator Idle Times Calendar

A calendar to take account of Excavator idle times has been added to excavators. It is accessed through the Truck/Shovel Simulation Settings dialog box.

3. Operating Cost Added to Truck and Excavator Models

An Operating Cost setting ($/hour) has been added to the truck and excavator models. The resulting calculated cost for each block has been added to the truck/shovel report.

4. Excavator Name added to Report File

A column with the name of the excavator used to dig each block has been added to the Report File. If several excavators were used, the names are concatonated with an "_" symbol between them.

6. Truck/Shovel Performance Report (Added Excavator Summary, Report File to Excel Button)

The dialog box shown at the end of a Truck/Shovel Simulation has been upgraded. This dialog box is also accessible after a simulation through the menu item Simulate/Last Simulation. The dialog box now shows a summary of excavator performance **(Total Dig Hours, Total Elapsed Hours, Volume per Dig Hour)**, for each excavator used in the Simulation.

A new "Report File to Excel" button has been added to the dialog box. Pressing this button opens Excel with the optional report file generated during simulation loaded and parsed into columns.

7. Trucks Data Base

Truck Database files (*.TRB) have been added to 3d-Dig*Plus* Truck/Shovel Module. These are accessed through buttons on the Truck Parameter dialog box. A standard version of the Truck Data Base is installed with 3d-Dig*Plus* Version 3.1.

8. Percent Utilization Implemented

This version implements a percent utilization parameter in calculations of elapsed time (vs digging time) for Automated Excavation and Dump and Truck/Shovel. The percent utilization is specified in Excavator Operating Parameters (for Truck/Shovel Simulation only) and in Preset Productivity Parameters (for Automated Excavation and Dump and for Truck/Shovel Simulation).

9. Access Properties Assigned to All Dumps

An option to assign the currently selected access road properties to all dumps of selected subsequences has been added on the Roads page of Truck Shovel Simulation Settings.

Dozer Module

Option to Include or Omit Push Direction When Copying Regions

When regions are copied in Dozer Simulation Settings, a new option allows users to either include or omit push direction in the parameters to be copied.

Offsets from Bridge Surface Optimized

This Build of 3d-Dig*Plus* contains an addition to Dozer Optimization. This allows a surface to be nominated as the bridge surface. Offsets from this surface can then be be optimized.

Reshaping and Transport Analysis Module

This Build also calculates centroids for Transport Analysis.

This Build completes the upgrade to Transport Analysis. This upgrade keeps the Sub-Region polygon persisting and will export information from the sub-region or from the whole TA region,

This Build has the first version of an upgrade to Transport Analysis. This upgrade keeps the Sub-Region polygon persisting and will export information from the sub-region or from the whole TA region. This upgrade is not fully complete in this Build.

1. Multiple Reshaping Polygons

This version of 3d-Dig*Plus* upgrades the reshaping funcionality to allow multiple selected polygons to be iterated over in one reshaping session.

Reshaping functionality for Select/Deselect multiple polygons is now complete. These are selected/deselected one at a time from the Dialog Box.

2. Reverse Settings for Reshaping

Reshaping can now be “Reversed” (to a limited extent) using the Reverse page of the Reshaping Dialog Box. This can be used when iterating for reshaping and the smoothing process is taken too far. Reversing will steepen the Terrain again so that a smaller degree of Reshaping can be used. This is described in new documentation.

3. Reshaping Parameters Remembered to 3dd Files

Reshaping parameters are now remembered to design (*.3dd) files. So reading a design file will return the reshaping parameters in use when it was saved.

4. Transportation Analysis Extra Parameters and Default Values

Some improvements have been made to the Transportation Analysis interface and default values.

An extra parameter ("iteration coefficient) has been added to the Transport Analysis interface. This parameter allows users to control the total number of iterations before the calculation stops. In this way, some arrows that carry very small amounts of material may be eliminated.

Transport Analysis "Display Arcs" now defaults to false.

5. “To Excel” Output of Transport Distances

"To Excel" output from Transport Analysis has been completed.

Dragline/Prestrip Integration Module

Many upgrades, improvements and fixes have been applied to the Dragline/Prestrip Integration Module. This Module is now complete.

New Items

New items added to this module include:

1. Show Right buttons to identify the “Right” side of strips
2. Show Toes button to show toe feature lines used in the simulation
3. A Dump Surface (using user-set parameters) and Pre-Strip Dump surfaces have been added.
4. Perpendicular End Wall Ramps do not require setting ramp toes now. They have their own batter angle.
5. Some shape changes for end wall area and slopes have been made.

All Ramp Types

Here is a full list of all types of ramps now supported in this module:

1. Internal Perpendicular ramp.
2. End Wall Perpendicular ramp (Left/Right).
3. Parallel Ramp bound to internal Perpendicular ramp (Left/Right).
4. Parallel Ramp bound to End Wall Perpendicular ramp (Left/Right).

5. Parallel Ramp bound to End Wall Left/Right).