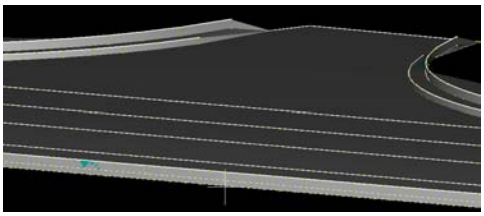


VBA Modeler for Automated Machine Control

Design Conference 2008
PEOPLE MOVING PEOPLE

Automated Machine Guidance

- Automated Machine Guidance (AMG) is a technology that more and more contractors are beginning to use
- Approximately 10% to 15% of heavy equipment purchased in Florida recently included machine guidance.
- AMG equipment requires 3D models or Land XML files.
- Contractors using AMG currently hire a third party to transfer the 2D plan information into a 3D model / Land XML.

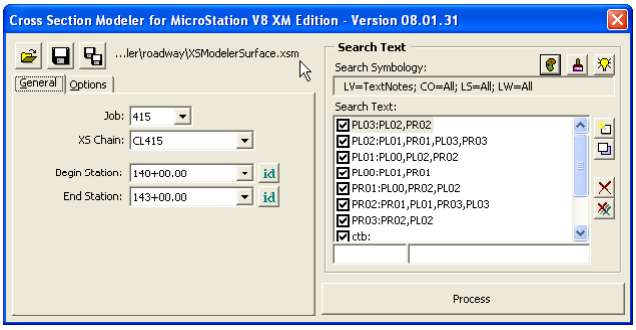
Benefits of AMG

- Promotes work zone safety
- Saves time
- Minimizes survey stakeout
- Less grading
- Fuel and equipment maintenance savings
- Smoother driving surface

AASHTO's Technology Implementation Group AMG Page:
http://tig.transportation.org/?siteid=57&pageid=2399

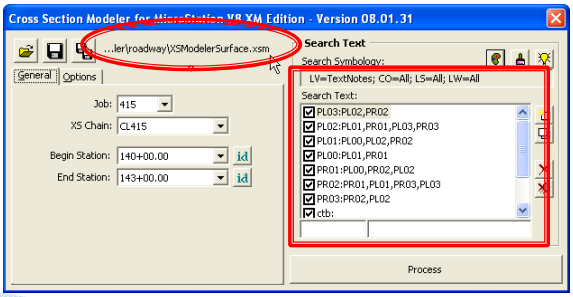
VBA Modeler

- The VBA Modeler was developed by Bentley under contract by the FHWA.
- It is used to generate a 3D model from cross sections.



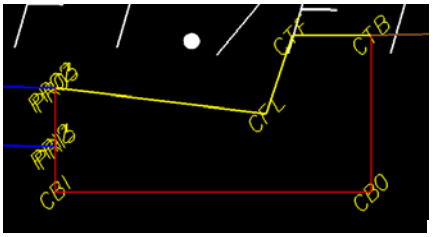
XSM Files

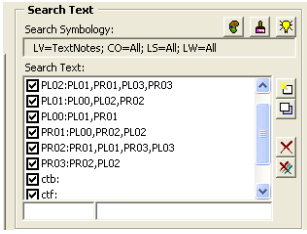
- The modeler uses a XSM file to store setting like the search text.
- XSM files that have been customized to work with FDOT's new criteria will be provided with the FDOT2008 software.



How Does It Work?

- The modeler scans the cross section file text elements on a user defined level.

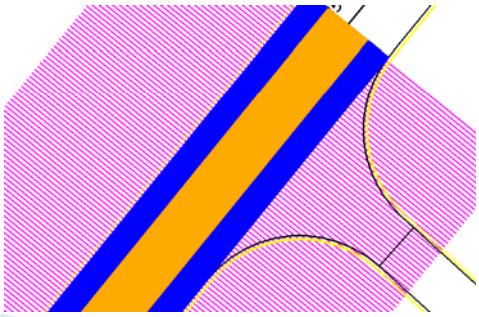




- It connects text from one section to the associated text on the previous section to create 3D break lines.

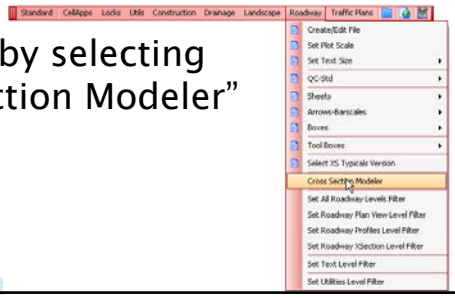
Closer Cross Sections

- Do cross sections for plans at normal intervals.
- To get an accurate model cross sections will have to be cut at much closer intervals.
- Model sections should be cut no more than five feet apart



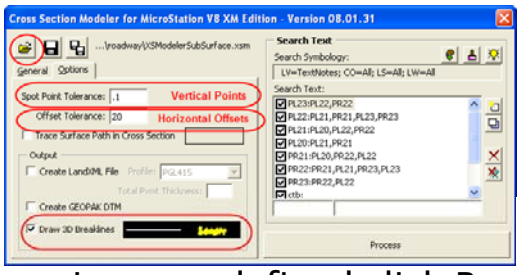
Generate Break Lines

- Use the Create Edit program to create a AMGMRD (Automated Machine Guidance Model) file, where the break lines and triangles will be created.
- Open the cross section file containing the sections the model will be generated from.
- Run the VBA Modeler by selecting "Roadway > Cross Section Modeler" from the FDOT menu.



Generate Break Lines

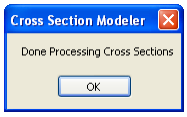
- Open the XSModelerSubSurface.xsm
- Click on the Options tab to define tolerances and break line symbology

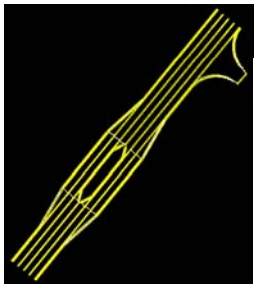


- When settings are defined click Process

Generate Break Lines

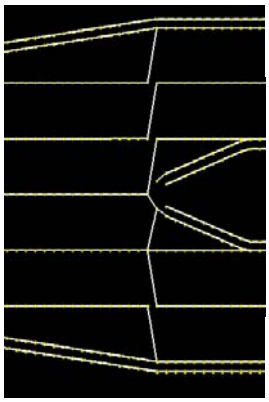
- The modeler will scan through the cross sections locating the text elements and then prompt for a file.
- Select the AMGMRD file created earlier for the break lines.
- You will be prompted when processing is complete and the file will automatically be opened.





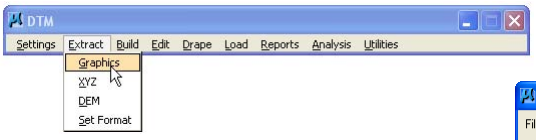
Clean Up Break Lines

- It may be necessary to do some clean up on the break lines before creating a TIN file.
- Use MicroStation tools to repair gaps and lines
- Good enough for grading may not require extensive clean up.

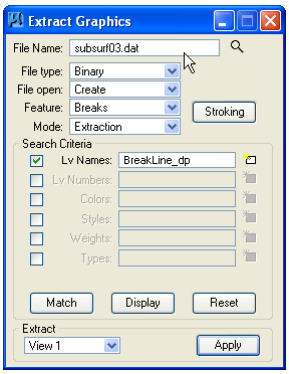


Extract Graphics

- Use GEOPAK's Extract Graphics utility create a DAT file from the break lines.

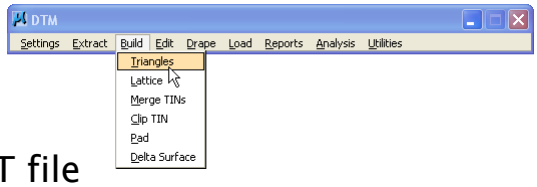


- Enter a name and settings
- Define search criteria
- Fit View
- Click Apply

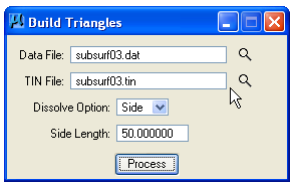


Build Triangles

- Use the Build Triangles tool to creat a TIN file from the DAT file.



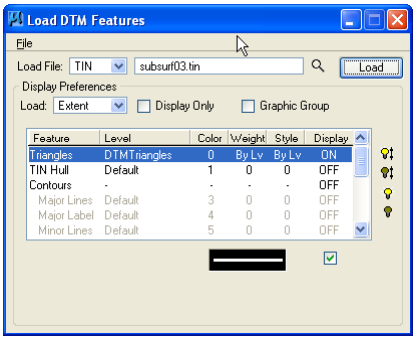
- Select DAT file
- Enter TIN file name
- Choose Side and Length
- Click Process



Load DTM Features

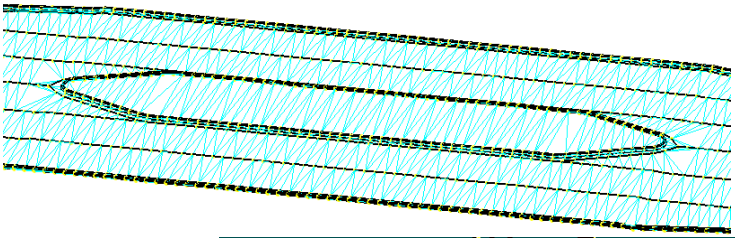
- Load the triangles to ensure the break lines were cleaned up properly

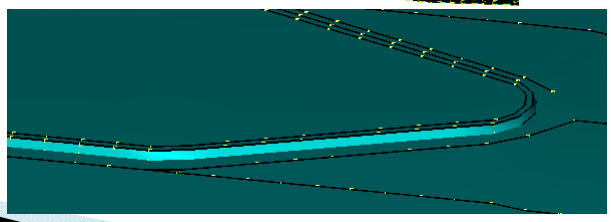
- Select TIN
- Turn on Triangles
- Define symbology
- Click Load



Review Surface

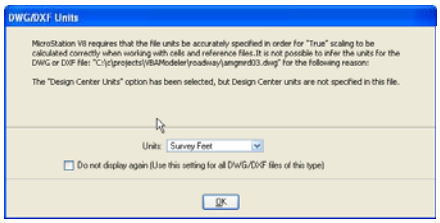
- Review the surface to make sure break line edit are correct.





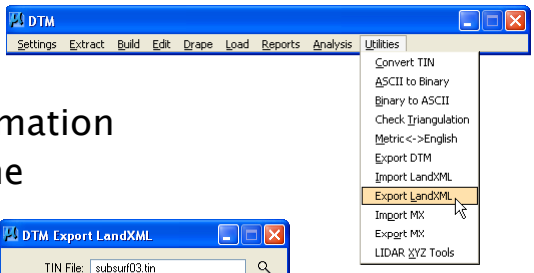
Save as DWG

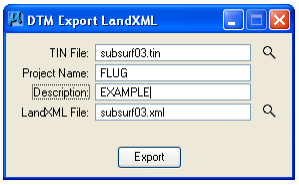
- Some of the AMG equipment requires a 3D DWG file.
- Save the AMGMRD file as a DWG file.
- Select “File > Save As” from the menu.
- Set Save as type to AutoCAD Drawing Files[*.dwg]
- Set Units



Export XML

- Create a Land XML file of the surface using GEOPAK's DTM Export LandXML utility.
- Select the TIN file
- Enter Project information
- Enter XML file name
- Click Export





Questions?

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Florida Department of Transportation
Engineering/CADD Systems Office
ECSO