

SOFTWEL DIGITAL TERRAIN MODELING 2014
(SW_DTM 2014)

User's Manual

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The Triangulation module is inspired from Triangle.net by Christian Woltering (<http://triangle.codeplex.com/>).

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About This Manual

This purpose of this manual is to serve as a reference document to new users of SW_DTM 2014, as well as to those migrating from previous versions.

Chapter 1 is a general introduction of SW_DTM and its features.

Chapter 2 contains the system requirements for running SW_DTM 2014.

Chapter 3 contains information on installing SW_DTM.

Chapter 4 has the instructions for plotting the sample data and drawing contours and cross section using the data.

Chapters 5-11 is the documentation for all the features available in SW_DTM 2014.

Chapter 12 contains a description of the changes in SW_DTM 2014 from the previous version. Users of previous versions of SW_DTM may want to start here.

Readers of this manual are expected to be experienced in using Microsoft Excel and AutoCAD.

The names of buttons and input boxes present in the application, as well as files, are referred to using their labels in **bold** letters.

When a sub menu item is referenced, it is referred to as **Menu->Sub-Menu**

Notes and important information are written in *italics*. Very important notes are *underlined*.

1 Introduction

SW_DTM (Softwel Digital Terrain Modeling) is a complete software package for Digital Terrain Modeling and Contouring, which is powerful and accurate while being user friendly and easy to learn.

This software features a user friendly interface for plotting survey points and generating contours at any specified interval. This software can also draw profile and cross section for any alignment at any user-defined scale.

- User friendly interface for plotting survey points, either manually or from data files/spreadsheets in true co-ordinates & elevation.
- Provisions for adding feature lines and boundary lines as well as inserting pre-defined blocks.
- Efficient and accurate contour generation.
- Supports writing contour annotations and drawing grids.
- Drawing of profile and cross-section for any alignment.

2 System Requirements

The recommended hardware requirements for SW_DTM 2014 are as follows.

- Processor: Intel Pentium 4 or better
- RAM: 1 GB or more
- Operating System: Microsoft Windows XP SP3 or newer
- Microsoft .NET framework 4
- AutoCAD 2000 or higher
- Microsoft Excel 2003 or newer

Please note that the system requirements of Microsoft Excel and AutoCAD must also be fulfilled.

3 Installation

To install SW_DTM, extract and execute the setup file. The installation dialog will guide you through the installation.

4 Getting Started

4.1 Starting the Application

The application can be started from the start menu shortcut. A supported AutoCAD version must be running and not busy when the application is started.

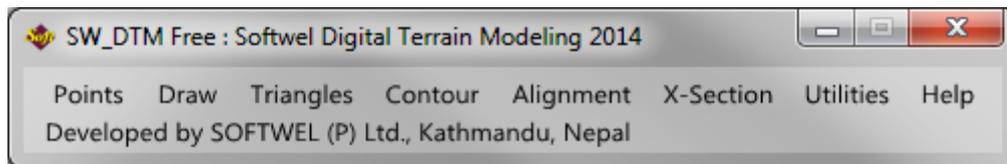


Figure 4.1: The Main SW_DTM Window

The following window will appear on startup:

However, the following message box will appear if AutoCAD is not running or busy:

In this case, start AutoCAD manually and press the **Retry** button, or press **Cancel** to close SW_DTM.

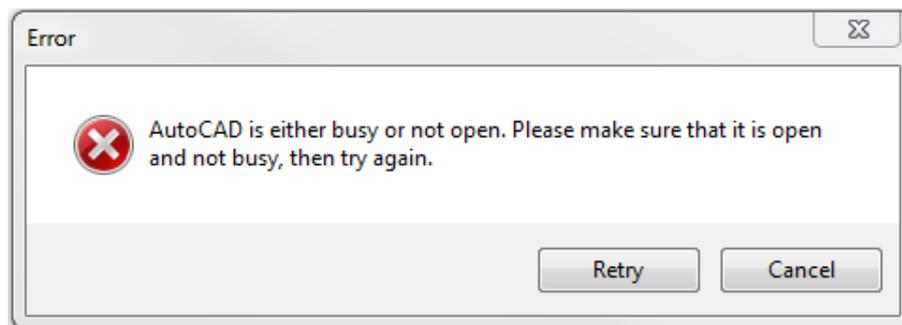


Figure 4.2: Error message if AutoCAD is not running.

The software is grouped into menus based on the similarity of functions. A summary of the menus are provided as follows:

S.N.	Menu	Description
1	Points	Contains functions for manipulating points (Add, Import, Export, Delete, Interpolate & Process points)
2	Draw	Allows inserting blocks & drawing of features and boundaries.
3	Triangles	Functions for triangle related tasks (Triangulation, drawing and erasing triangles)
4	Contour	Menus for drawing, erasing and annotating of contours.
5	Alignment	Menus for drawing, manipulating and extracting alignments.
6	X-Section	Menus for extracting and drawing L-Profile and Cross Section.
7	Utilities	Provides miscellaneous utilities for polyline conversion, switching active AutoCAD document and exporting DTM file.
8	Help	About the software

4.2 Accessing the Included Samples

The sample files included with SW_DTM contains the following files.

1. **Small_Sample.dwg** : Sample AutoCAD drawing file
2. **Points.csv** : Sample Points File
3. **Chainage.txt** : Sample Chainage File
4. **Dtm_Sample.xls** : Sample Excel file calculation of Co-ordinates

Samples can be downloaded from the SOFTWEL website www.softwel.com.np .

4.3 Plotting the Sample Points

In order to plot the points contained in the file **Points.csv** in AutoCAD, follow the steps below.

1. Select menu **Points->Import Points from File**. A dialog box will appear.
2. Click the **Import Points** button.
3. Select the Points.csv file. The file is located in the **Samples** folder in the SW_DTM installation folder.

4.4 Drawing Contours and Cross Sections

For drawing contours and cross sections, we will be using the **Small_Sample.dwg** drawing file. The file already contains the points in the **Points.csv** file, along with features and alignments.

Follow the steps given below to draw contours in the sample drawing file.

1. Open the drawing file **Small_Sample.dwg** in AutoCAD.
2. Open SW_DTM, select **Points->Process Points**.
3. To process all points and features, select **All Points and Features** in the processing options in the bottom right corner. Ensure that the layer **Features** is selected in the feature layers list. Click **OK** to process points.
4. After processing is completed, click menu **Triangles->Triangulate**. A message box will appear after triangulation is completed.
5. Click **Contours->Draw Quick Contour**. Set the contour interval and click Draw. Contours will be drawn in AutoCAD as shown in Figure 4.3.
6. Click **X-Section->Sections by DTM**.
7. Change mode to **L-Profile and X-Section**.
8. Check **Write Chainage** to mark chainages along the alignment.
9. Set the left and right **Partial Distances**.
10. Click **Select**. Then select a convenient location as the save file destination in the **Save as** dialog box that appears.
11. Select the alignment line that is already present in the sample drawing.

12. To draw Cross sections, click **X-Section->Draw X-Section**. A dialog box will appear.
13. To read the default file that was created after step 11, click **Execute**.
14. To draw all cross sections click **Draw All**. AutoCAD will ask you to select a reference origin point for the drawings. You may also select a starting cross section and click **Draw Sheet** to draw a single sheet.

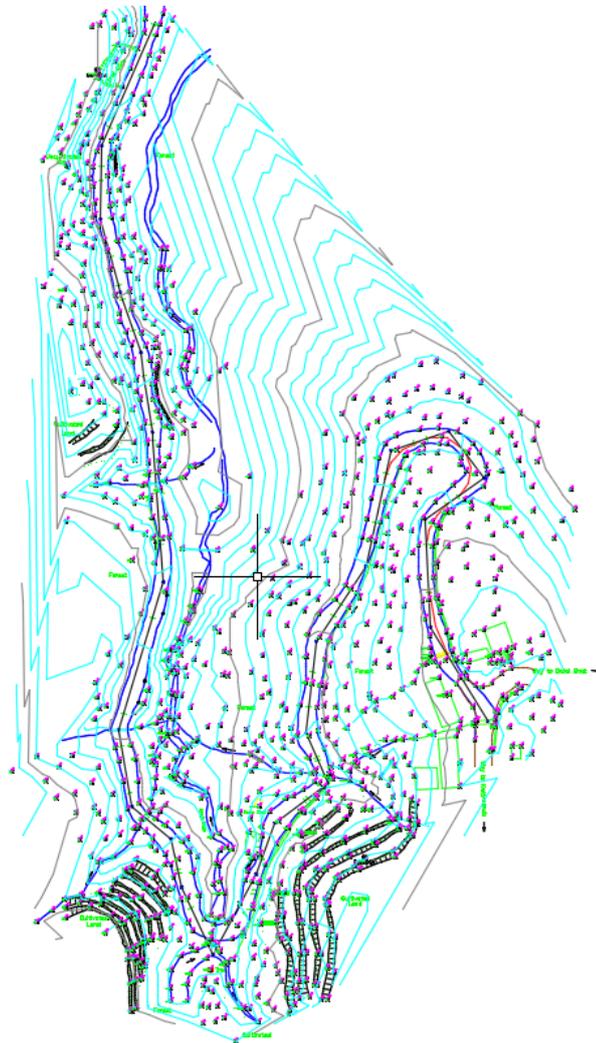


Figure 4.4 Contours Drawn in Sample File

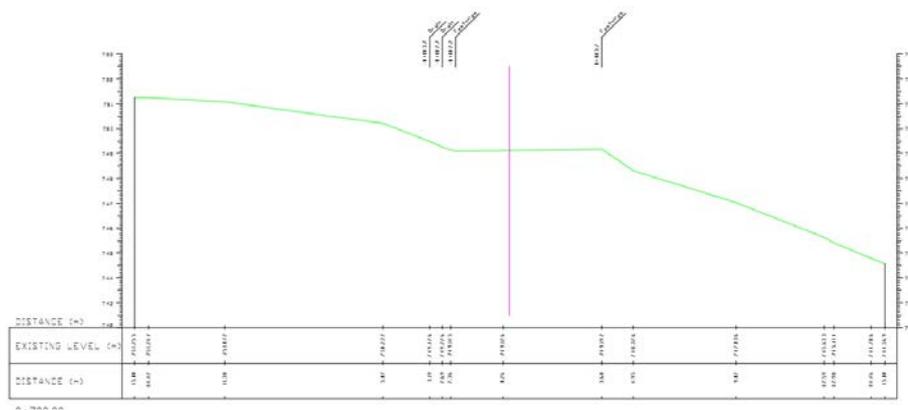


Figure 4.4 Cross Section Drawing

5 The Points Menu

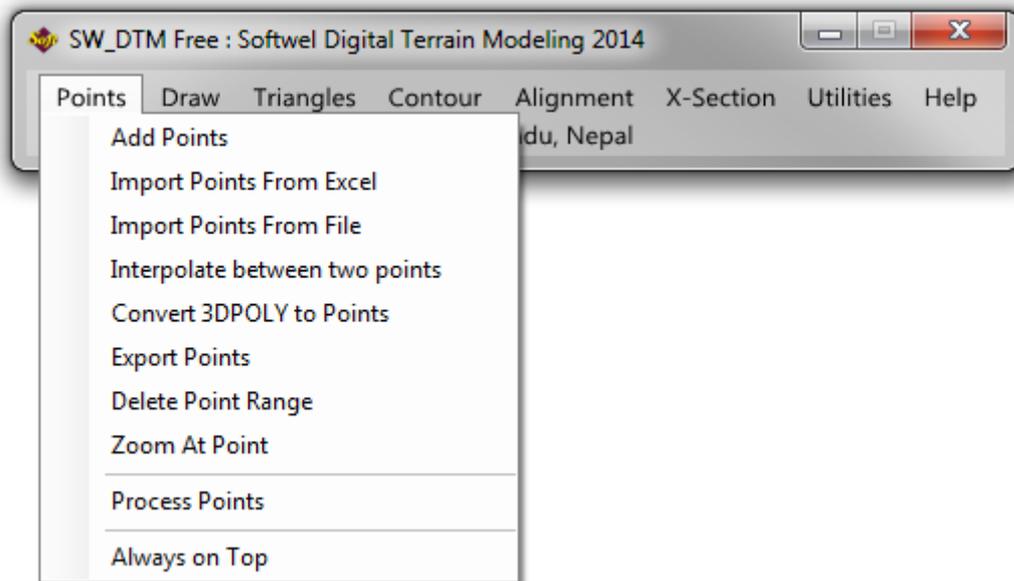


Figure 4.1 The Points Menu

5.1 Add Points

This menu opens a dialog box which allows adding points to AutoCAD, with the specified point number and elevation.

To add a point, follow the steps below

1. Input the point number and elevation of the new point. Change the point scale if required.
2. Click the **Add Point** button.
3. Follow the AutoCAD prompt and click where the new point is to be placed. After adding point, the point number is incremented automatically. To add another point,
4. Click **Add Point** Again.

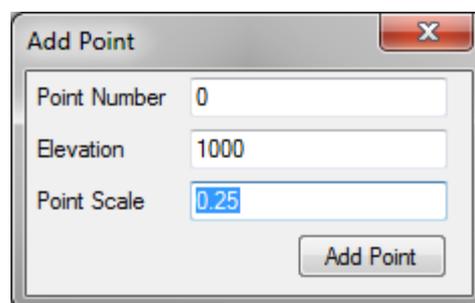


Figure 5.2 The Add Points Dialog

5.2 Import Points from Excel

This menu allows the user to input points directly from Excel into AutoCAD.

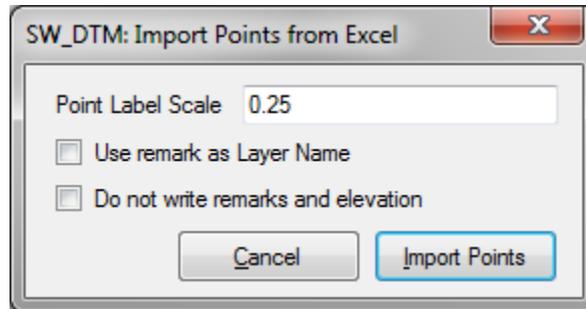


Figure 5.3 The "Import Points from Excel" Dialog

To import points, follow the steps below

1. Open the file containing the points in Excel. The columns should be in a specific format (S.N., X, Y, Z, remarks)
2. Select the rows of points to be imported.
3. Set the desired Point Label Scale and click **Import Points**. The points will be imported into AutoCAD. *Zooming must be done manually.*

In addition to the above procedure, the following additional options are provided.

- i. **Use Remark as Layer Name**
Checking this option will use the remark of a point as the layer name of that particular point.
- ii. **Do not write remarks and elevation**
Checking this option will plot the points as AutoCAD point objects, without writing any other details. Please note that points imported with this option cannot be processed.

5.3 Import Points from File

This menu allows the user to input points from CSV files into AutoCAD.

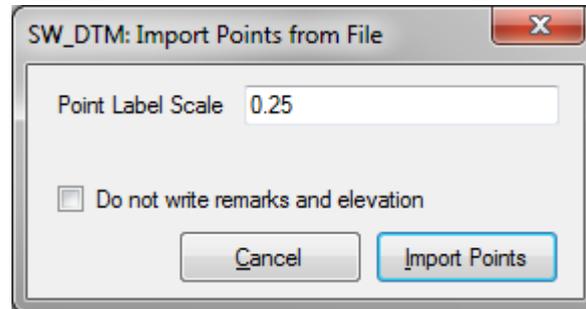


Figure 5.4 The "Import Points from File" Dialog

To import points, follow the steps below

1. Set the desired **Point Label Scale**.
2. Click the **Import Points** button.
3. Select the CSV file containing the points. The point file must be in a specific format (S.N., X, Y, Z, remarks)

5.4 Interpolate between two points

The function of this menu is to add a user defined number of points between two points by linear interpolation.

After selecting this option, follow the AutoCAD prompts to input the number of points and select two points. The new points will be added automatically.

5.5 Convert 3DPOLY to Points

This feature allows extraction of the vertices of an AutoCAD 3D polyline object and converting them to points that can be processed, or saved in a file.

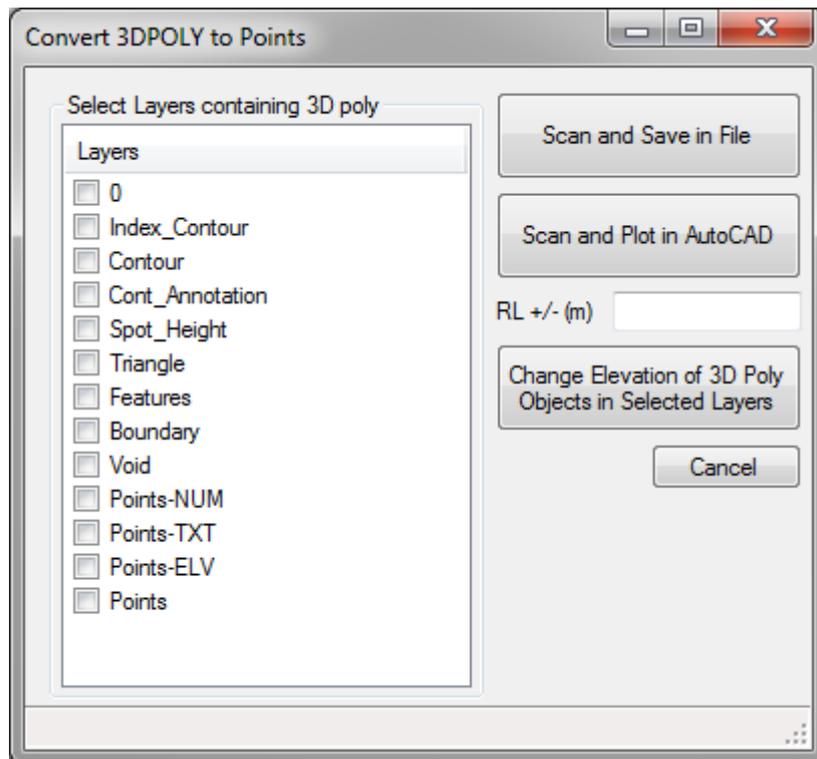


Figure 5.5 The "Convert 3DPOLY to Points" Dialog

In order to use this tool, follow the steps below:

1. Select the layer that contains the 3D polylines.
2. Click **Scan and Save in File** to save the extracted points in a file, or click **Scan and Plot in AutoCAD** to plot the scanned points directly in AutoCAD.

This tool also provides the option to change the elevation of 3D polyline objects in the selected layers. Simply type the elevation change in the **RL +/-** input box and click the button labeled **Change Elevation of 3D Poly Objects in Selected Layers**.

5.6 Export Points

This function is for extracting all the plotted points from AutoCAD and exporting them to a file with a specific format. The following formats are supported:

1. Tab Delimited text file
2. Space Delimited file
3. Comma Delimited CSV file
4. Comma delimited XYZ file, containing co-ordinates only

5.7 Delete Point Range

This menu opens a dialog box for deleting points that lie within a specified range.

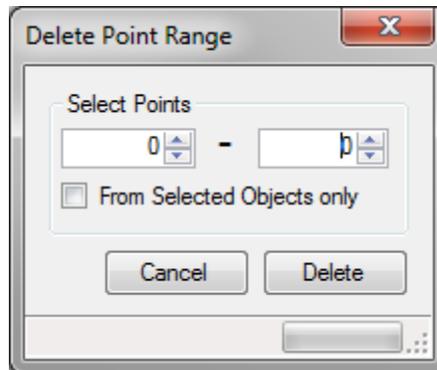


Figure 5.6 "Delete Point Range" Dialog

To use this feature, follow the steps given below

1. Input the range of point numbers for deleting. The range may be given in any order i.e. 100-300 is the same as 300-100.
2. Click the **Delete** button. If **From Selected Objects Only** is checked, AutoCAD will ask for a selection and the points will be searched and deleted in the given selection only. If left unchecked, all points will be searched.

Note: Searching a large set of points may take a long time.

5.8 Zoom At Point

This feature centers the AutoCAD viewport to the point with the specified point number, making it easy to search for a specific point.

Note: Points must be processed to use this feature and the search is performed on processed points only.

5.9 Process Points

This menu opens a dialog box which reads from AutoCAD, information on all or selected points and features from selected layers, required by SW_DTM for further operations, which includes triangulation, contouring and drawing profile or cross sections.

Click the **OK** button to process points with the selected option. Three options are provided for processing points:

1. All Points and Features

Use this option to process all points, and the features contained in the selected feature layers.

2. All Features and Contours

Use this option to process points from the selected contour layers.

3. Selected Points

Use this option if you want to process selected points only. AutoCAD will ask for a selection after the **OK** button is clicked.

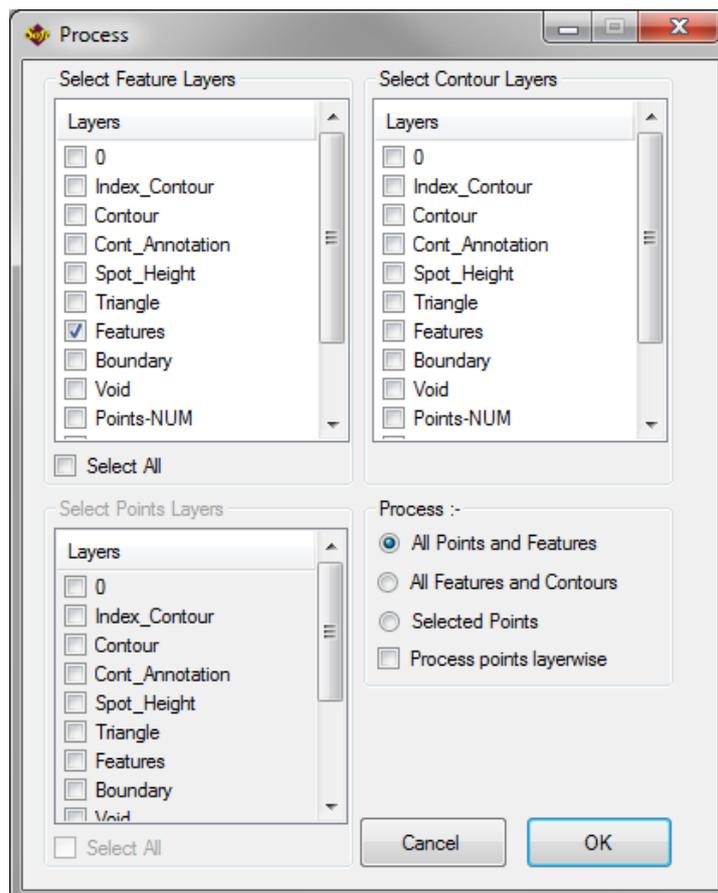


Figure 5.7 The "Process Points" dialog

6 The Draw Menu

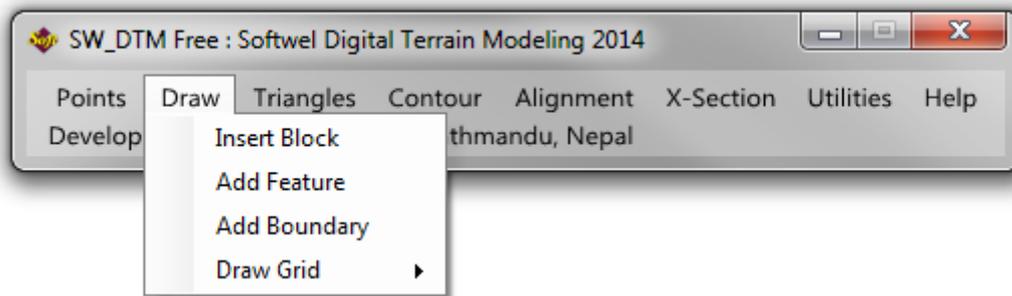


Figure 6.1 The Draw Menu

6.1 Insert Block

Insert block is used to insert predefined blocks to co-ordinates read from Excel. It can be used to define details like trees, poles, stations.

The block must be defined in AutoCAD before insertion. A dialog box will ask for the name of the block to be inserted. The remaining process is similar to that of importing points from Excel; select the points and click **Read Data**.

6.2 Add Feature

Add Feature allows the user to define triangle edges. It is used to ensure that contours go around details such as riverbanks or road boundaries as expected.

To add a feature, follow the AutoCAD prompts. Feature lines must satisfy the following conditions.

1. A feature polyline must have at least two plotted points as its vertices for interpolation. Feature lines containing only one point will be *ignored during triangulation*.
2. Two feature lines must not intersect each other.
3. A feature going through the same point twice without touching any other points will result in a Closed Feature error.

6.3 Add Boundary

The user can create boundary line for triangulation of points plotted as required. Triangles that intersect boundary lines are deleted.

6.4 Draw Grid

This tool is used for drawing grids in AutoCAD, with the specified interval and text height. The Sub-menus included in this menu are as follows.

1. Draw Grid With Grid Lines
2. Draw Grid Without Grid Lines
3. Erase All Grids

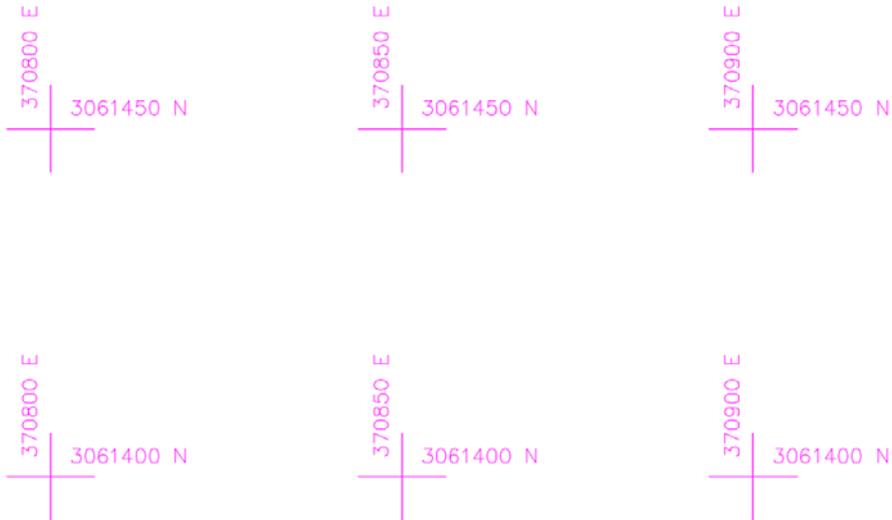


Figure 6.3 Grid Without grid Lines

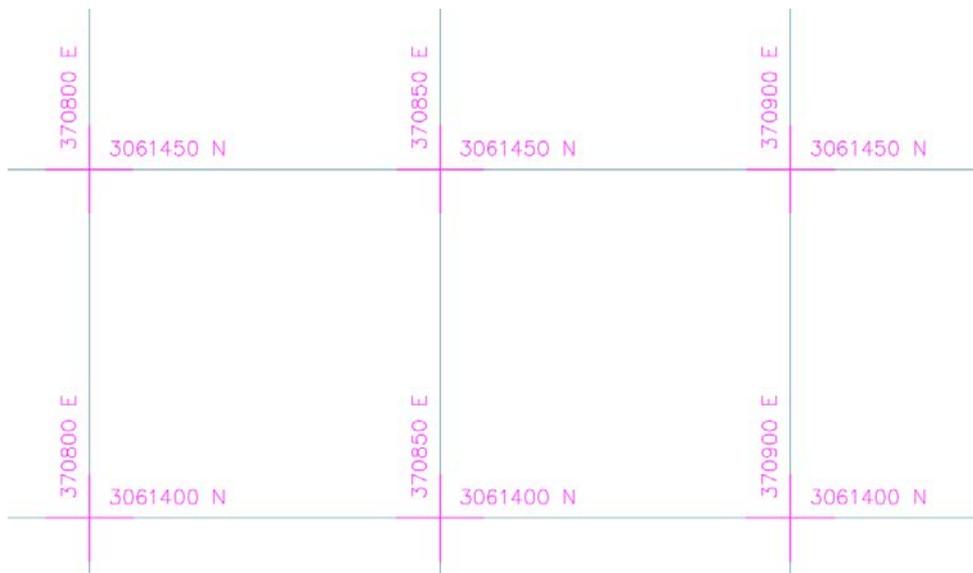


Figure 6.2 Grid with Grid Lines

7 The Triangles Menu

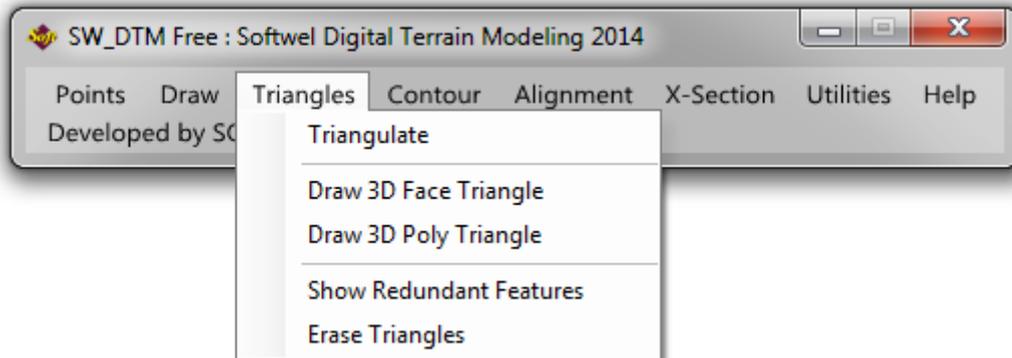


Figure 7.1 The "Triangles" Menu

7.1 Triangulate

Clicking this menu item will triangulate the processed points. The triangulation will include all features processed.

Upon completion of triangulation, a message will be displayed.

Errors may occur during triangulation due to incorrectly drawn feature lines. In such cases, the following message is displayed.

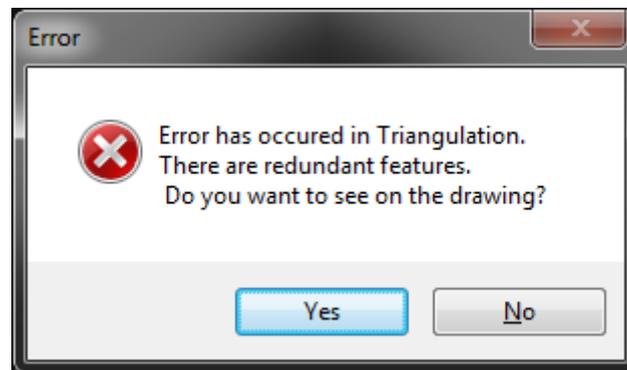


Figure 7.2 Triangulation error

Clicking "Yes" will open the Redundant Features Dialog.

Note: Performing triangulation may take a long time. Please be patient.

7.2 Draw Triangles

This menu can be used to draw the triangles obtained after triangulation in AutoCAD. Two options are provided

1. **Draw 3D Face Triangle:** Draws triangles as 3D Face objects.
2. **Draw 3D Poly Triangle:** Draws triangles as 3D Polylines.

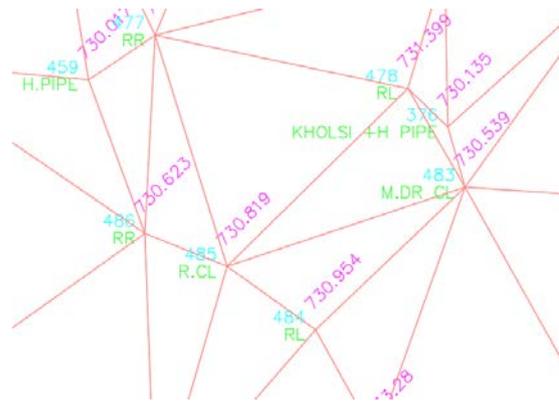


Figure 7.3 Triangles drawn in AutoCAD

7.3 Show Redundant Features

This menu opens the following dialog box, which shows the errors occurred during triangulation.

Double clicking on the error row will zoom at the point where the error has occurred and draw a red circle around the point.

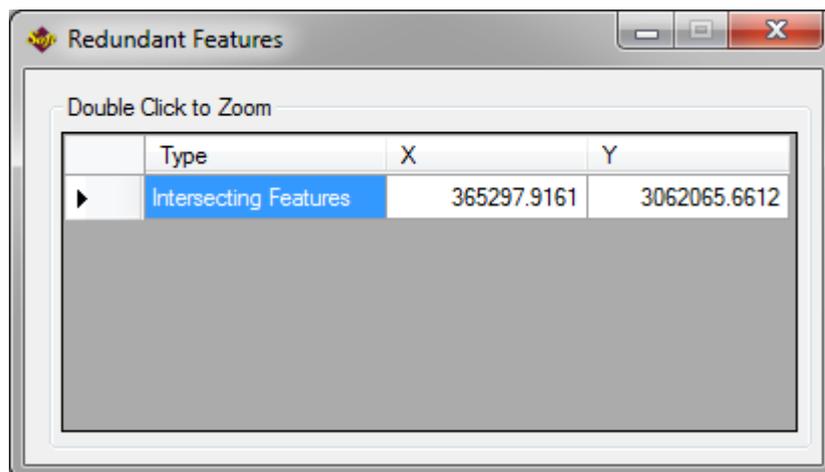


Figure 7.4 "Redundant Features" Dialog

7.4 Erase Triangles

This menu item will erase all the triangles that are drawn in AutoCAD. It will not have any effect on the triangulation.

8 The Contour Menu

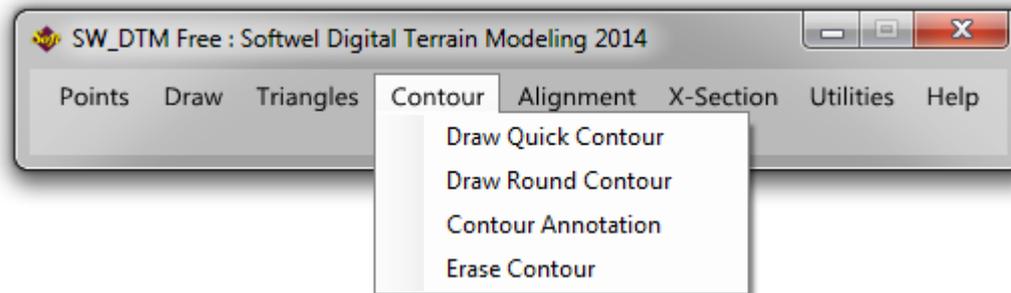


Figure 8.1 The Contour menu

8.1 Draw Quick Contour

This menu allows the user to draw contours with the specified interval. Set the required intervals and click **Draw**.

Note: Drawing contours requires triangulation to be performed. The program will automatically perform triangulation (if not already performed) before displaying this dialog.

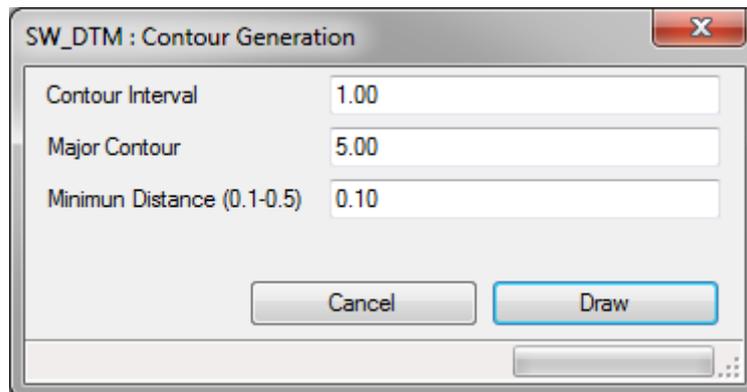


Figure 8.2 Draw Quick Contour

8.2 Draw Round Contour

This menu allows the user to draw smoother, round contours. The process for drawing round contours is similar to that of drawing quick contours. The **Rounding Factor**, an integer between 1 and 10, determines the amount of rounding.

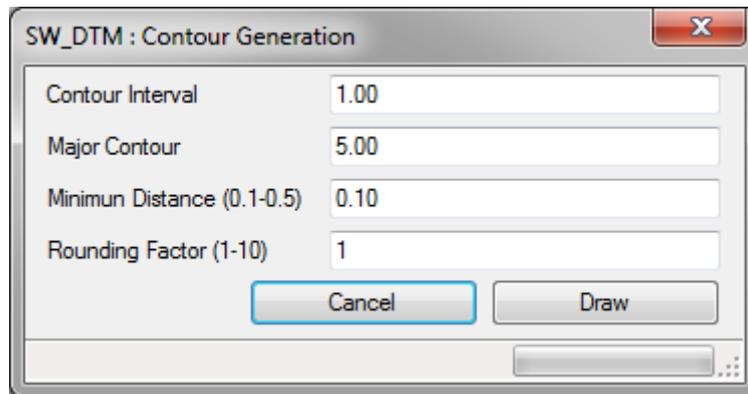


Figure 8.3 "Draw Round Contours" dialog

8.3 Contour Annotation

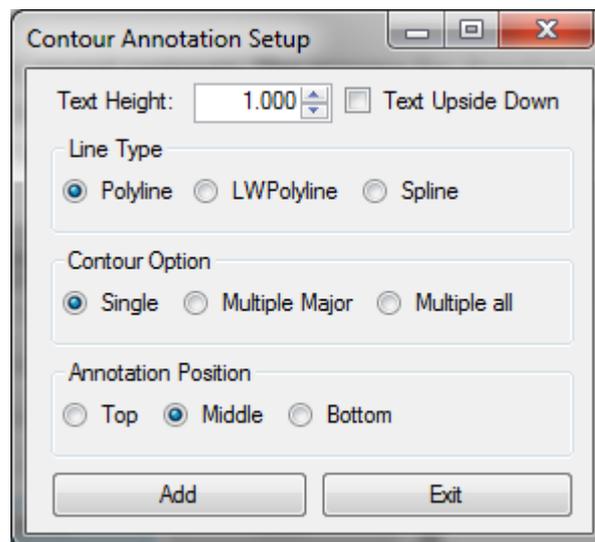


Figure 8.4 Contour Annotation Setup

This menu opens the following dialog box for annotation of contours.

To annotate contours, follow the following steps.

1. Enter the text height. Check **Text Upside Down** if you want the annotation text to be inverted.
2. Select the line type of the contour. Polyline is the default.

Note: For contours generated by earlier versions of SW_DTM, use LWPolyline.

3. Select the contour option. Use **Single** for annotating a single contour, **Multiple Major** for annotating major contours in a specified range and **Multiple All** for annotating all contours in the specified range.
4. Set the Annotation position and click **Add**.
5. If **Single** is selected as Contour option, AutoCAD will ask you to select a single contour. If **Multiple Major** or **Multiple All** is selected, AutoCAD will ask for two points and annotations will be added where the line joining the two points crosses the contours.

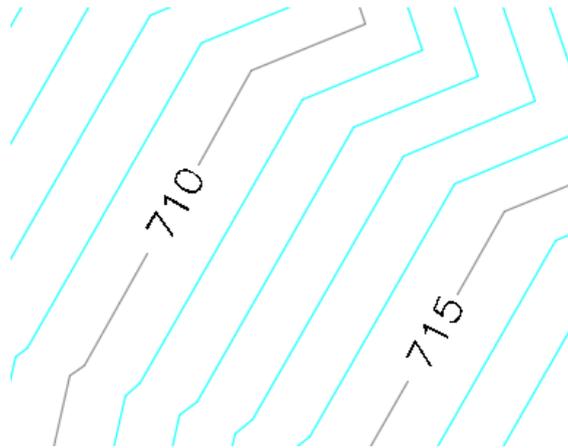


Figure 8.5 Quick Contours with Multiple Major Contour Annotation

8.4 Erase Contour

This menu will erase all contours from AutoCAD.

9 The Alignment Menu

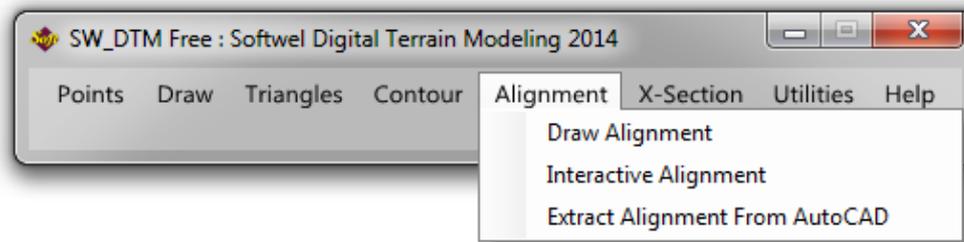


Figure 9.1 The Alignment Menu

9.1 Draw Alignment

Use this menu to draw an alignment line in AutoCAD. Alignments are AutoCAD Polyline objects and can be drawn without using this feature as well. Only lines and simple curves are available through the interactive alignment. 3D polylines cannot be used as alignments.

9.2 Interactive Alignment

The **Interactive Alignment** utility allows the user to manipulate existing alignments. The user can load an alignment from a file or select an existing alignment from AutoCAD, then perform tasks such as joining two alignments, appending additional IP to the alignment and changing the curve radius.

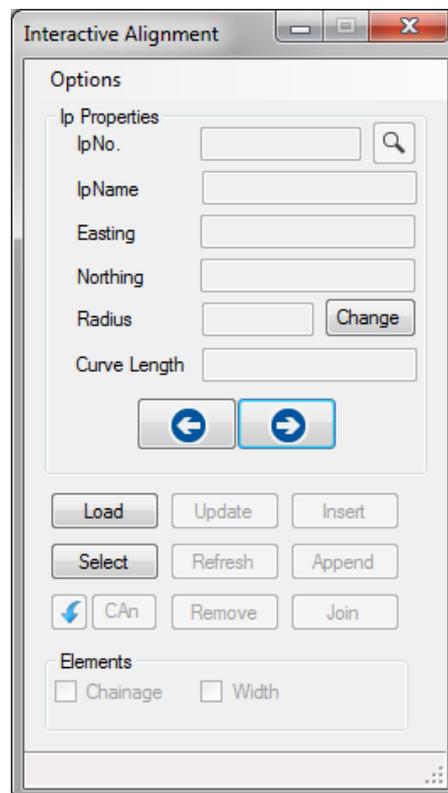


Figure 9.2 The Interactive Alignment Tool

Follow the steps below to change radius of an IP

1. Click the **Load** button to load an alignment from a previously saved file, or the **Select** button to select an alignment drawn in AutoCAD. Clicking **Select** will ask for initial IP no. and the initial chainage.
2. Navigate through the IPs using the arrow buttons on the window. Click the Zoom button next to the IP No. box to zoom at the IP.
3. To change the curve radius, click the **Change** button next to the **Radius** box. The new curve will be shown in red in AutoCAD

If the curves of two IPs overlap, both IPs are marked with red circles.

Note: Radii below 4m are not supported.

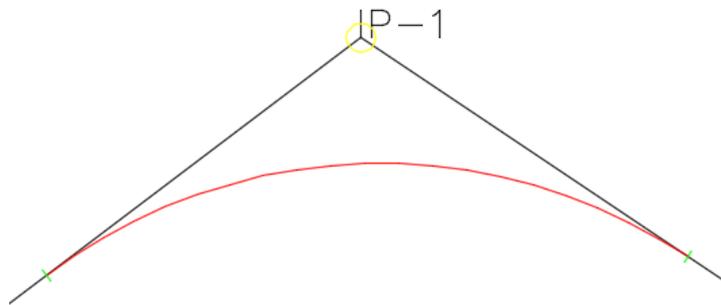


Figure 9.3 Curve radius shown in AutoCAD

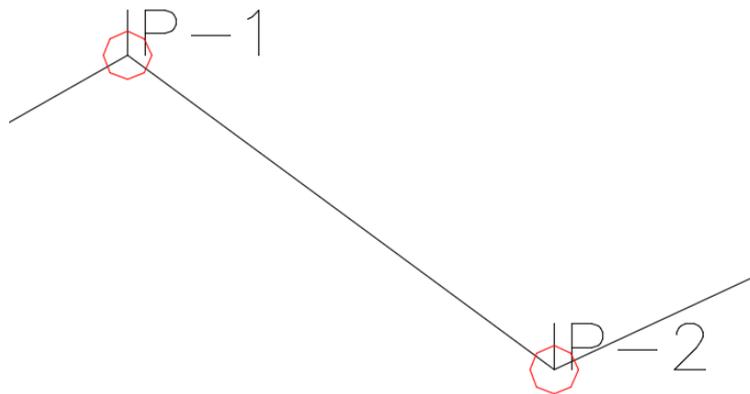


Figure 9.4 Error marking when curves overlap

The following additional functions are included in this tool

1. **Insert:** This function will insert an IP after the currently selected IP.
2. **Remove:** This function will remove the currently selected IP.
3. **Append:** This will append an IP to the end of the alignment.
4. **Join:** this will join the currently selected alignment to another alignment drawn in AutoCAD. Click the alignment to be joined after clicking this button.

The **Options** menu includes the following options.

1. **Change Annotation:** Changes the annotation of the currently selected IP.
2. **Text Size:** Set the text size of the IP labels.
3. **Save:** Save the alignment to a file, that can be loaded later.
4. **Set Chainage Interval:** Allows changing of the interval at which the chainage elements are drawn.
5. **Set Width:** allows changing of the alignment width.
6. **Draw Final Alignment:** Finalizes all changes made and draws the final alignment. This should not be carried out if there are IPs marked with red circles.

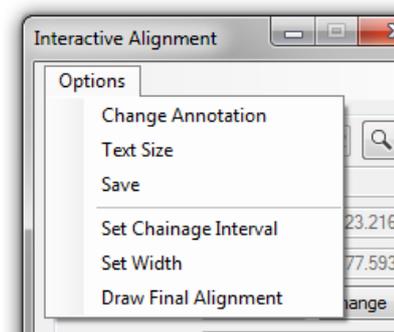


Figure 9.5 The Options Menu

This tool also allows drawing of the following elements through the checkboxes at the bottom.

1. Chainage
2. Width

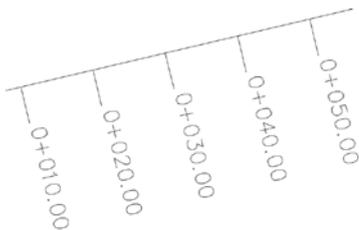


Figure 9.7 Chainage in Alignment

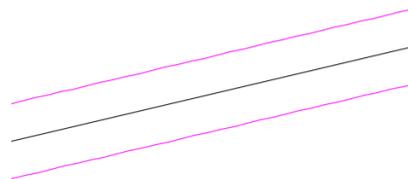


Figure 9.6 Width in Alignment

9.3 Extract Alignment from AutoCAD

This feature is used to extract alignment data from AutoCAD to a file. After clicking this menu, select the alignment near the start point in AutoCAD, then click a point near the alignment's end. The software will then prompt you to select a save file.

10 The X-Section Menu

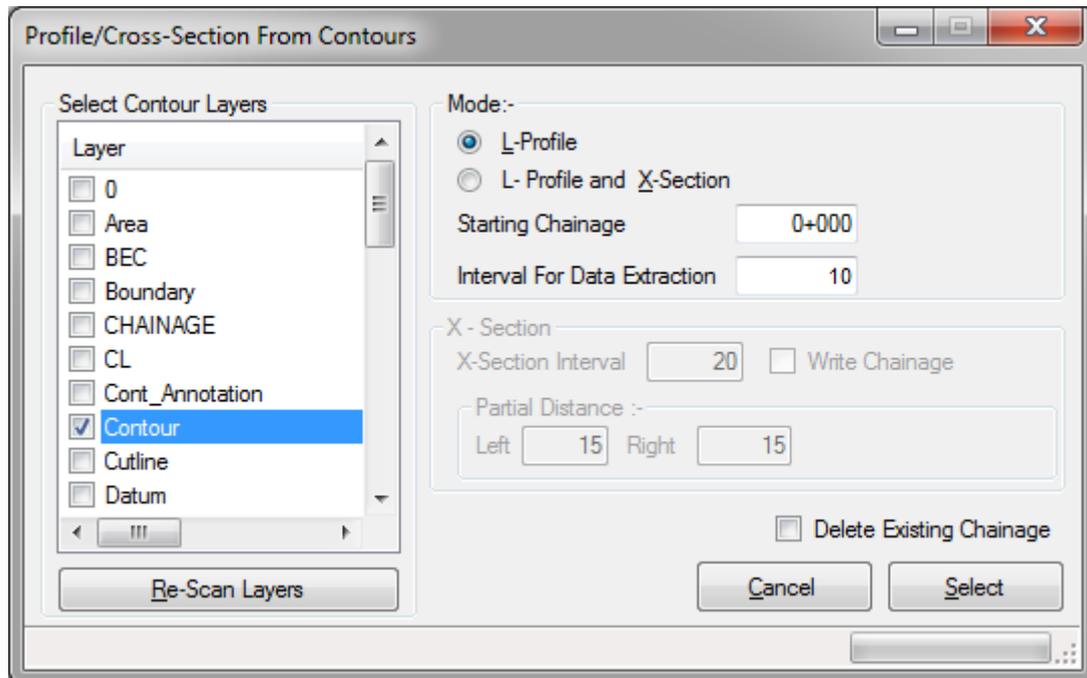


Figure 10.1 Sections by Contours

10.1 Sections by Contours

Section by Contours is utilized when point information required by SW_DTM is not available but drawings that contains contours are available. This can be used to generate profile and cross sections from old drawings containing contours generated by other software.

On clicking this item, the following dialog appears.

The list of layers on the left lists all the layers on the current AutoCAD document.

To obtain L-Profile and X-Section from contours, follow the steps below

1. Select the contour layers.
2. Select **L-Profile** if you want to extract L-Profile only and **L-Profile and X-Section** if you want to extract both L-Profile and Cross-Section.
3. Set **Starting Chainage** and **Interval for Data Extraction**.
4. If cross section is also selected, set the **Cross Section Interval** and the Left and Right **Partial Distance**.
5. Check the **Write Chainage** option if chainage needs to be written along the alignment. Check **Delete Existing Chainage** to delete chainages that are already written.
6. Click the **Select** button to select the alignment in AutoCAD.
7. AutoCAD will ask you to select the alignment first. Then it will ask you to pick a point near the end of the alignment.

8. After selecting alignment, a **Save As** dialog will appear. Select the location where the profile and cross section data will be saved.
9. To draw the extracted profile and cross section data, see Section [10.3](#) and [10.4](#).

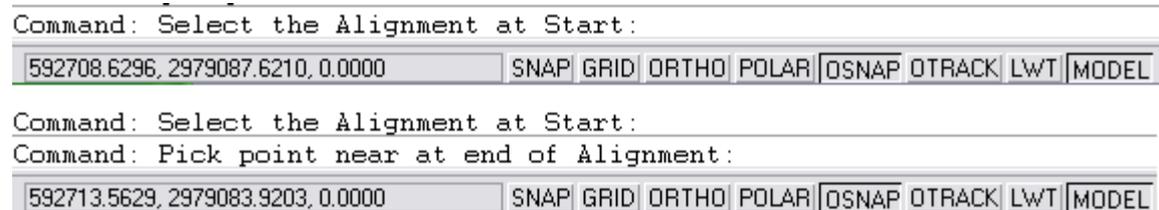


Figure 10.2 AutoCAD prompts when selecting alignment

10.2 Sections by DTM

Sections by DTM is utilized to extract data for drawing profile and cross sections using the triangulated data. Triangulation must be performed prior to selecting this option.

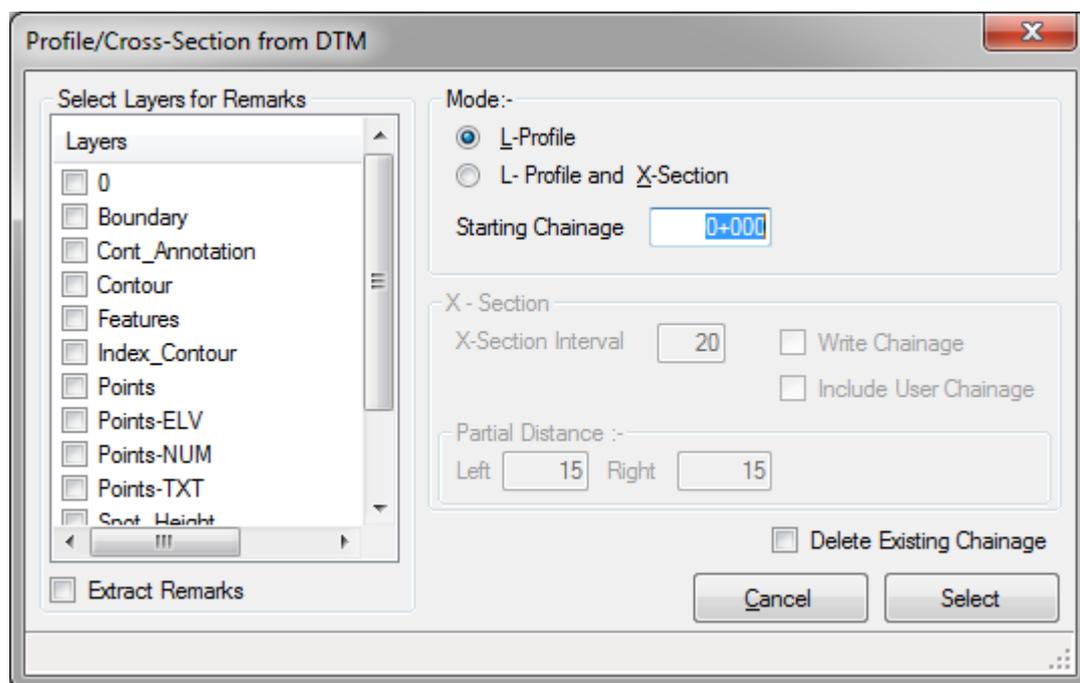


Figure 10.3 Dialog Box for Generating Profile and Cross Section from DTM

This form allows users to select the required layers for remarks. It also allows the user the option for generating data either for Profile only or Profile and cross-section.

Follow the steps below to generate profile and cross section data

1. Select whether you want **L-Profile** only or both **L-Profile and X-Section**. Selecting “L-Profile” option will generate data for profile section only and the option “L-Profile and X-Section” will generate data for profile and cross section both.
2. Give the value for starting chainage.
3. If X-Section is also selected, set the required **X-Section Interval** and select either to **Write Chainage** on plan or not. Also define the value for the **Partial Distance** at right and left from the center line for the cross-section.
4. Check **Extract Remarks** if remarks are to be extracted along with cross section. Select the layers you want remarked on the cross section drawings by checking the layer items on the left.
5. Click **Select**, select the destination for the data files to be saved, then select the alignment in AutoCAD.

10.3 Draw L-Profile

This menu opens a dialog box to draw the previously extracted L-Profile data in AutoCAD.

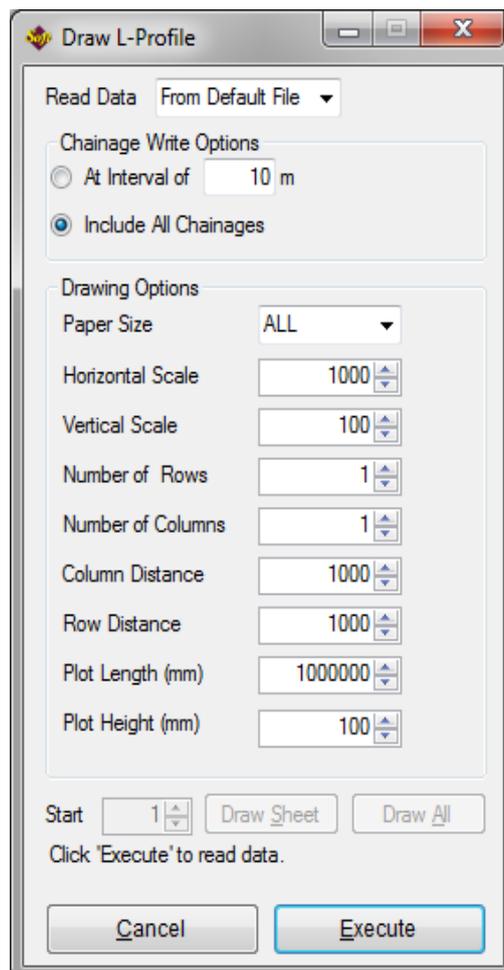


Figure 10.4 The "Draw Profile" Dialog

Follow these steps to draw profile.

1. Read profile data. The profile data can be read from three sources: the **Default File** created by SW_DTM every time after extracting profile, a previously saved **External File**, or from profile data in **Excel**.
Reading from external file will ask for a file containing profile data, and reading from excel will prompt for a selection range in Excel from which the data is to be read.
2. After selecting the data source, select the required paper size (A1, A2 and A3). If all profile is needed to be drawn then select **ALL**. Other parameters for drawing, like plot length and height, will adjust automatically.
3. Click **Execute** to read data.
4. Select the **Chainage Write Option**. You may choose to write all chainages present in the file, or to write chainage in fixed intervals.
5. Change other values if required, set the starting sheet then click **Draw Sheet** to pick an origin point in AutoCAD for the sheet to be drawn. If all sheets need to be drawn, click **Draw All** instead.

The following parameters can be changed for drawing.

1. **Plot Height** will allow user to keep the difference in reduce level while drawing which will create a breaking for the profile drawings. The height difference is in meter.
2. **Plot Length** will break the sheet and start the new sheet as the value mentioned for it. The plot length is in meter.
3. **Column Distance** is the distance between two sheets column wise.
4. **Row Distance** is the distance between two sheets row wise.

10.4 Draw X-Section

This menu opens a dialog similar in appearance and functionality to the Draw L-Profile dialog. Its function is to draw cross sections from previously extracted data.

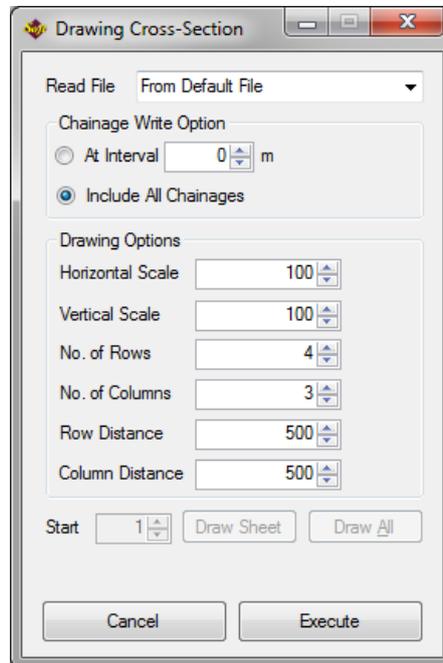


Figure 10.5 The "Draw X-Section" Dialog

Follow these steps to cross sections.

1. Read the cross section data. The cross section data can be read from three sources: the **Default File** created by SW_DTM every time after processing cross sections, a previously saved **External File**, or from cross section data in **Excel**. Reading from external file will ask for a file containing cross section data, and reading from excel will prompt for a selection range in Excel from which the data is to be read.
2. Click **Execute** to read data.
3. Select the **Chainage Write Option**. You may choose to write all chainages present in the file, or to write chainage in fixed intervals.
4. Change the scale, no. of rows/columns and the row/column distance if necessary. Then, set the starting sheet then click **Draw Sheet** to pick an origin point in AutoCAD for the sheet to be drawn. If all sheets need to be drawn, click **Draw All** instead.

11 Utilities

11.1 Make DTM

This utility creates a DTM file for SW_Roads. The DTM file will be saved in the location selected in a Save As dialog, which appears after selecting this option.

11.2 Convert 3D to 2D Polyline

As the name suggests, this utility is used to convert an AutoCAD 3D polyline to a 2D polyline.

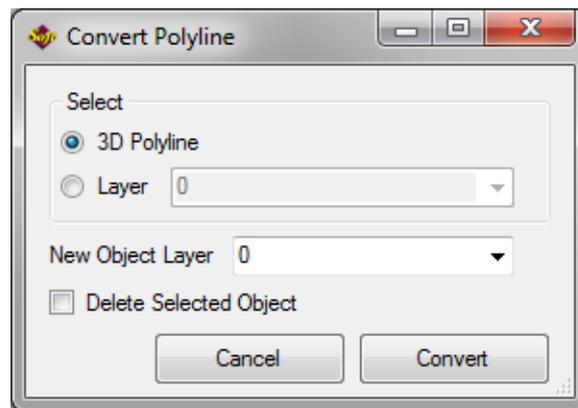


Figure 11.1 The "Convert Polyline" Dialog

The following dialog is opened when this menu is clicked.

To convert a single 3D polyline,

1. Select the **3D Polyline** option.
2. Select the **New Object Layer**, which is the layer in which the converted polyline will be placed.
3. Check **Delete Selected Object** if you want the original 3D polyline to be deleted.
4. Click the **Convert** button.
5. In AutoCAD, select the 3D Polyline that you want to convert.

To convert all the polylines in a layer,

1. Select the **Layer** option.
2. In the dropdown alongside the **Layer** option, select the layer containing the 3D polylines.
3. Select the **New Object Layer**, which is the layer in which the converted polyline will be placed.
4. Check **Delete Selected Object** if you want the original 3D polylines to be deleted.
5. Click the **Convert** button.

11.3 Switch AutoCAD Document

Multiple AutoCAD documents can be open at once in a computer. However, SW_DTM can only work with one document at a time. If the active document used by SW_DTM needs to be changed at any time, use this utility. It will switch SW_DTM's AutoCAD document to the *currently active AutoCAD document*.

12 Upgrade Notes

This new release of SW_DTM 2014 includes many changes, including performance enhancements and changes in the user interface. The SW_DTM 2014 is a deployed based on ClickOnce Technology, hence the software will upgrade to newer versions by itself. This chapter summarizes the changes and contains information about new and updated features.

12.1 Points

- Importing points, both from Excel and from files, is now much faster. Since all points are imported at once, the progress of plotting cannot be viewed in AutoCAD. Also, the new SW_DTM does not perform a Zoom Extent after plotting the points and it must be done manually if required.
- The feature **Delete Point Range** has been added. This allows you to delete points with point number lying in a specified range, from all or selected points. For more information, see Section [5.7](#).
- The default point size has been changed from 1 to 0.25.
- **Scale Point Size** has been removed.

12.2 Draw

- **Draw Details from Excel** has been removed.
- **Convert 3D to 2D LWPolyline** has been moved to the **Utilities** menu and has been renamed to **Convert 3D to 2D Polyline**.

12.3 Triangulation

- This menu has been renamed to **Triangles**.
- Triangulation is now performed directly after clicking the **Triangulate** command. Performing multiple steps is not required now.
- The speed of drawing triangles has been significantly improved.
- **Show Redundants** has been renamed to **Show Redundant Features**. The dialog box has a completely new interface that shows the type and location of errors instead of the point number. For more information, see Section [7.3](#).

12.4 Contour

- All contour lines are displayed in AutoCAD at once.
- The progress of generating contours is shown in a progress bar and the process can be cancelled at any time.
- **Draw Grid** has been moved to the **Draw** menu, with the option to delete all grids.

12.5 Alignment

- The new **Alignment** menu contains the utilities related to alignments. These items were present under the **Utility** menu.

12.6 X-Section

- **Select Alignment** has been renamed to **Sections by DTM**.
- **Sections by Contours** uses a completely new user interface, consistent with the **Sections by DTM** dialog. See section [10.1](#) for more information.
- The same menu boxes are used to draw L-Profile & X-Section regardless of whether the data was created from contours or from DTM.
- The ALI and CSD file extensions are not used by this version.

12.7 Utilities

- **Switch AutoCAD Document** has been added as a new feature. For more information, see Section [11.3](#).

About the Developers

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Prashant Malla is the Managing Director of Softwel (P) Ltd. His specialty includes software development related to Civil engineering applications and GIS. He holds a Bachelor Degree in Civil Engineering (1988) from Punjab Engineering College, India and s Master’s Degree in Environmental and Water Resource Engineering (1992) from Youngstown State University, Ohio, USA. He has been working in software development since 1993 and has developed many civil engineering software, GIS based applications and Management Software.

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