

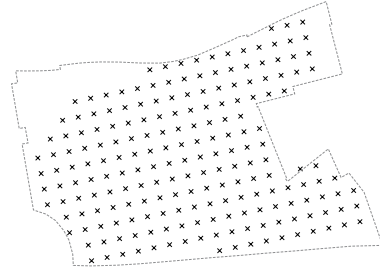
TIN — Triangulated Irregular Network

Objectives:

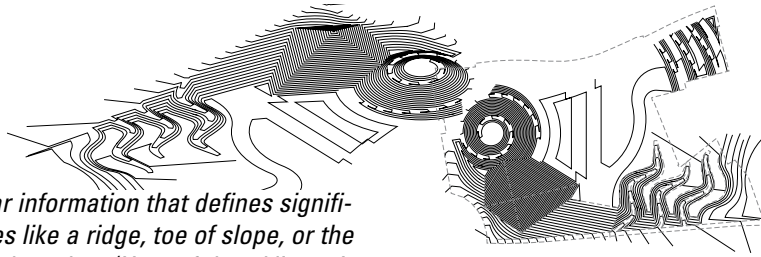
To create a TIN Surface representation of a topographic condition for visualization analysis, and calculation. This tutorial outlines the procedure for the generation of a TIN surface in a traditional CAD package with a civil engineering module, Like AutoDesk's Land Development Desktop. This procedure parallels surface generation in both ESRI's Arc View and ArcInfo.

Input Entity and Interface:

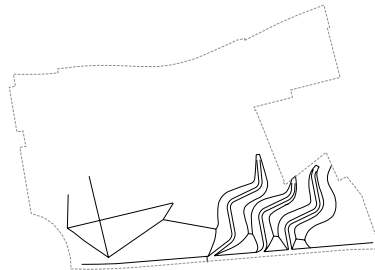
Points (x,y,z): Spot Elevation. Zero dimensional entities with an elevation attribute or Z height/value. (Points can be used alone or in combination with contours.)



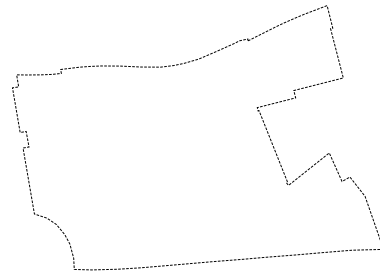
Contours 2D or 3D: Linear information that defines significant topographic features like a ridge, toe of slope, or the edges of pavement and curbs. (Use of breaklines is optional.)



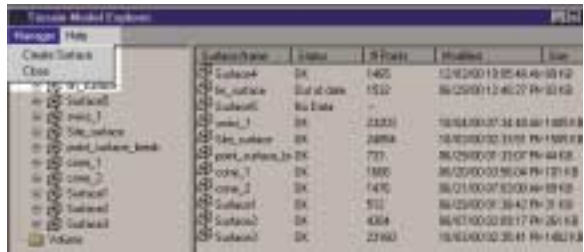
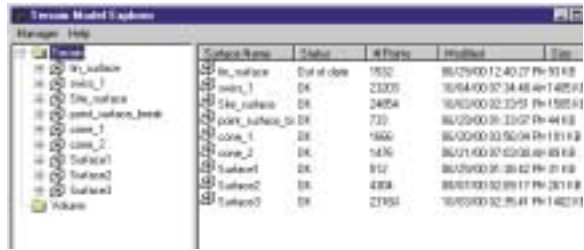
Breaklines: Linear vector information with an elevation attribute or a vector entity with a constant Z height or elevation. (Contours can be used alone or in combination with point data.)



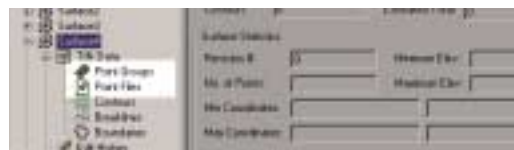
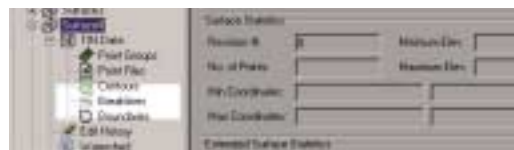
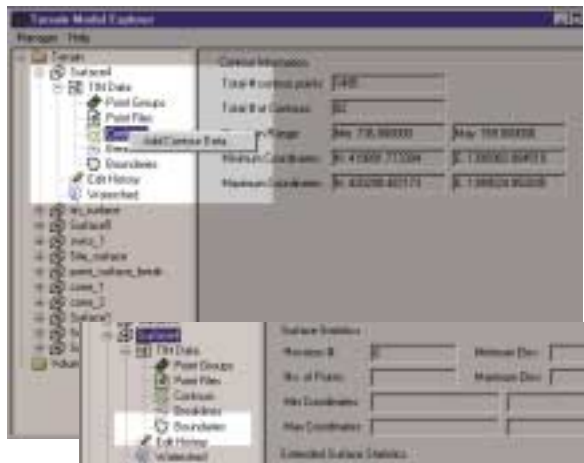
Site Boundary: Linear information that defines the limits of the surface to be built and analyzed. The boundary can often be associated with a project's "limit of work" or the site boundary. (Boundary information is required.)



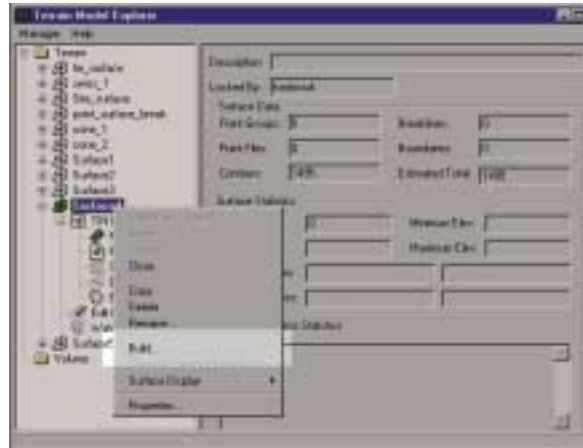
1. Initiate the process for defining the surface. Depending on the software application, this often entails launching the terrain analysis and generation module. In the AutoDesk Land Development Desktop it is the Terrain Model Explorer.



3. Add Input Data. Now that you have named the surface and created the database, the software application expects you to identify and input the data you will use to represent the surface. You must enter either point or contour data or a combination of both, and a site boundary. Breaklines are optional but will ensure accurate representation of surfaces and detail. Entities for input can be selected directly or can be entered by specifying the layer upon which the data is located within the CAD file. When working with GIS, the user specifies the coverage or shape file name.



4. *Build the Surface.* This process associates the topographic data with the site boundary and breaklines information. The application determines the topological relationships among the entities and constructs a surface representation which is then stored within the file's internal database. When this process is completed there will be no physical entities visible in the applications graphic window. To see the surface you must request its display. If the surface has changed or you have either added or subtracted topographic data, the surface must be rebuilt. The changes are not recorded until the surface is "built" again.



5. *Surface Display.* The surface representation resides within the database of the CAD file – display can be delivered to the user at any time and can be represented temporarily or result in the generation of physical entities.



6. *Temporary Display.* A temporary representation would be the delivery of a hidden line view to the monitor, typically a TIN. The surface representation can be screen captured and saved as a raster image. The usefulness of this representation type is limited.

7. *Physical Entities.* For the generation of physical entities, the application will provide a series of entity types that facilitate either visualization or analysis. You can choose to generate 3DFaces, a Polyface Mesh, or 3D entities that either describe the surface, slope percentage, or elevation value. For slope percentage or elevation values the surface entities color attribute is used to differentiate between values. These three-dimensional entities can be exported to rendering applications for visualization or as underlays for the generation of three-dimensional views. Change does not occur dynamically if the surface data changes in any way. The surface definition must be rebuilt and the physical representation regenerated.