6.3 Exercise 19: TEDDS Excel Link

The TEDDS Excel Link allows you to link your TEDDS calculations with Microsoft Excel spreadsheets by transferring data from TEDDS to Excel and from Excel back to TEDDS. Please note the Excel link requires at least Microsoft Excel 2000. The calculations used in the following simple example can easily be written in TEDDS without the need for the Excel link, the purpose of the example is simply to demonstrate the transfer of data between TEDDS and Excel.

6.3.1 Step 1 - Create the Spreadsheet

- *Open **Microsoft Excel** and create a new blank workbook with a single worksheet.*
- *Rename the **worksheet** TieDesign*
- *Type the following text to create a simple spreadsheet for a steel section tie design*

	A	B
1	Minimum yield strength	
2	Tie force	
3	Tie effective length	
4	Slenderness limit	
5	Design strength	=0.6*B1
6	Minimum gross section area	=B2/B5*10
7	Minimum radius of gyration	=B3/B4*100

If you enter appropriate values into the top four cells in column B then the remaining cells will update with the calculated results. Now that you have created a simple example you can link this spreadsheet to TEDDS. Before continuing save the workbook.

- *Save the **workbook** as "\My Documents\TEDDS\Excel\Steel Tie Design.xls"*

6.3.2 Step 2 - Create the TEDDS Excel Link Field

- *Either open the "**Steel Tie Design – with Input Table.doc**." that you created in the previous exercise and delete the formulae for Design Strength, Minimum gross section area and Minimum radius of gyration OR.*
- *Open a new blank document in **TEDDS for Word**.*
- *Type the following calculations which will define the input for your example spreadsheet. Use Input Fields or if you like.*

TIE DESIGN

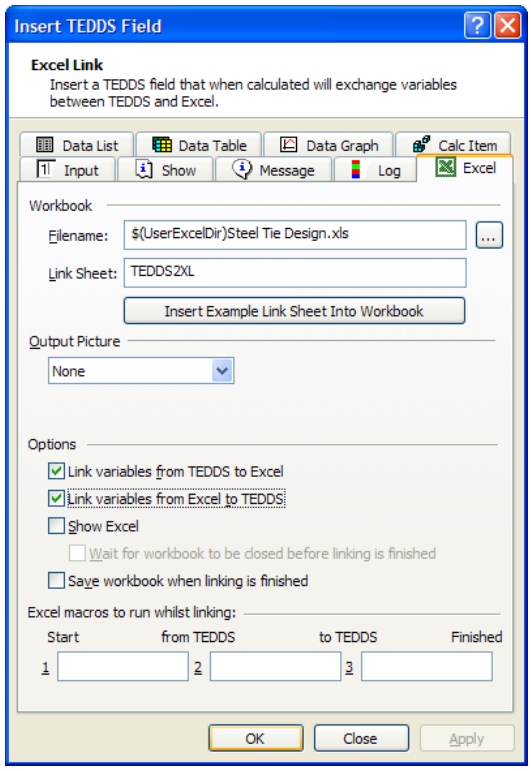
Minimum yield strength; F_y = 275 N/mm^2

Tie force; T_f = 450 kN

Effective length; L_e = 5 m

Slenderness limit; λ_l = 300

- *Ensure that your cursor is on the line beneath 'Slenderness limit; ……'*
- *Open the **Insert TEDDS Field** dialog and select the **Excel** tab.*
- *In the filename box enter the path of the **Steel Tie Design.xls** workbook that you created earlier using the browse button to locate the saved file.*



- *Click the button **Insert Example Link Sheet into Workbook**. This will open the example workbook in Excel and insert a TEDDS Excel link worksheet which includes instructions on how to link your spreadsheet to TEDDS. Save the workbook and close Excel.*
- *Leave the other options at their default settings and click **OK**. TEDDS will insert a new field into your document that when calculated will open your workbook and perform the necessary linking.*
- *Type the following at the end of the document to display the results of the spreadsheet calculations:*

TIE DESIGN

Minimum yield strength;	F_y = 275 N/mm^2
Tie force;	T_f = 450 kN
Effective length;	L_e = 5 m
Slenderness limit;	λ_l = 300
;	
Design Strength;	F_a = ?f1 N/mm^2
Minimum gross section area;	A_{MIN} = ?f2 cm^2
Minimum radius of gyration;	r_{MIN} = ?f2 cm

6.3.3 Step 3 - Create the Link Tables

You need to define which values will be transferred between TEDDS and Excel.

- *Go back to the Steel Tie Design workbook that you created earlier*
- *View the additional worksheet **TEDDS2XL**.*

This worksheet defines a list of variables that will be transferred from TEDDS to Excel and a second list of variables that will be transferred from Excel back to TEDDS. Read the documentation included on the worksheet which explains in more detail how the lists should be defined.

The **Variables from TEDDS** table defines the variables that will be read from your TEDDS document. When the TEDDS Excel link starts the value of each variable will be inserted into the value column automatically by TEDDS.

- *Modify the table **Variables from TEDDS** so that it defines the input variables as follows:*

	A	B	C	D	E
1					
2		VARIABLES FROM TEDDS			
3		Variable	Value	Unit	
4		F_{y}		N/mm^(2)	
5		T_{f}		kN	
6		L_{e}		m	
7		\6C_{l}			
8					

You now need to modify your example worksheet to use the input values.

- *Open the **TieDesign** worksheet*
- *Enter references in the first four rows of column B that refer to the value column of the **Variables from TEDDS** table you just created.*

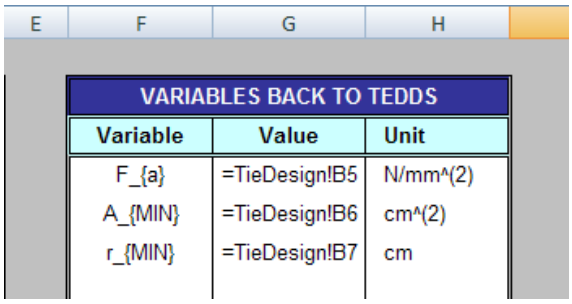
	A	B
1	Minimum yield strength	=TEDDS2XL!C4
2	Tie force	=TEDDS2XL!C5
3	Tie effective length	=TEDDS2XL!C6
4	Slenderness limit	=TEDDS2XL!C7

In order to complete the linking process you now need to define the values that you want to write back to your TEDDS document as variables, i.e. the results of the spreadsheet calculations.

- *Go back to the **TEDDS2XL** link worksheet.*

The **Variables back to TEDDS** table defines the variables that will be assigned by TEDDS when the Excel link is finished, the value of each variable will be read from the worksheet and written to the TEDDS document. In this example you have created cell references that refer to the calculated results in the **TieDesign** worksheet.

- *Modify the **Variables back to TEDDS** table so that it defines the output variables as follows:*



VARIABLES BACK TO TEDDS		
Variable	**Value**	**Unit**
F_{a}	=TieDesign!B5	N/mm^(2)
A_{MIN}	=TieDesign!B6	cm^(2)
r_{MIN}	=TieDesign!B7	cm

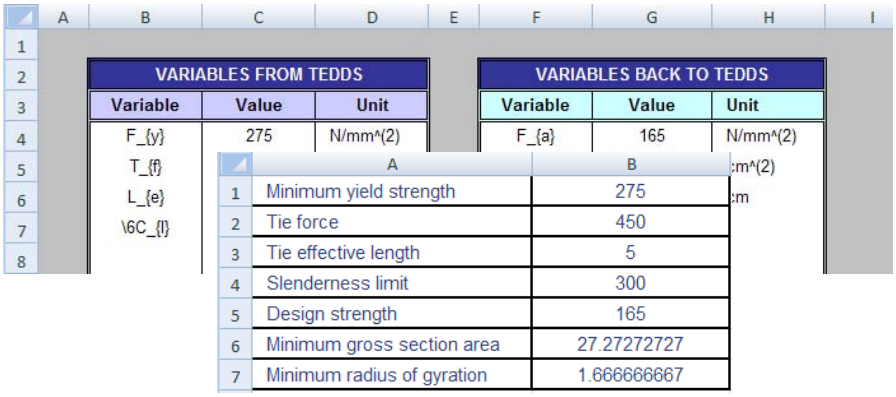
- *Save your workbook and close Excel.*

6.3.4 Step 4 - Running the Example

The link between TEDDS and Excel is now complete and you are ready to run your example.

- *Use the **Calculate All** command to calculate the TEDDS document.*

TEDDS will read the input variables you have defined in your document and copy the values to the Excel workbook. Excel will then update the tie design calculations based on the input data. TEDDS will then copy the calculated results back to your document. Finally the remaining expressions in your document will output the calculated results.



VARIABLES FROM TEDDS		
Variable	**Value**	**Unit**
F_{y}	275	N/mm^(2)
T_{f}		
L_{e}		
\6C_{l}		

VARIABLES BACK TO TEDDS		
Variable	**Value**	**Unit**
F_{a}	165	N/mm^(2)
A_{MIN}		cm^(2)
r_{MIN}		cm

	A	B
1	Minimum yield strength	275
2	Tie force	450
3	Tie effective length	5
4	Slenderness limit	300
5	Design strength	165
6	Minimum gross section area	27.27272727
7	Minimum radius of gyration	1.666666667

TIE DESIGN

Minimum yield strength; F_y = 275 N/mm^2
Tie force; T_f = 450 kN
Effective length; L_e = 5 m
Slenderness limit; λ_l = 300
;
Design Strength; F_a = **165.0** N/mm^2
Minimum gross section area; A_{MIN} = **27.27** cm^2
Minimum radius of gyration; r_{MIN} = **1.67** cm