Tutorial 2: Test Data Correlation for a Transient Model

The model in this tutorial is a simple bar heated on one end and radiating to space. The conductivity and capacitance are not known but a test has been conducted.

Lesson 1: Get Started

Open barDemo-01.dwg

Lesson 2: Create a Data Logger Compare

1. Select **Thermal > Logic Objects Manager**. The Logic Manager window opens.
2. Right-click and choose **Create > Data Logger Compare**. The **Data Logger Compare** dialog opens.
3. Type something like **Bar test – 100 seconds** in the Comment field.
4. Since the test data was given the extension *.dlc, the file is already shown in the **Filename for input** field. If another file is desired, use the drop-down to select it or to browse for it.
5. Type **bar_test.dlo** in the **Filename for output** field.
6. Type **bar_test** in the **Variable Prefix String** field.
7. Select **TimeWeighted root of sum of squared values of the errors** from the **Type of comparison to perform** drop-down list.
8. Click OK to close the Data Logger Compare dialog.
9. Click OK to close the Logic Manager.

Review the test.dlc file in Notepad.

Lesson 3: Parameterize the model

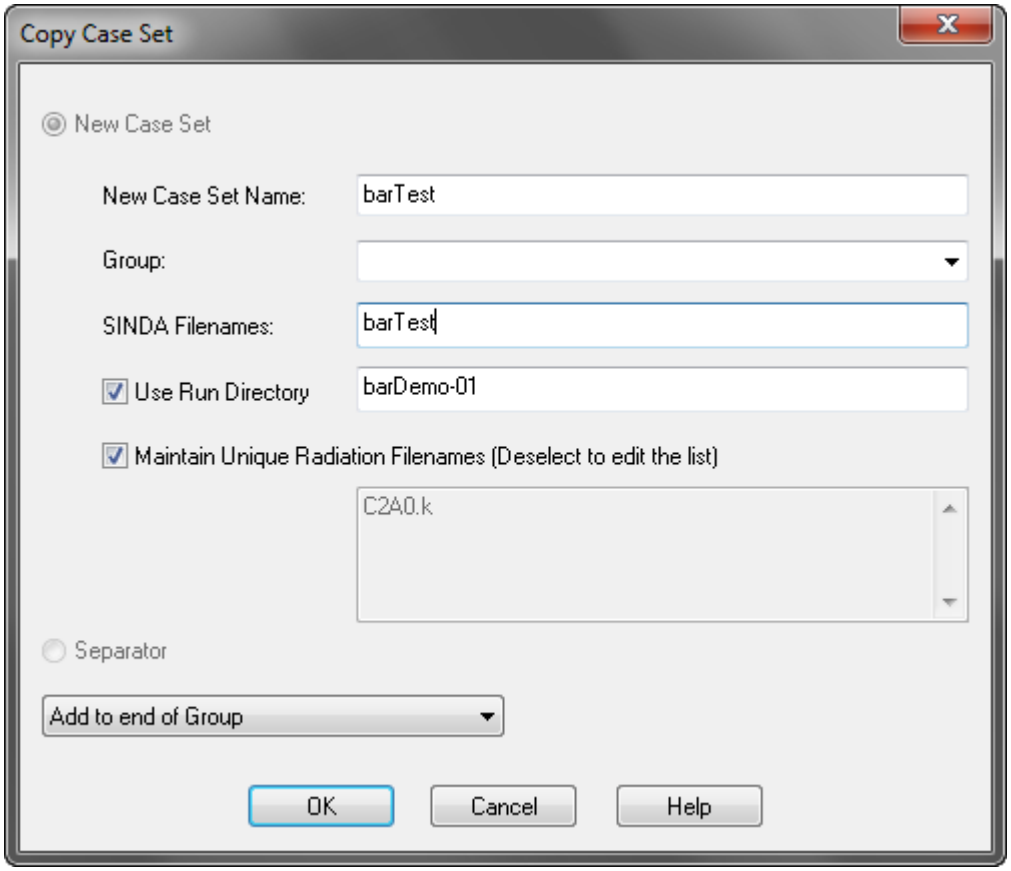
Some symbols have already been created but need to be applied to the model. The density and conductivity multipliers are a great way to modify properties (and even geometry) without having to modify a property database or the geometry itself, if the changes are not too large.

1. Double-click the bar. The FD Solid Edit dialog opens.
2. Select the **Cond/Cap** tab.
3. Double-click in the **Density Multiplier** field. The Expression Editor opens.
4. Right-click in the **Expression** field and select **General > density_factor**.
5. Repeat steps 3 and 4 for the **X-direction Cond Mult** and choose **conductivity_factor**. Since the bar only has nodes in the X direction, only the X-direction Cond Mult must be changed.
6. Click OK to close the FD Solid Edit

Lesson 4: Add and edit a Case Set

Copy a Case Set

7. Select **Thermal > Case Set Manager**. The Case Set Manager opens.
8. Click on the Case Set named **hotbar** and click **Copy**. The Copy Case Set dialog opens.
9. Change the fields to match the image below.



10. Select **OK**.
11. Select **Yes** for a message requesting to create a directory. This is a directory that will be used for all of the outputs of the run.

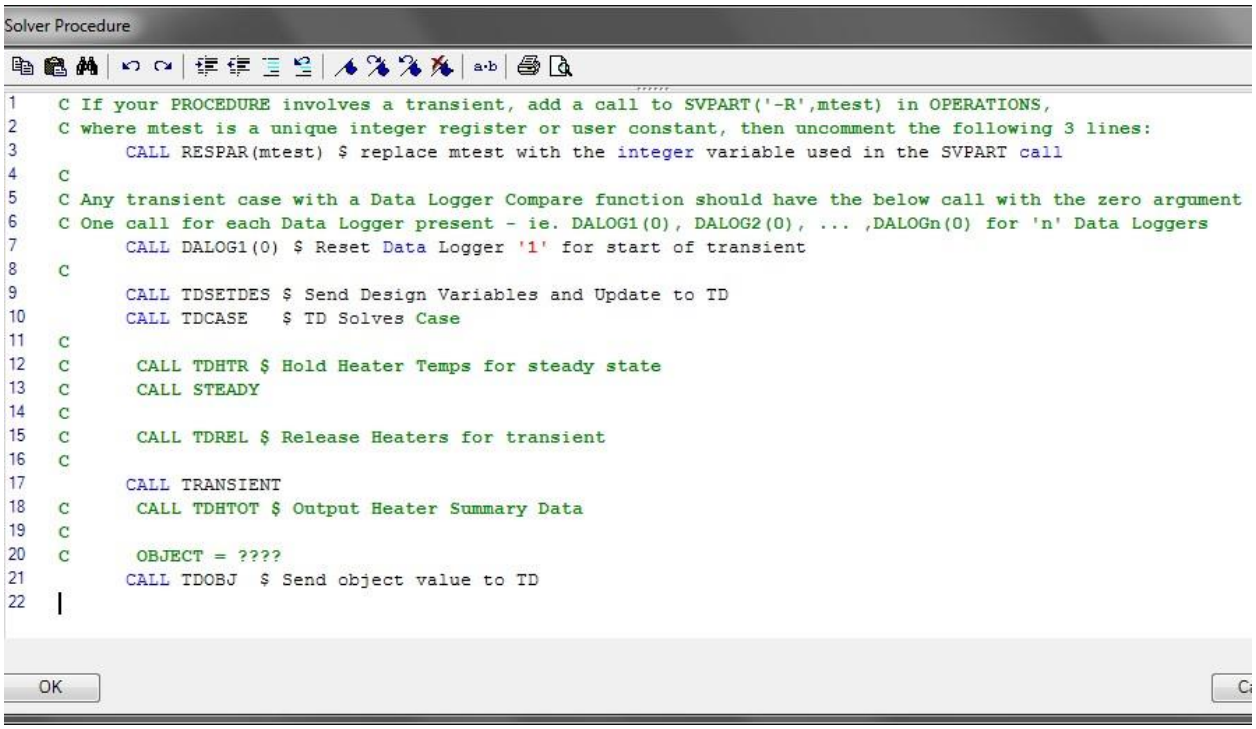
Edit the Case Set

1. Right-click on the **barTest** Case Set name and select Edit. The Editing 1 Case Set – barTest dialog opens.
2. Select the **SINDA** tab and double-click on OPERATIONS.
3. Replace the word **TRANSIENT** with **SOLVER**. This calls the Solver.
4. Click **OK**.
5. Select the **Dynamic** tab.

6. Check the box **Use Dynamic SINDA**. This allows the radiation and conductance and capacitance calculations to be updated.
7. Double-click on **Design** under Solver Data.
8. Choose the following as design variables and set the appropriate minimum and maximum values.

```
0.5 <= conductivity_factor <= 5
0.5 <= density_factor <= 5
```

9. Click **OK** to close the **Solver Design Variables** dialog.
10. Double-click **Control**.
11. Check **OBJECT Set From Data Loggers** 12. Click **OK**.
13. Double-click **Procedure**.
14. By deleting the C at the beginning of the lines, set up the PROCEDURE as shown below.



15. Note the first line of the text in PROCEDURE. This needs to be added to the operations block.
16. Click **OK** to close the Solver Procedure window.
17. Click the **SINDA** tab.
18. Double-click **OPERATIONS**. The Operations Data window opens.
19. Before the CALL solver line, type

```
<tab>CALL SVPART(mtest)
```

This line of code stores the initial conditions, so the next transient solution starts from the same place.

20. Click OK to close the Operations Data window.
21. Click **OK** to close the Editing 1 Case Set – barTest dialog.
22. Click **Run 1 Selected Case**. **Lesson 4: Review the Results**

1. While solving, the Dynamic Sinda Status window shows the current iteration, the value of cond, the value of emiss, and the value of Trad. The “test data” was generated by running the model with

- density_factor = 0.75
- conductivity_factor = 2 Review the DLO file.