THE UNIVERSITY OF TEXAS AT AUSTIN
CENTER FOR TRANSPORTATION RESEARCH

0-6850-P1

CORRIDOR-BASED PLANNING TOOL FOR TRANSPORTATION OF WIND TURBINE COMPONENTS: MANUAL GUIDE

Chandra R. Bhat
Sebastian Astroza
Priyadarshan Patil
Katherine Smith
Zhanmin Zhang

TxDOT Project 0-6850: Texas Transportation Planning for Future Renewable Energy Projects

ORIGINAL VERSION: MARCH 2016
REVISED VERSION: AUGUST 2016

Contents

The accompanying CD/DVD contains 0-6850-P1, a stand-alone planning tool that can be used to propose a route plan for wind turbine components passing along Texas routes. Following are the instructions.

The CD/DVD contains a TransCAD batch file (Batch1.rsc), four datasets (Bridgeshort.zip, PMIS.rar, SAM_V3 Model.zip, and VertClearance.zip), the compiled TransCAD network (Final Map.rar), and the complete user's guide. The user should copy the folder "WTC_TOOL" and paste it in C:\. The four separate datasets were provided in addition to the already created network in case TxDOT would like to modify the network in the future. Detailed instructions on how to replicate the data creation process are provided in the appendix of this guide. However, the final dataset is the only map the user should open.

Using the tool requires only two steps: open the map in TransCAD (Final Map.cdf) and enter some basic inputs regarding the truck, load, and start/end points. The tool will generate the shortest route based on those inputs. However, the user should compile the batch file first.

Compiling the batch file

In order to compile the batch file, the user should go to the *'Tools'* menu and open the *'GIS Developer's Kit'*. Then the user should click in the first icon, *'Compile to UI'*, and select the file Batch1.rsc and the UI database ui1.dbd. A "compilation successful" message should appear after a few seconds.


Once the batch file is compiled, the user needs to include an add-in in the TransCAD tools menu. In order to do that, the user should go to the *'Tools'* menu and open the *'Setup add-ins'* dialog box. The user should *'Add'* a dialog box with description "Batch Macro", name "Batch Run Example" and using the UI database included in the CD/DVD (ui1.dbd).
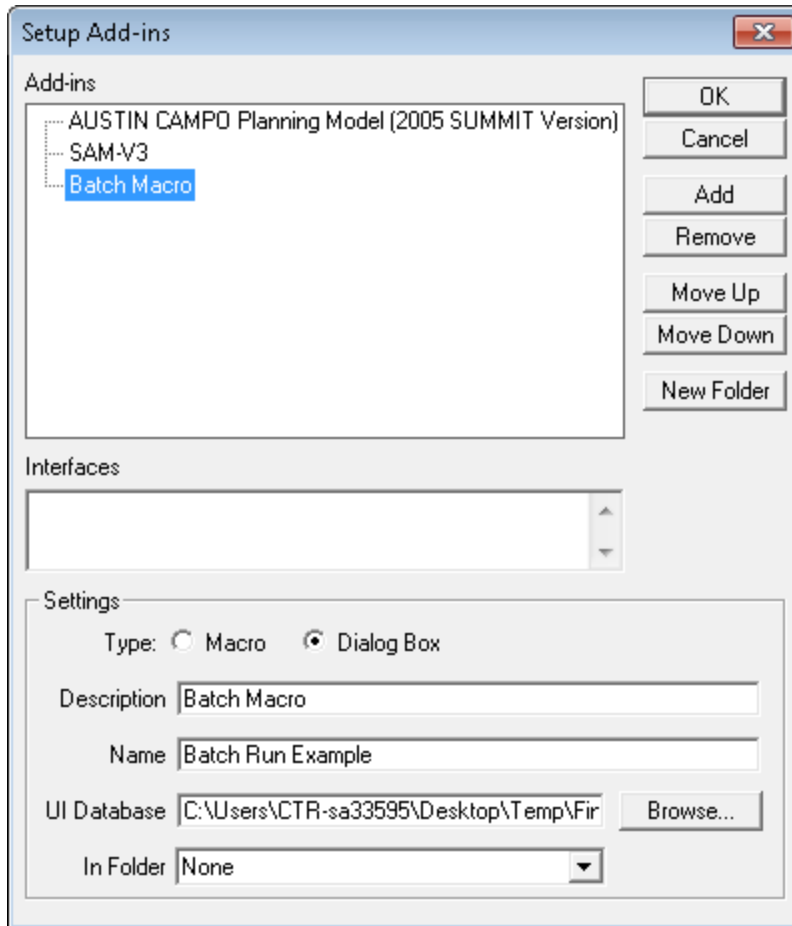
Running the add-in

In order to run the add-in, the user should go to the *'Tools'* menu and open the *'Batch Macro'*. A small dialog box will appear.
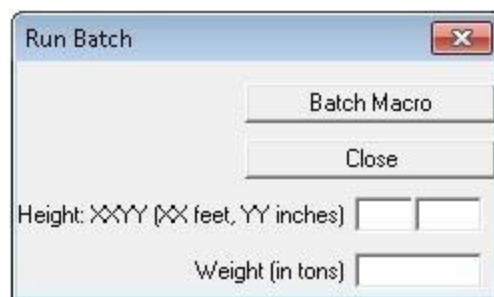
The user should input the Height of their truck (this is a four-digit code, with first two showing feet and next two showing inches, e.g., a clearance of 12 feet and 5 inches will have 1205 as the attribute) and also the weight of the load and truck (in tons). Finally, the user should press the "Batch Macro" button and TransCAD will automatically select only the links of the network in which the truck meets the load and vertical clearance

limitations. The user should see a "Batch routine terminated successfully" message after a few seconds.

Now the user can go to the *'Networks/Paths'* menu and run the shortest path toolbox.
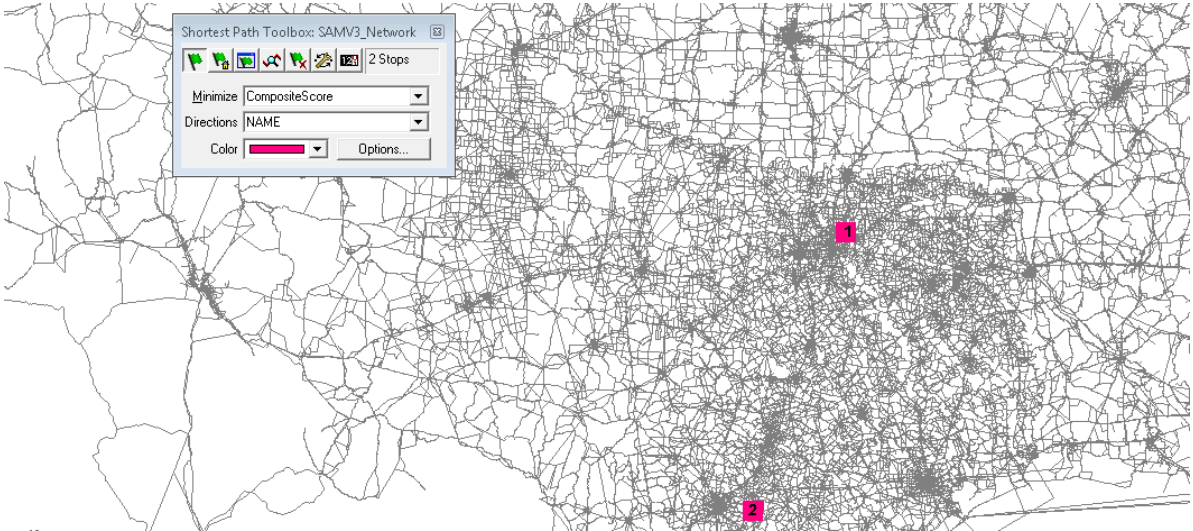
At this point, the user inputs origin and destination (or multiple points, as multiple stops are allowed) and the routine will find the shortest path, creating a list of instructions in a .txt file and an accompanying map.

Directions

| From Stop 1 To Stop 2	(Node IDs: 4475562/3748483)		
Start	South on MURPHY RD	1.1 Miles	(1.1 Miles)
Turn Right	South on SH0078	15.8 Miles	(16.9 Miles)
Continue	West on IH0030	2.2 Miles	(19.1 Miles)
Continue	West on I30	1.2 Miles	(20.3 Miles)
Continue	West on IH 30	.4 Miles	(20.7 Miles)
Turn Left	South on I30	1.3 Miles	(22.0 Miles)
Continue	South on I35 E Toll	3.3 Miles	(25.3 Miles)
Continue	South on IH 35E HOV	1.6 Miles	(27.0 Miles)
Continue	South on IH0035E	6.7 Miles	(33.6 Miles)
Continue	South on I35E	6.4 Miles	(40.0 Miles)
Continue	South on US0077	9.8 Miles	(49.8 Miles)
Continue	South on I35E	.9 Miles	(50.7 Miles)
Continue	South on IH0035E	26.3 Miles	(77.0 Miles)
Continue	South on IH0035W	.1 Miles	(77.1 Miles)
Continue	South on IH0035	12.2 Miles	(89.3 Miles)
Continue	South on IH 35	16.2 Miles	(105.5 Miles)
Continue	South on BU0077L	5.3 Miles	(110.8 Miles)
Continue	South on IH 35	21.3 Miles	(132.1 Miles)
Continue	South on IH0035	1.2 Miles	(133.4 Miles)
Continue	South on IH35	7.6 Miles	(141.0 Miles)
Continue	South on IH0035	.3 Miles	(141.3 Miles)
Continue	South on IH35	2.6 Miles	(143.8 Miles)
Continue	South on IH35(2B)	.7 Miles	(144.5 Miles)
Continue	South on IH0035	.1 Miles	(144.6 Miles)
Continue	West on IH35(2B)	4.5 Miles	(149.1 Miles)
Continue	West on IH0035	5.8 Miles	(154.9 Miles)
Continue	South on IH35	6.7 Miles	(161.6 Miles)
Continue	South on IH0035	82.0 Miles	(243.7 Miles)
Turn Left	South on SH123	4.4 Miles	(248.1 Miles)
Continue	South on SH0123	13.2 Miles	(261.3 Miles)
Continue	South on BS0123B	6.9 Miles	(268.1 Miles)
Continue	South on SH0123	10.0 Miles	(278.2 Miles)

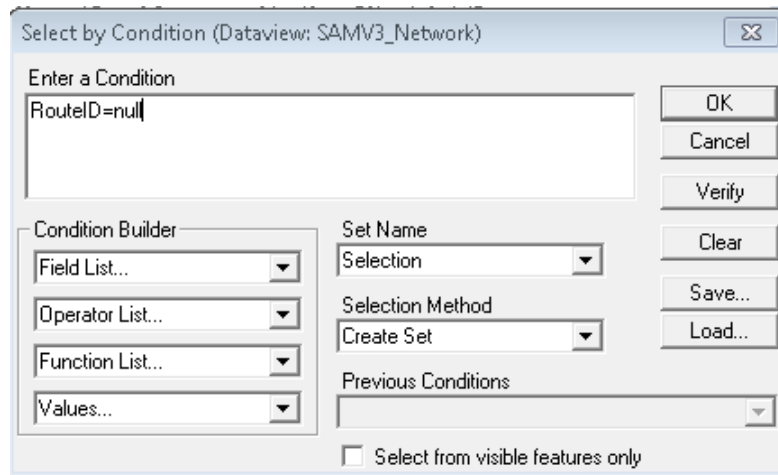Would you like to make Internet Explorer your default browser?   Yes   No   ▼   ✕

Appendix A: Data creation process

The operations we perform to create the dataset are as follows:
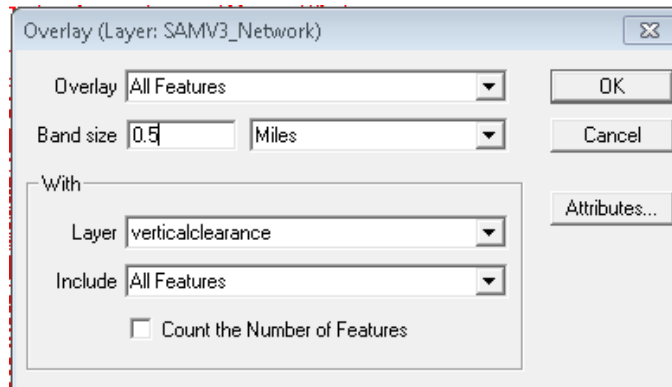
1) Read the Texas road network from the SAM Dataset and add the other three layers (bridges, vertical clearance and pavement condition).
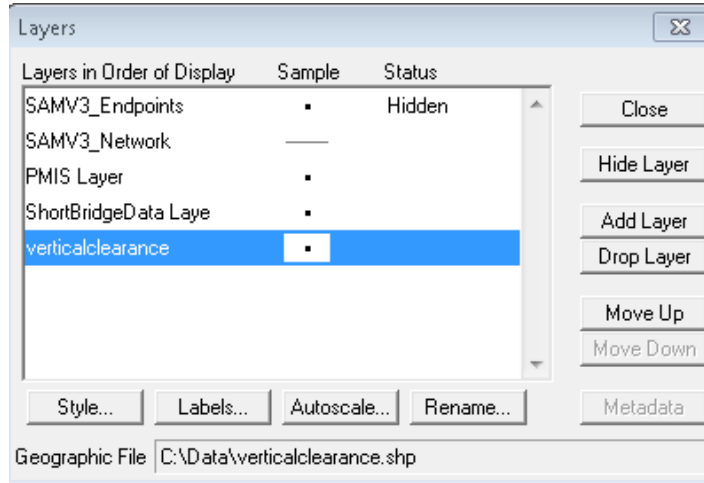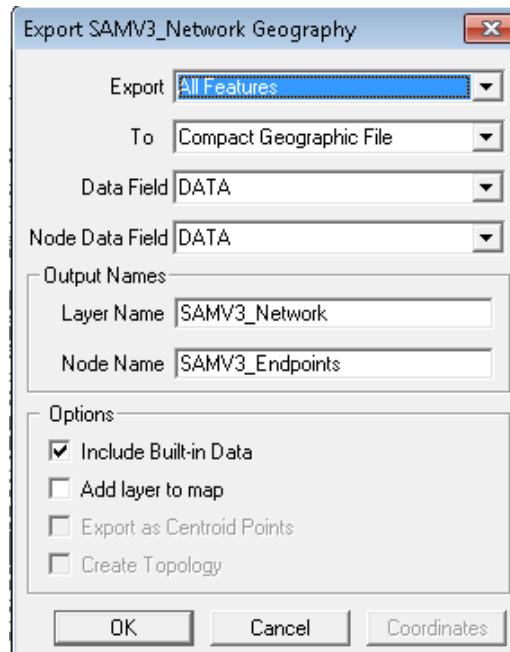

2) Select only road links from the network (exclude rail and air).

3) Overlay the vertical clearance shapefile on the data with a band size of 0.5 miles.

4) Export this overlay map and save it.

5) On this overlaid map, overlay the bridge data with a band size of 0.05 miles (this data is fairly accurate, geographically).

6) Export and save this overlay map.

7) Open this saved map and overlay the pavement data with a band size of 0.05 miles.

8) Export and save this final map.

9) Open the dataview of the map, and delete the columns we are not using.

10) Use the vertical clearance data fields along with the bridge over/under data fields to add an attribute of maximum vertical clearance to all the links. (This is a four-digit code, with first two showing feet and next two showing inches, e.g., a clearance of 12 feet and 5 inches will have 1205 as the attribute).

11) Use the bridge data to fill in the maximum load capacity of certain links (in tons).

12) From the pavement data, assign a condition score to each road.
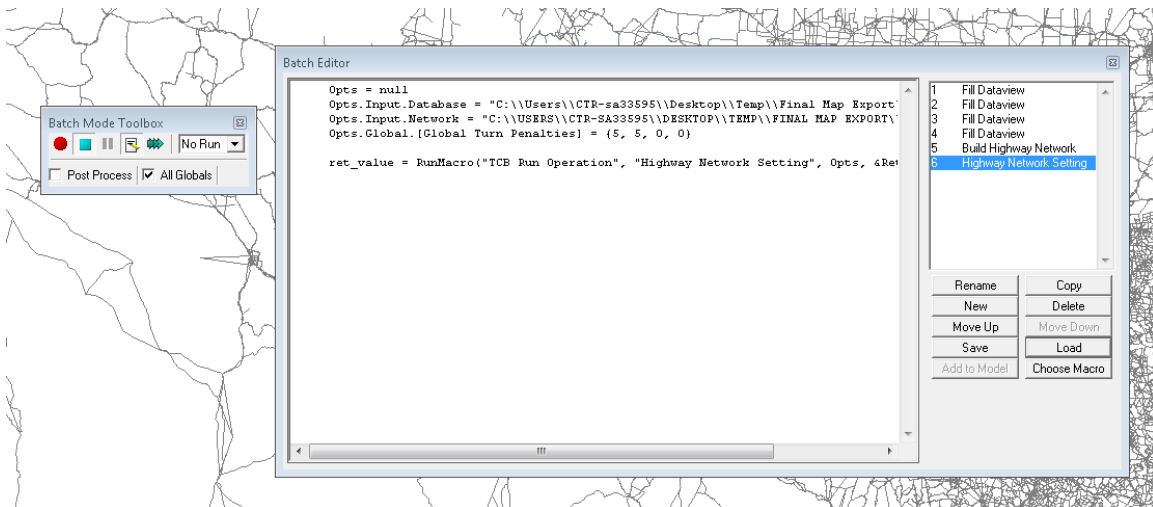
13) Export this dataset. This is our final dataset.

Appendix B: Modifying the optimization criteria

The user can modify the parameters of the optimization criteria using the Batch Mode Toolbox.

Item number 4 contains the formula with the weights of the travel distance and the pavement score.
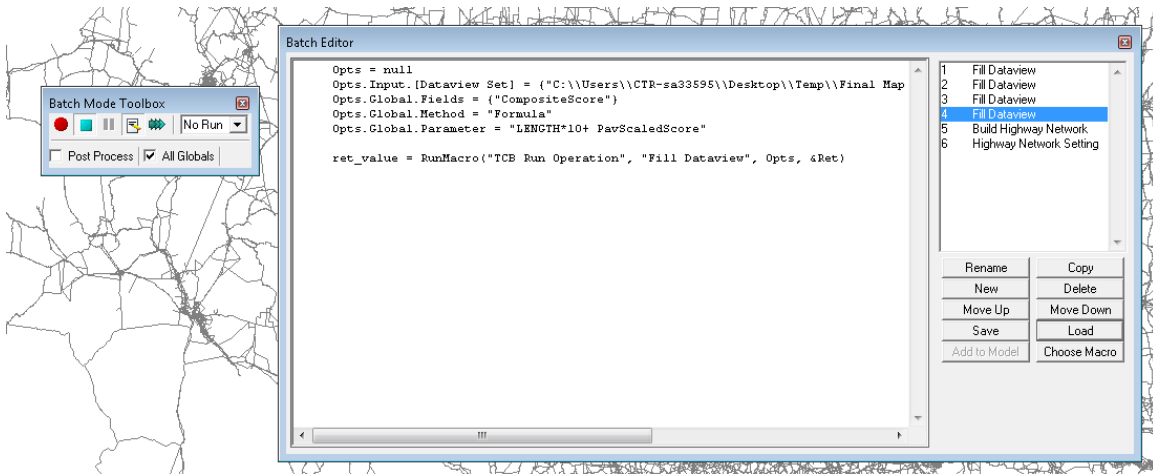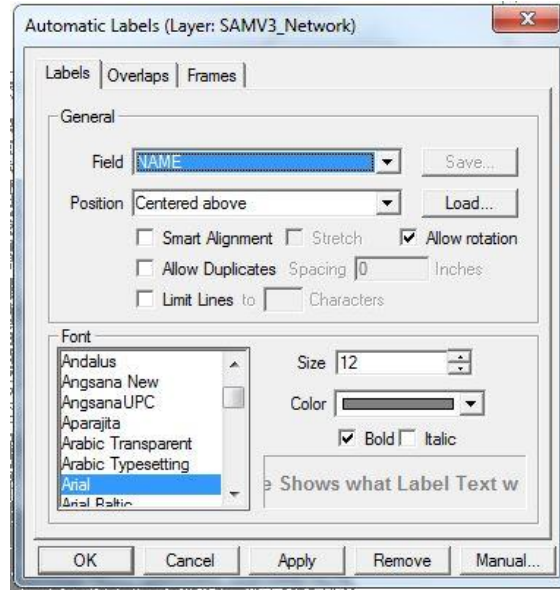

Item number 6 contains the left turn and right turn penalties.

Appendix C: Labeling the Main Highways

The user can add labels for the main highway names by pressing the automatic labels button: [icon]. In the "Labels Menu" the user should select 'NAME' as Field.

Then, in the "Overlaps Menu", the user should make sure the 'prevent overlapping labels' option is selected.