

Density-Depth Tables in GM-SYS 3D Modelling

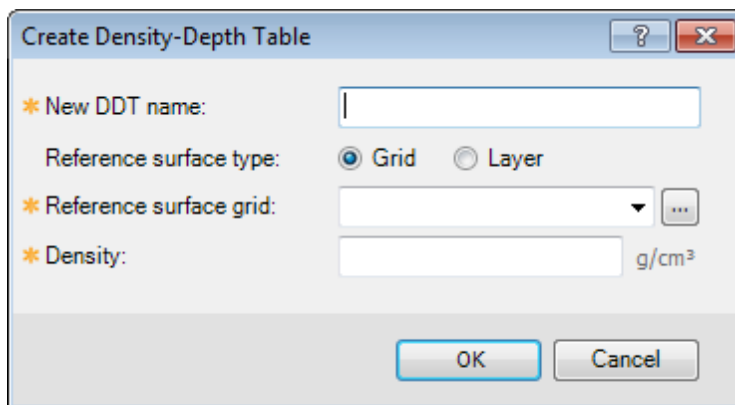
Sedimentary layers are sometimes characterized by gradually-increasing density with depth, due to sediment compaction. GM-SYS 3D can model this by assigning vertical density distribution to one or more layers in a model. The vertical density distribution is approximated by a Density-Depth Table (DDT). The DDT is defined in terms of offsets from a reference relief surface – typically a layer in the model, like bathymetry. Only one DDT may be defined for a model, but that DDT may be assigned to any number of layers in the model. The table may be created manually, using a function relating density to depth, or by importing an existing table exported from another model.

Create a Density-Depth Table Manually

Create a new Density-Depth Table for your model. The new Distribution will be created and displayed in the Properties panel. Here you may populate the table by entering offset-density pairs in the table.

To Create a Density Depth Table:

1. From the *DDT* menu select **Create DDT**. The *Create Density-Depth Table* dialog appears.



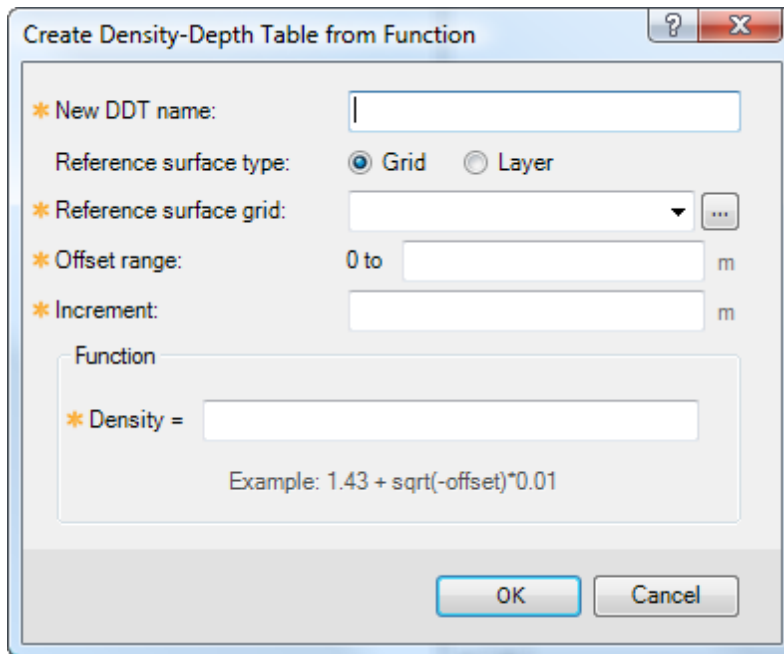
2. Specify a *New DDT name*.
3. Select whether the *Reference surface type* will be defined by an elevation grid in the workspace, or an existing layer in the model.
 - If the reference surface is a grid, select from grids in the workspace, or browse to find the appropriate grid.
 - If the reference surface is a layer within the model, select it from the list of model layers.
4. Specify the *Density* at offset = 0.
5. Click **OK**. The Density-Depth table is created and appears in the Model Explorer on the *DDT* tab.

Create a Density-Depth Table from Function

Define the Density-Depth Table (DDT) using a Geosoft expression relating Density to Depth. You may use any Oasis montaj expression operators. The new Distribution will be created and displayed in the *Properties* panel.

To Define a Density Depth Table Using an Expression:

1. From the *DDT* menu select **Create DDT from Function**. The *Create Density-Depth Table from Function* dialog appears.



2. Specify a *New DDT name*.
3. Select whether the **Reference surface** will be defined by an elevation grid in the workspace, or an existing layer in the model.
 - ▶ If the reference surface is a grid, select from grids in the workspace, or browse to find the appropriate grid.
 - ▶ If the reference surface is a layer within the model, select it from the list of model layers.
4. Specify the maximum *Offset* in the units specified. This must be a negative number larger than the **increment**.
5. Enter the *Increment*. This is the interval at which the function will be sampled. This must be a negative number smaller than the maximum offset.
6. Enter a valid expression for density as a *Function* of offset.
7. Click **OK**. The Density-Depth table is created and appears in the Model Explorer on the *DDT* tab.

Edit a Density-Depth Table

Select a Density-Depth Table (DDT) in the *DDT* tab of the Model Explorer and the table will be displayed in the Properties panel. You may edit the values in the table.

The offset is relative to the "reference" surface and must be increasingly negative value with depth. Invalid entries will be flagged as errors and must be fixed in order to change the table.

To Edit a Density Depth Table

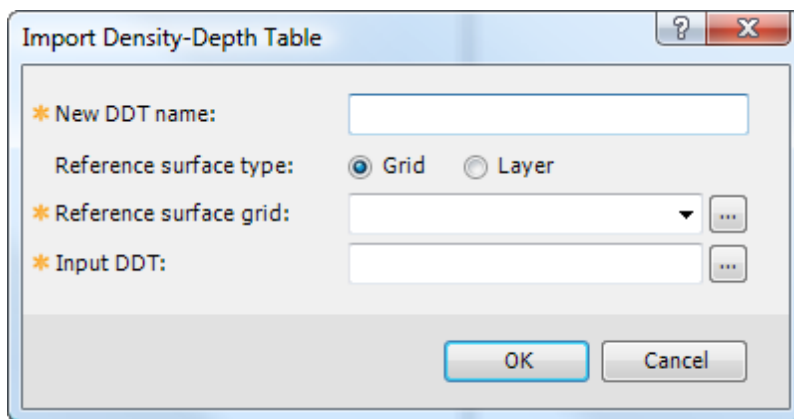
1. From the *DDTs* tab in the *Model Explorer*, select the Density-Depth Table to edit.
2. In the *Properties* pane, on the right side of the Model Explorer you can edit the *Offset* and *Density* as required.
3. Click **Apply**. The changes are saved to the selected Density-Depth Table.

Import a Density-Depth Table

Create a Density-Depth Table for your model. The new Distribution will be created and displayed in the Properties panel by importing an existing table from a text file.

To Import a Density Depth Table:

1. From the *DDT* menu select **Import DDT from File**. The *Import Density-Depth Table* dialog appears.



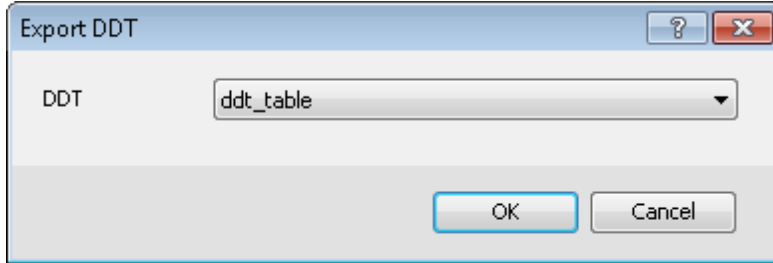
2. Specify a *New DDT name*.
3. Select whether the **Reference surface** will be defined by an elevation grid in the workspace, or an existing layer in the model.
 - ▶ If the reference surface is a grid, select from grids in the workspace, or browse to find the appropriate grid.
 - ▶ If the reference surface is a layer within the model, select it from the list of model layers.
4. **Browse** to select the *Input DDT* file.
5. Click **OK**. The Density-Depth table is created and appears in the Model Explorer on the *DDT* tab.

Export a Density-Depth Table

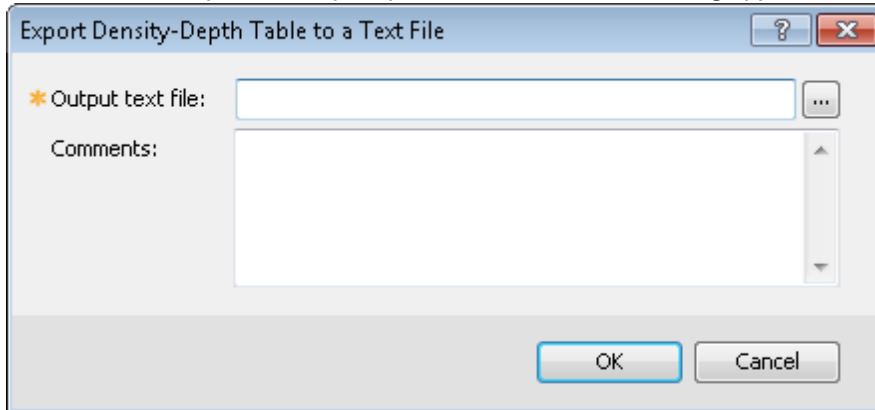
Export a Density-Depth Table to an ASCII file containing offset-density pairs. Header lines will indicate which fields contain offset and density, as well as the units used.

To Export a Density Depth Table

1. From the *DDT* menu select **Export DDT**. The *Export DDT* dialog appears.



2. From the dropdown list, select the **DDT** to export.
3. Click **OK**. The *Export Density-Depth Table to a Text File* dialog appears.



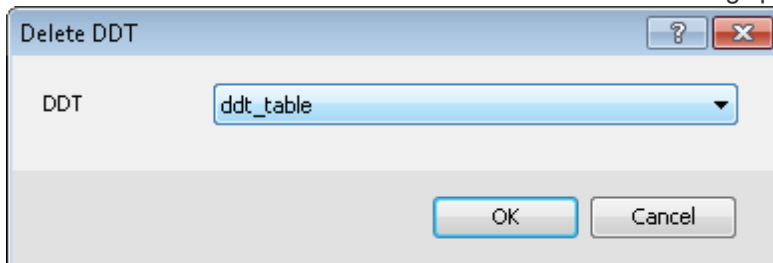
4. Specify the *Output text file* name and location.
5. Add any comments, if desired.
6. Click **OK**. The Density-Depth table is exported.

Delete a Density-Depth Table

Remove the selected Density-Depth Table from your model. All layers that reference the table as the density source will revert to constant density. This action is permanent.

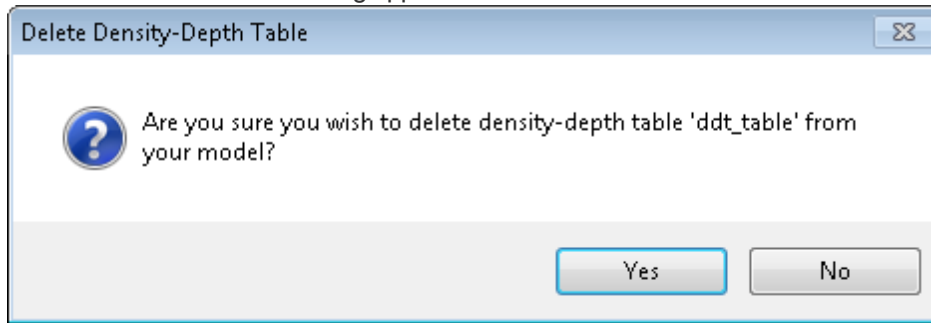
To Delete a Density Depth Table

1. From the *DDT* menu select **Delete DDT**. The *Delete DDT* dialog appears.



2. From the dropdown list, select the **DDT** to delete.

3. Click **OK**. A confirmation dialog appears.



4. Click **Yes** to confirm the deletion or No to cancel.

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