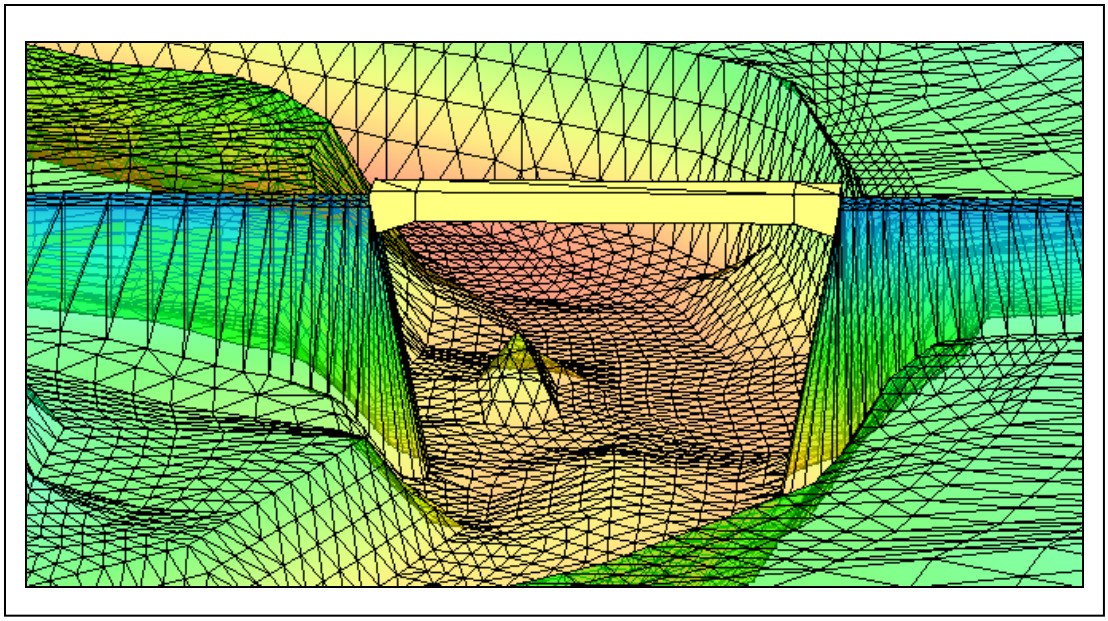
SMS

v. 13.1

SMS 13.1 Tutorial

3D Bridge



Objectives

This tutorial demonstrates how to model a 3D bridge structure in SMS.

Prerequisites

- SMS Overview
- Map Module

Requirements

- Map Module
- Mesh Module

Time

- 10–20 minutes

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1 Introduction

This tutorial demonstrates modeling a 3D bridge. A 3D bridge can be modeled on an existing model using components in SMS.

This tutorial makes use of a location on Double Pipe Creek near Detour, Maryland. The project begins with a 2D mesh that includes abutments for a proposed bridge. The location of the bridge will be designated using an 3D bridge coverage, then the bridge will be modeled using the bridge dialog.

2 Getting Started

Start by importing a project file containing an existing mesh:

1. Launch the SMS application.
2. Select *File* | **Open…** to bring up the *Open* dialog.
3. Select "Project Files (*.sms)" from the *Files of type* drop-down.
4. Browse to the *data files* folder for this tutorial and select "DoublePipe.sms".
5. Click **Open** to import the project and exit the *Open* dialog.

The project should appear similar to Figure 1

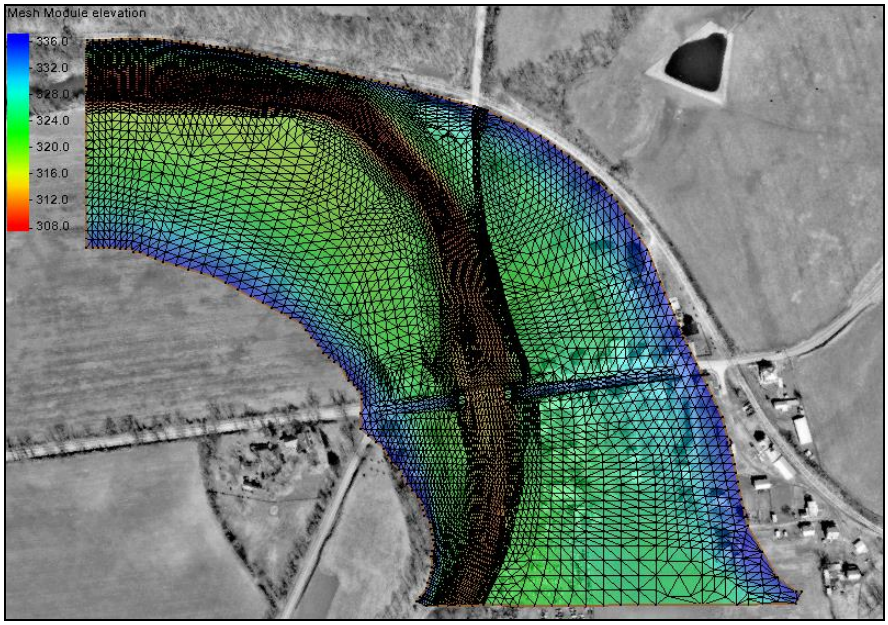

Figure 1 Initial project

3 Creating the Bridge Arcs

The arcs defining the bridge area are created on a 3D Bridge coverage. Two arcs are needed for defining the bridge area.

1. Right-click "Map Data" and select **New Coverage** to bring up the *New Coverage* dialog.
2. Select *Model* | **3D Bridge** in the *Coverage Type* section.
3. Click **OK** to close the *New Coverage* dialog.

A new 3D Bridge coverage should appear in the Project Explorer. To define the bridge arcs, do the following:

4. Select "3D Bridge" to make it active.
5. **Zoom** in to the area near the bridge abutments, as shown in Figure 2.
6. Starting on the left side of the river, use the **Create Feature Arc** tool to create upstream side of the bridge. Double-click to end the arc.
7. Repeat step 6 to create the second arc as shown in Figure 2.

It is helpful to note the length of the each arc by selecting the arc and viewing the length in the Status Window.

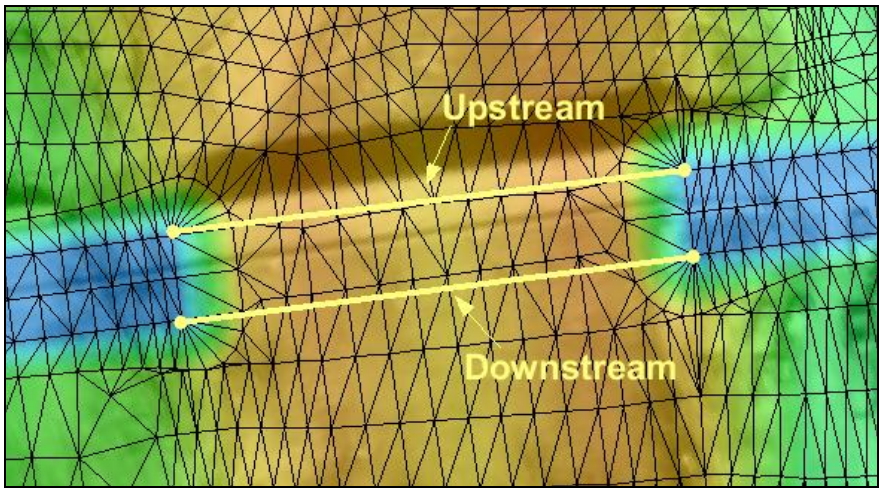

Figure 2 Location of the upstream and downstream bridge arcs

4 Defining the Bridge

With Bridge component created, the 2D bridge tools can be accessed to define the 3D bridge. To do this:

1. Right-click on the "3D Bridge" coverage and select **Edit Bridge** to open the *Bridge* dialog.

In this dialog, define the top, upstream, and downstream profiles as shown in the following sections. Profiles are defined by giving the bridge elevation at specified distances along the bridge arcs.

4.1 Top Profile

The top profile defines the highest point of the bridge. This may be the bridge deck, but could also be the guardrails. This example will assume the bridge has guardrails. To define the top profile, do the following:

1. Under the *Top Profile* section, click the **Edit** button to open the *XY Series Editor*.
2. Change *Number of Rows* to "2".
3. In the spreadsheet, enter the distance and elevation using the following values:

	Distance	Elevation
1	0.0	333.0
2	153.0	333.0

After completing the spreadsheet, a preview of the top profile will appear. In this case, the profile should be a horizontal line since the bridge will be level.

4. Click **OK** to close the *XY Series Editor*.

4.2 Upstream Profile

The upstream profile defines the elevations on the underside of the bridge on the upstream end side. To define the upstream profile, do the following:

1. Under the *Upstream Profile* section, click the **Edit** button to open the *XY Series Editor*.
2. Change *Number of Rows* to "4".
3. In the spreadsheet, enter the distance and elevation using the following values:

	Distance	Elevation
1	0.0	330.0
2	15.0	331.0
3	138.0	331.0
4	153.0	330.0

After completing the spreadsheet, a preview of the upstream profile will appear. In this case, the profile should be a horizontal line with a bevel at each end.

4. Click **OK** to close the *XY Series Editor*.

4.3 Downstream Profile

The downstream profile is made in the same way as the upstream profile. Adjustments can be made if the downstream arc is shorter or longer than the upstream arc. For this example, keep the downstream arc the same as the upstream arc. To create the downstream arc:

1. Repeat all steps in Section 4.2 for the *Downstream Profile* section.

5 Export 3D Bridge

With the profiles defined, the 3D bridge can now be exported to a file. To do this:

1. Click the **Export 3D Bridge** button to up a *Save* dialog.
2. Browse to the directory where the tutorial files are saved.
3. Enter "doublepipebridge.xmugrid" as the *File name*.
4. Click **Save** to finish creating the file and close the *Save* dialog.
5. Click **OK** to close the *Bridge* dialog.

SMS saves the bridge geometry along with a file containing the projection information for the bridge.

6 Viewing the Bridge

With the bridge file created, it can now be imported into the model.

1. Select *File* | **Open** to bring up the *Open* dialog.
2. Locate and select the file "doublepipebridge.xmugrid" and click **Open** to import the bridge.

The bridge will appear as a Ugrid object. To better see the bridge, complete the following:

3. Click the **Display Options** macro to open the *Display Options* dialog.
4. Select *UGrid: doublepipebridge – [Active]* from the list on the left.
5. Turn on *Cell face*s.
6. Click **OK** to close the *Display Options* dialog.
7. Use the **Rotate** tool and **Zoom** tool to view the bridge.

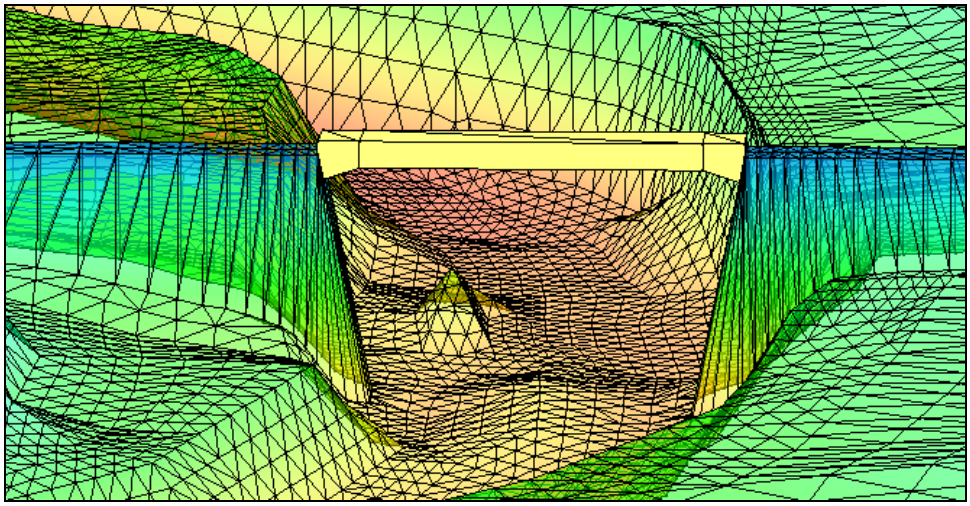

Figure 3 Imported 3D bridge

7 Conclusion

This concludes the "3D Bridge" tutorial. Feel free to continue to experiment with the SMS bridge scour tool, or exit the program.