Tekla Tedds e-Learning

Tedds Writing Calculations

Training manual

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Table of Contents

Conventions used in this guide

Typographical conventions

The following typographical conventions are used in this guide:

Header	Usage
Bold	Any text that you see in the user interface appears in **bold**. This font is used, for example, for window and dialog box titles, box and button names, and list items.
Italic bold	New terms are in ***italic bold*** when they appear in the current context for the first time.

Note boxes

The following types of note boxes are used in this guide:

A **tip** might introduce a shortcut, or suggest alternative ways of doing things.

A **note** draws attention to details that you might easily overlook. It can also point you to other information in this guide that you might find useful.

You should always read very **important notes and warnings**, like this one. They will help you avoid making serious mistakes, or wasting your time.

This symbol indicates **advanced or highly technical information** that is usually of interest only to advanced or technically-oriented reader

LESSON 1

1 Introduction to Calculation Writing

1.1 Session topics

- Introduction to the fundamental rules of writing calculations in Tedds for Word
  - Working with units
  - Defining variables
  - Writing expressions
  - Formatting results
  - Common error messages
- Pre-defining variables
- Linking information between calculations

1.2 Introduction to Calc Writing

1.2.1 Calc Writing Basics

Writing calculations in Tedds for Word is straightforward and is very similar to how you would write them by hand.

- You can use the same math symbols that we're accustomed to: + – * ÷ / ×( ) < > √
- You can also use common math functions: max, min, sum, abs, sin, cos, if etc. and raise a variable to a power using superscripts

Fundamental Rules for Writing Calculations

Variable names must comply with the following rules

- Names are case sensitive; i.e. A and a are different variables.
- Names can be no longer than 32 characters

Can contain:	**Cannot contain:**
Alphanumeric characters (A-Z, a-z, 0-9)	Spaces
Greek characters	Superscript characters; formatting other than subscripts is not allowed
Underscores (_)	Same name as an existing function (i.e. min, max)
The @ symbol	Cannot start with a number
Full stops (.)	
Commas (,) only as subscript	

- Units must be used in a mathematically sound manner; you cannot add a length to a force. There are common engineering practices that do not fit this criteria, for example √(f'c) would be written as √(f'c x 1 ksi) to result in ksi.
- For multiplication you must use either the insert multiplication symbol (×) command or the asterisk (*) symbol on your keyboard; you cannot use the letter 'x' it has no mathematical function.
- Equals signs (=) denotes text is to be calculated.
- Question marks (?) indicate locations of results or answers; X + Y = ?

- Spaces and tabs are ignored so they can be used to layout calculations.
- Lines of text and multiple equations in the same paragraph must be separated by a semi-colon (;).
  - This is known in Tedds as a ***Delimiter***.
  - The end of a paragraph is also treated as a delimiter and is defined by pressing 'enter' on your keyboard

Dead load; PDL = 350 plf

Live load; PLL = 600 plf

Factored load; Wu = 1.2 x PDL + 1.6 x PLL = ?F3 klf

Tedds Units

Tedds for Word can handle units and perform dimensional analysis on your equations. When performing calculations it uses a set of internal system units, known as ***Base Units***.

- Units are case sensitive
- Hold an accuracy of 15 decimal places.
- Units are stored and conversions applied automatically.
- Units are verified for dimensional accuracy.

Tedds Base Units			
Unit	***Metric Units***	***Imperial Units***	***Dimension***
Length	m	ft	L
Mass	kg	slugs	M
Time	s	s	T
Temperature	°C	°C	D
Angle	°, deg, degs	°, deg, degs	dimensionless

When performing calculations Tedds for Word:

- Converts all values and units into its base units using a comprehensive database.
- Stores this converted value.
- Performs all calculations in these base units.
- Stores any values derived by these calculations in these base units.
- Converts its base units into the units required for a final result field.
- Outputs the converted result using the correct format and precision.

Defining variables and expressions

There are two ways to define variables in Tedds

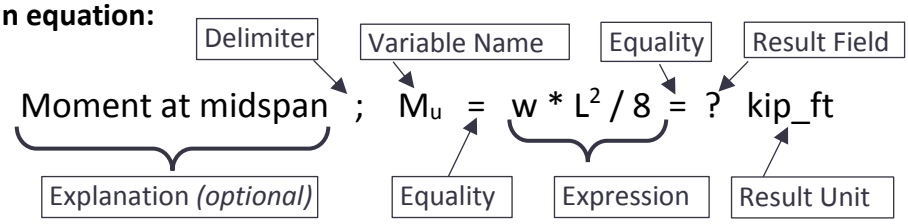
- Store variables as a value – Define variables by specifying the name and value
  wDL = 175 plf
  wLL = 300 plf
- Store variables as an expression – Variable name must start with $ you can then assign an expression to the variable
  $wDL = DL x L_{trib}
  $wLL = LL x L_{trib}

Tedds follows standard mathematical rules and uses standard mathematical operators, so equations can be written and calculated very easily.

- You must calculate the document or the expression to store the variable and update expressions
- Stored variables can be used in subsequent calculations
  Wu = 1.2 x wDL + 1.6 x wLL = ?F3 ksf
- Always indicate the result unit or values will be displayed in base units

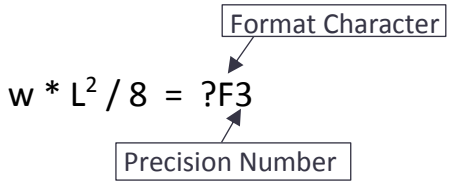
Within an expression, multiplication and division are calculated first and hold the same importance, they are calculated in order. Addition and subtraction are calculated second. Use parenthesis to ensure the correct order of operations.

Parts of an equation:



Formatting Results

You can set a results format and precision as you type the equation. Do this by typing a format character and a precision number following the result field symbol (?).



- The format character is not case sensitive.
- There cannot be a space between these characters: ?F3
- There is a limit of 9 decimal places.

These are the recognized format characters:

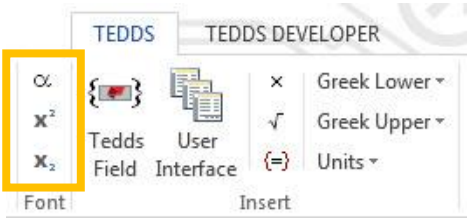
Format	Example
F - Fixed format	8396 = ?F3 = 8396.000 (decimal)
S - Scientific format	8396 = ?S3 = $8.396x10^3$ (decimal)
G - General format	8396 = ?G3 = 8396 (decimal)
E - Engineering format	8396 = ?E3 = $8.40x10^3$ (Significant Figures)

Calc Writing Tools in the Ribbon

Input text as greek letters

Input Text as superscript

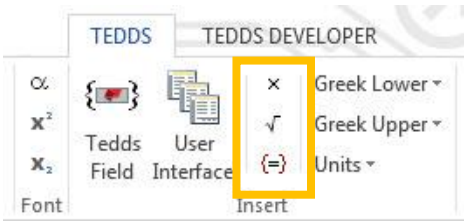
Input text as subscript



Multiplication symbol

Square root symbol

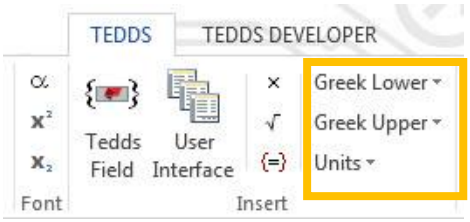
Descriptive equal sign



Input single Greek lower case letter

Input single Greek upper case letter

View or input units



Calc Writing Example

Input Equations

North beam spacing; S_N = 6 ft;
South beam spacing; S_S = 84 in;
Total tributary length; $L_T = (S_N + S_S)/2$ = ?F1 ft;
Total floor load; W_T = 150 psf;
Distributed load; $w = W_T * L_T$ = ?F2 klf;

Results

North beam spacing	S_N = 6 ft
South beam spacing	S_S = 84 in
Total tributary length	$L_T = (S_N + S_S)/2$ = 6.5 ft
Total floor load	W_T = 150 psf
Distributed load	$w = W_T * L_T$ = 0.98 klf

1.2.2 Error Messages

Error messages are displayed if an equation is calculated that doesn't follow the rules previously discussed.

Continue	carry on calculating
Interrupt	stop calculating and show the updated results
Abort	stop calculating without updating the results

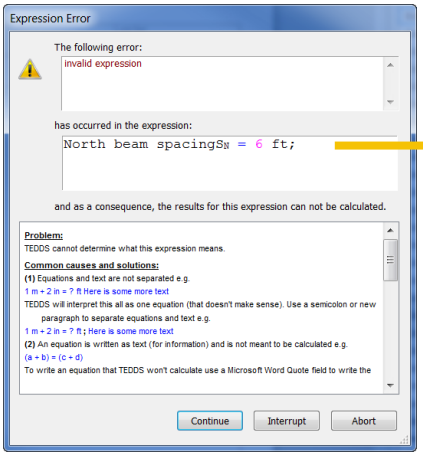
- Continue or interrupt will display the errors where they occur in the document in red text.
- Error messages indicate the type of error, location of problem and displays suggestions for solutions.

Common errors:

Invalid Expression	This message can represent several different errors relating to the inability of Tedds to calculate the expression. Examples include a missing semi-colon, a missing question mark or math symbol, or incorrect use of Greek, subscript or superscript formatted text.
Specified result units do not match dimensions of expression	Indicates the result's units do not match the dimensions of calculation in the equation. For example a length value added to a length value does not equal a force.
Undefined variable	Indicates a variable in the expression has not been previously defined in the variables list and so Tedds does not know what value to use. It could be that the variable has been defined in the document but has not been calculated or the variable name has been written differently in the expression to how it was originally defined.

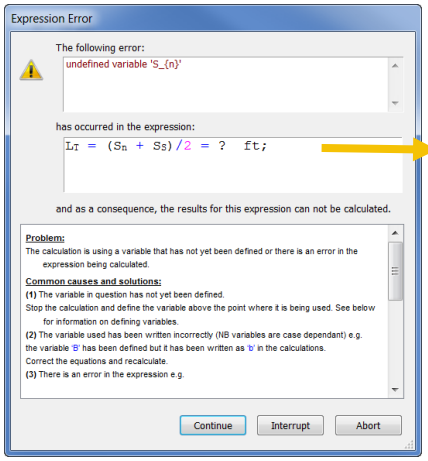
Error examples:

Missing semi-colon



North beam spacing	S_N = 6 ft<Error: invalid expression>
South beam spacing;	S_S = 84 in
total tributary length;	$L_T = (S_N + S_S)/2$ = 6.5 ft
Total floor load;	W_T = 150 psf
Distributed load;	$w = L_T \times W_T$ = 0.98 klf

Variable name not typed correctly



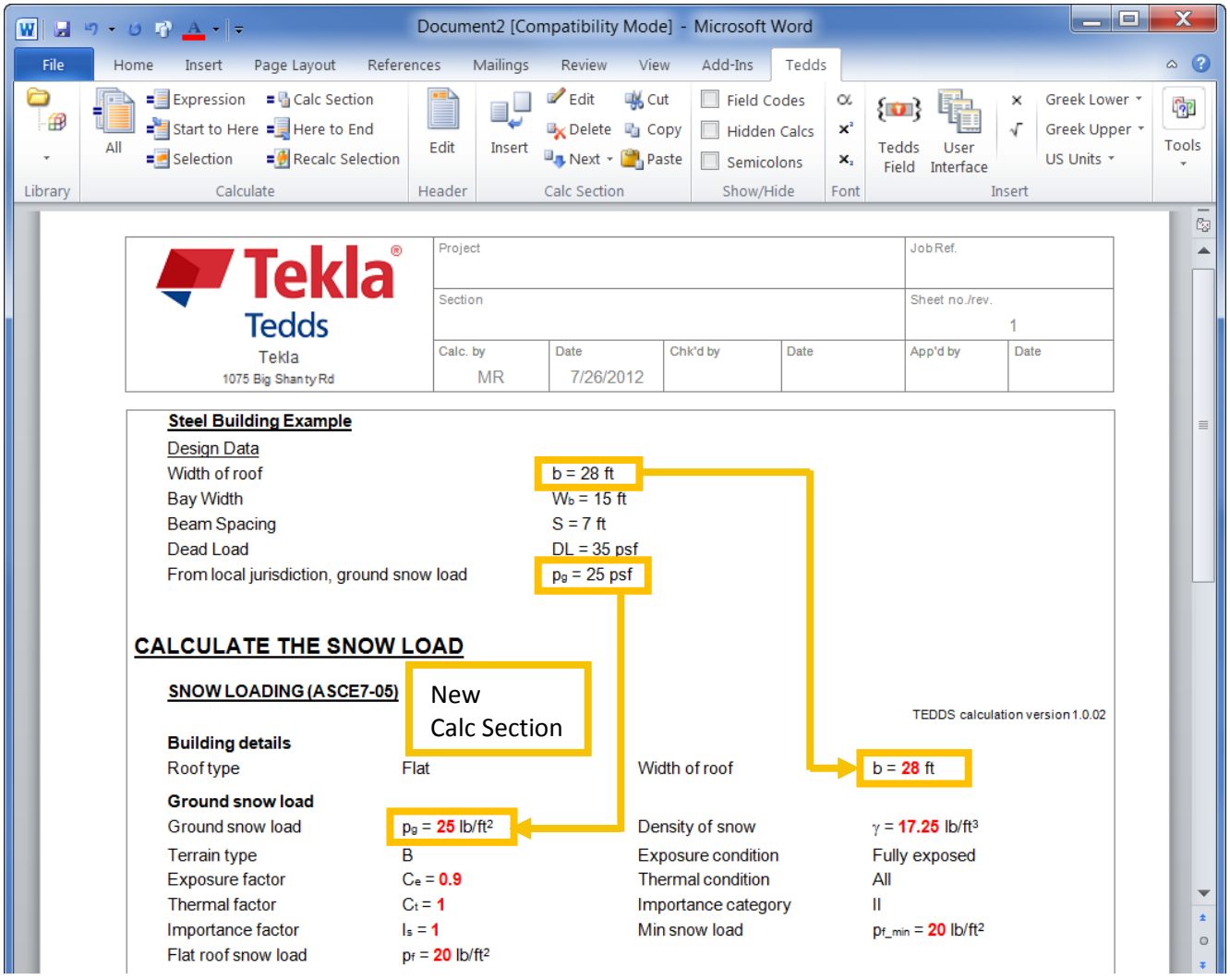
North beam spacing;	S_N = 6 ft
South beam spacing;	S_S = 84 in
total tributary length;	$L_T = (S_n + S_S)/2$ = ? ft<Error: undefined variable 'S_n'>
<interrupted by user>	
Total floor load;	W_T = 150 psf
Distributed load;	$w = L_T \times W_T$ = ? klf

1.3 Applying Calc Writing to Predefine Variables and Link Calculations

1.3.1 Predefining Variables

The calc writing basics can be used with the built-in library of calculations to input design data and predefine variables.

- You need to know the variable names in the calculation to predefine the values.
- Run the Tedds library calculation that you want to predefine variables for to determine the variable names.
  - The variable names have to be exact.
  - One 'Calc Section' cannot use variable values from another Calc Section.
  - Every 'Calc Section' can use document variables.
  - Define the document variable before any Calc Section
  - Calculate the document before adding any Calc Sections to make sure there are no errors.
  - Add the Library calculation to the document making sure to add a Calc Section when adding the calculation. When the calculation

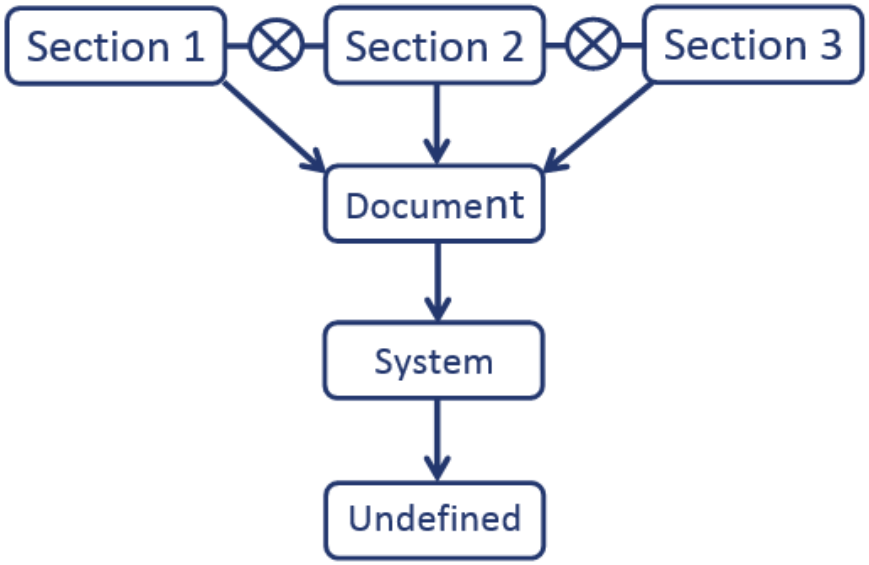


1.3.2 Recalculating the Document

- After calculating the document, the predefined variable values will now be stored in the **Calc Section**.
- Tedds looks first in the **Calc Section** variables list for values;
  - The user interface assigns the values of the variables and has now stored them as a calc section variable.
  - Since these variables are now defined if the document variables are changed when recalculating, this will not update the variable values in the **Calc Section**.

1.3.3 Variable Hierarchy

- When Tedds for Word is calculating a Calc Section, it will not use the variables defined in any other Calc Sections.
- To find the value of a variable Tedds will look for the value in the following order.
  - First in the Calculation Section
  - Second in the document variables list.
  - Third in the system variables list.
  - If the variable hasn't been defined in any of the above locations, then it is Undefined depending on your Tedds settings
  - You will either be prompted to enter a value or you will be shown an undefined variable error message.

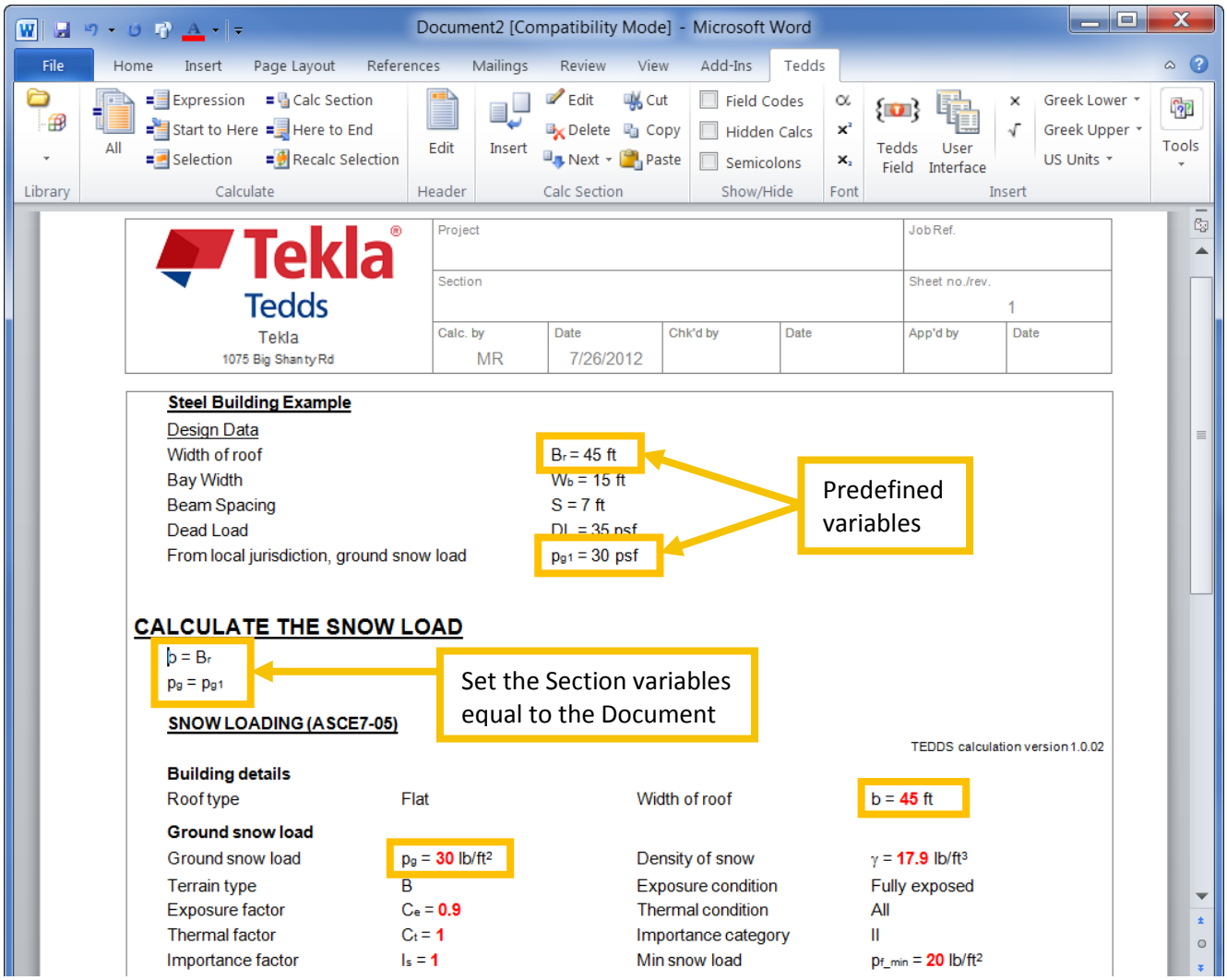


- If a Calc Section defines a variable, it will no longer look to the document variables when you recalculate the document
  - This is the case for any variables defined in a User Interface
  - This is not the case for a variable that is used only in an expression
- Correct way to predefine variables in a user interface:
  - Define a unique name to the document variable
  - In the Calc Section, set the section variable name equal to the document variable name

1.3.4 Modifying the Predefined Variables

A workaround to keep the values linked to the document variables is to use different names when predefining variables.

- Make sure your predefined variable names do not occur anywhere else in document.
- Additional equations also need to be added at the start of the Calc Section, BEFORE the Tedds library calculation.
- The additional calculations will copy the values from the predefined variables to those variables used by the calculation each and every time the Calc Section is calculated.
- You can then change the values of the predefined variables at the start of the document and all subsequent Calc Sections will be able to use the modified values.

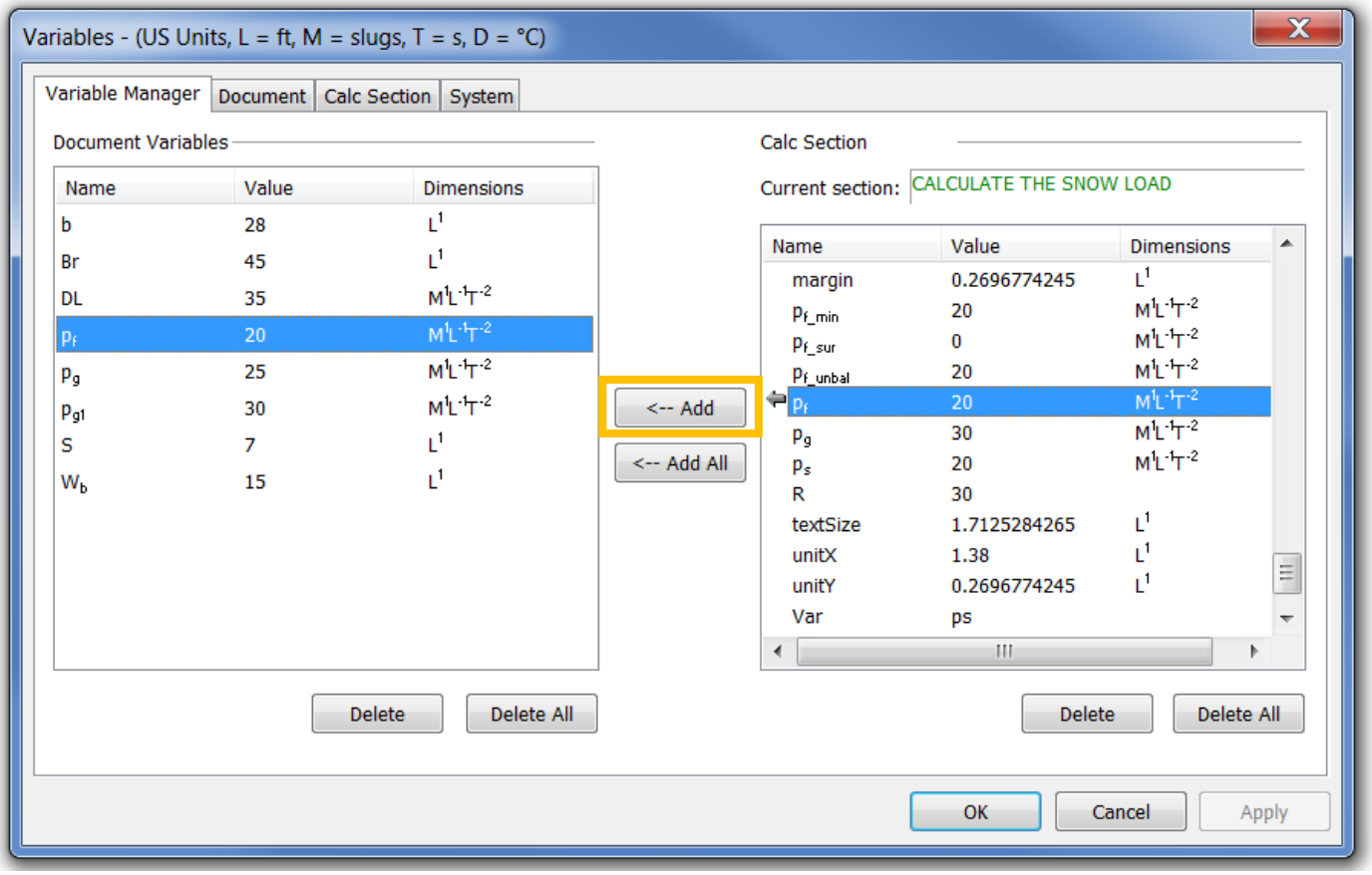


1.4 Linking Calculations

Results from one calculation can be used in subsequent calculations by linking the **Calc Sections**. Since variables are kept separate in their own **Calc Sections** they need to be manipulated in order to accomplish this.

1.4.1 Promoting Variables

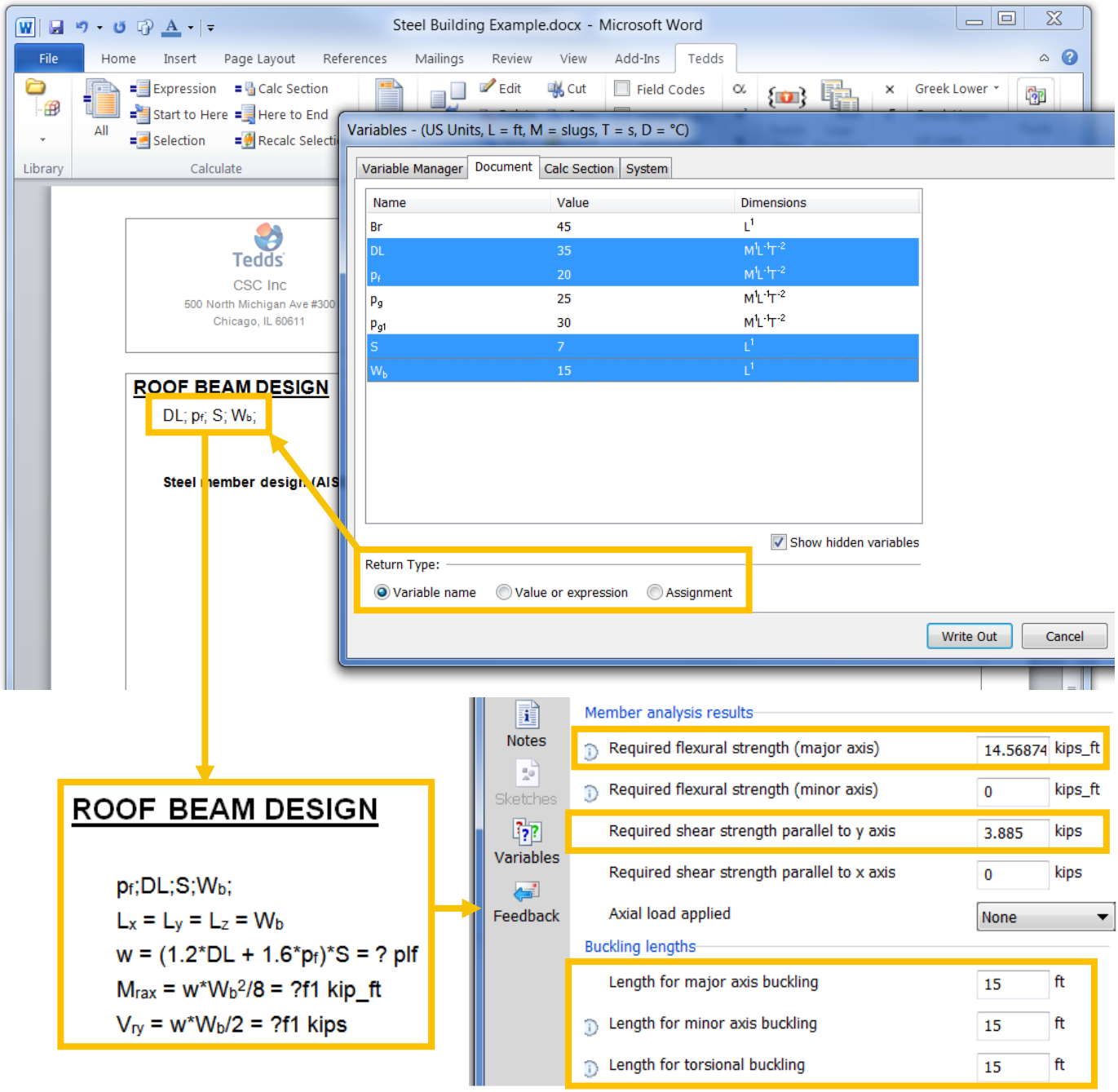
One way to transfer information between **Calc Sections** is to ***promote*** a section variable to a document variable. All **Calc Sections** have access to the **Document Section** allowing all subsequent calc sections in the document to use this variable.



- Promote variables in the **Variable Manager**
- Select the variable from the **Calc Section** that is to be promoted and **Add** it to the document variables list.
- Once a variable has been promoted, any following **Calc Section** will be able to use it.
- Variables should only be promoted this way if they do not occur in any other Calc Sections.
- You can also promote a variable by using a function; this will be introduced in the next session.
- You can also use a Calc Section variable in another section using the function that gets the variables; this will be introduced in the next session.

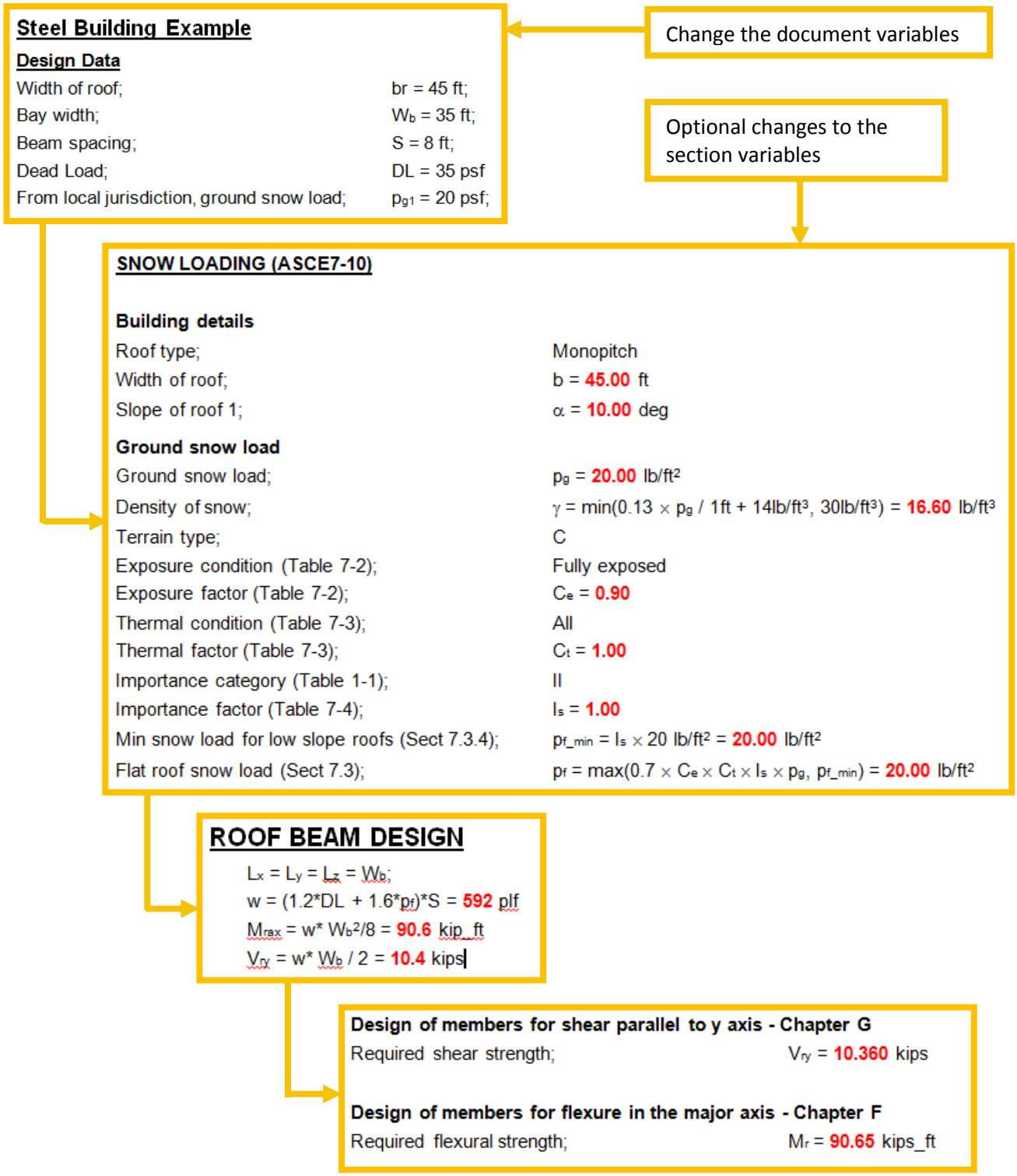
1.4.2 Creating the Links

- When linking calculations, remember the basic calc writing rules.
- Use Word's copy and paste commands to copy variable names to avoid typing errors and ensure that you are using the correct variables.
- Use the ***Write Out*** feature in the Variables list to return exact variable names.
- These variables can then be used in calculations or to predefine the variables in Library Calculation.



1.4.3 Recalculating the Document

The calculations are now properly linked. You can make changes to the document variables, recalculate the document and those changes will be reflected in the subsequent calculations.



LESSON 2

2 Introduction to Tedds Fields and Functions

2.1 Session Topics

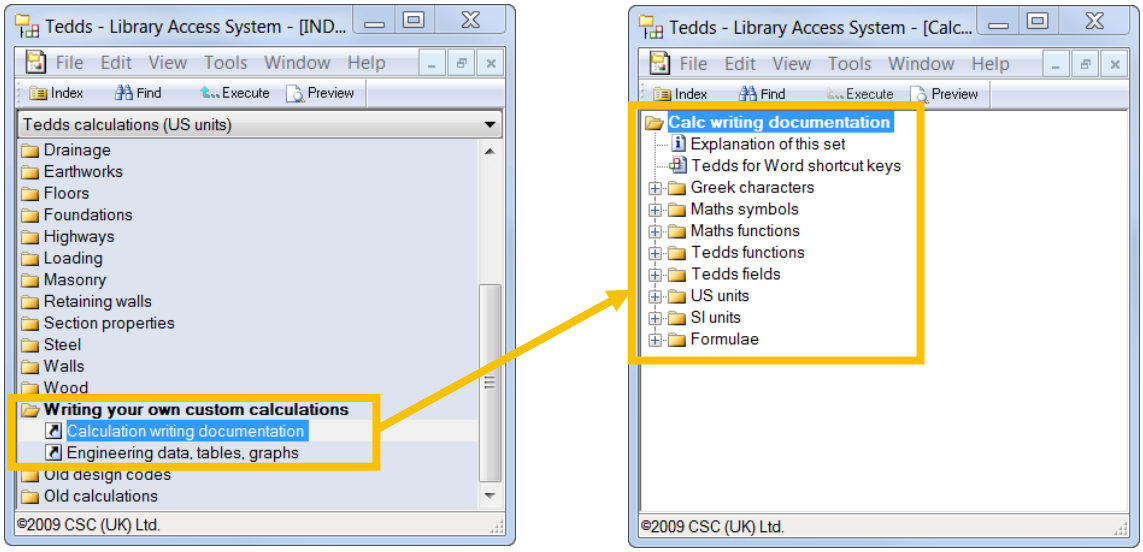
- Introduction to functions
- Creating a dynamic table
- Introduction to and working with Tedds Fields

2.2 Functions and Dynamic Tables

2.2.1 Introduction to Functions

Any function can be used directly in Tedds expressions. These can be mathematical functions or specific Tedds functions.

- Examples of mathematical functions include; tan(x), log(x), max(x,y,z,…), abs(x) etc.
- A list of functions can be found in 'Tedds Help' – type "operators" in the search bar and double click on it in the results.
- A list of functions with explanations and examples are available in the Library Access System > General utilities and tools > Calc writing aids



There are several Tedds functions that will help transfer information between built-in calculations and in calculation writing.

- Function names are not case sensitive.
- The most common functions used with the built-in library calculations and typical calculation writing are Logic and Variable functions, these will be discussed in this session
- String functions are used to display text, primarily used in the User Interface
- Drawing functions are used to create Active Sketches; this is discussed in Tedds Expert sessions.

2.2.2 Tedds Logic Functions

The main use of logic functions is to create conditional statements to refine a calculation and perform an advanced check.

- **Logic functions** are used in many code based design manuals and you can use them in your calculations in the same manner
- Familiar functions include: And, Equal, Greater Than, and many more…
- The basic formatting for writing out a function in Tedds includes the following:
  function($value_1$, $value_2$, $value_n$) = ?
- One of the most common logic functions is the **if statement**; this is an advanced logic function.
  - In its simplest form, the basic make-up of an if statement contains a condition with possible results:
    If(condition,x,y) = ?
    If "condition" is **met** then the value of "x" will be returned
    If "condition" is **not met** then the value of "y" will be returned
- Logic functions can be expanded to check several different conditions, this is most commonly done with the if statement.
- Additional forms of "statements" allow you to further refine the calculation and check different conditions
  - The if(and()) statement can be used to check if two simultaneous conditions are met
    If(and (condition A, condition B), x, y) = ?
    If **both conditions** A and B are true, then the value of "x" will be returned
    If **neither** condition is true then the value of "y" will be returned
  - the ifelseif() statement allows you to check two different conditions and return a result depending on which condition, if any, is satisfied.
    Ifelseif(condition A, x, condition B, y, z)
    If condition A is **met** then the value of "x" will be returned
    If not, check condition B. If condition B is **met** then the value of "y" will be returned
    If **neither** condition is true then the value of "z" will be returned

2.2.3 Tedds Variable Functions

Variable functions can be used to manipulate variables.
Useful variable functions:

PromoteVariable(“variable name”) = ?

- Promotes variable from Calc Section to document, this is an alternative to the variable manager.
- It is most useful if you are planning on publishing your calculation

GetSectionVar(sectionID,”variable name”,default) = ?

- Returns the value of the calc section variable from a different section into the current section
- This is useful for creating dynamic summary tables
- A default value can be used if no value exists in the specified section

GetVar(“variable name”,default) = ?

- Returns the value of a variable in the current calc section or a document variable
- A default value can be defined if the variable doesn’t yet exist
- This is useful when creating a user interface

VarExists(“variable name”) = ?

- Check is a variable exists in the document.
- Returns 1 if variable exists and 0 if it doesn’t
- Commonly combined with If statements to perform calculations dependent on whether a variable exists

There are several other variable functions available in Tedds. We encourage you to explore them within the program and contact the support department with any questions.

2.2.4 Using Tedds Functions

Promoting Variables

In the example from session 1 we can use a function to promote the snow load calculation **pf** instead of using the **Variables** Manager.

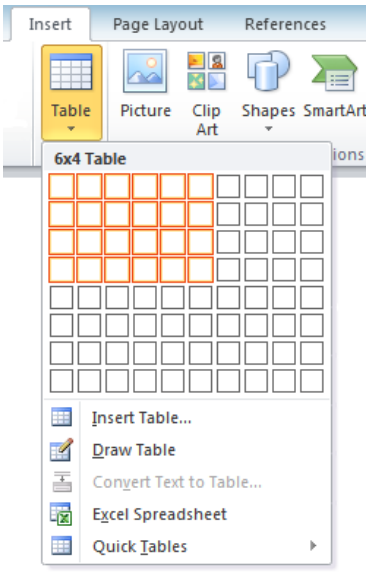
Monoslope

Sloped roof snow load p_s = **31.5** lb/ft²

PromoteVariable("p_f") = **1.00**

- You can type out the command at the end of the calculation
- Start with a semi-colon before the function to separate the library calculation from the added calc.
- The variable is promoted during the calculation and can be viewed in the document list after the calculation is run.

Creating a Dynamic Table



Microsoft Word's built-in Table features can be used in our Tedds calculations to organize input or summarize results. Variables and functions can be used to populate the table.

Insert a Table in your document using Word tools:

- Use tables to organize inputting variables.
- For summaries, place tables in their own Calc Section.
- Format tables the same way as in regular Word.
- Separate text and calculations in the tables with semi-colons.

Define variables and call variables from other Calc Sections into the table.

- To show the value of a document variable without re-assigning a new value, use the **GetVar** function
- Use the descriptive equals sign in the Tedds Ribbon as needed
- Assign new variable names as previously.
- Use the **GetSectionVar** function to show values from other Calc Sections
- Write out equalities and units.
- Hide unwanted texts that are necessary for calculations (useful keyboard shortcut: **Ctrl + Shift + h**)

CALCULATION SUMMARY

Loading;		Bending;		Shear;	
Dead =;	GetVar("DL") = 35.00 psf;	Mu =	GetSectionVar(2,"M_r") = 113 kip_ft;	Vu =	GetSectionVar(2,"V_{ry}") = 12.9 kips;
Snow =;	GetVar("p_f") = 31.50 psf;	ϕMn =	GetSectionVar(2,"M_c") = 139 kip_ft;	ϕVn =	GetSectionVar(2,"V_{cy}") = 102.0 kips;
		UR_1 =	Mu/ϕMn = 0.81;	UR_2 =	Vu/ϕVn = 0.13;

CALCULATION SUMMARY

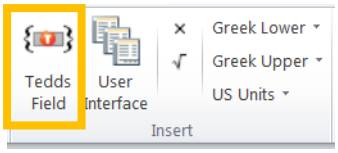
Loading		Bending		Shear	
Dead =	25.00 psf	Mu =	10 kip_ft	Vu =	2.8 kips
Snow =	10.00 psf	ϕMn =	139 kip_ft	ϕVn =	102.0 kips
		UR_1 =	0.07	UR_2 =	0.03

2.3 Introduction to Tedds Fields

Tedds for Word has specialized fields to enhance the look of a calculation and make it easier for other people to use it.

There are many types of fields including:

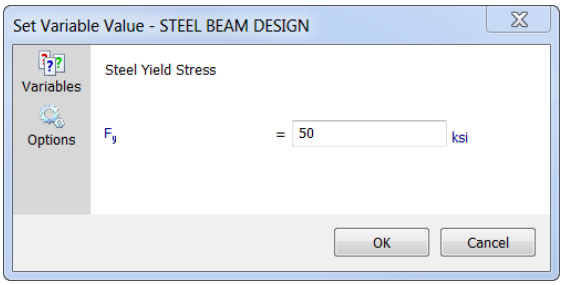
Input Fields	Creates a dialog box for inputting a variable value
Data Fields	Includes data lists, data tables and data graphs
Output Fields	Includes message, log and show fields
Calc Item Field	Inserts saved calculations into a document
Excel Field	Links with Microsoft Excel



- All Tedds fields are inserted by using the ***Tedds Field*** command in the Tedds Ribbon.
- The fields will be inserted into the document wherever the cursor is located when the Tedds Field command is used.

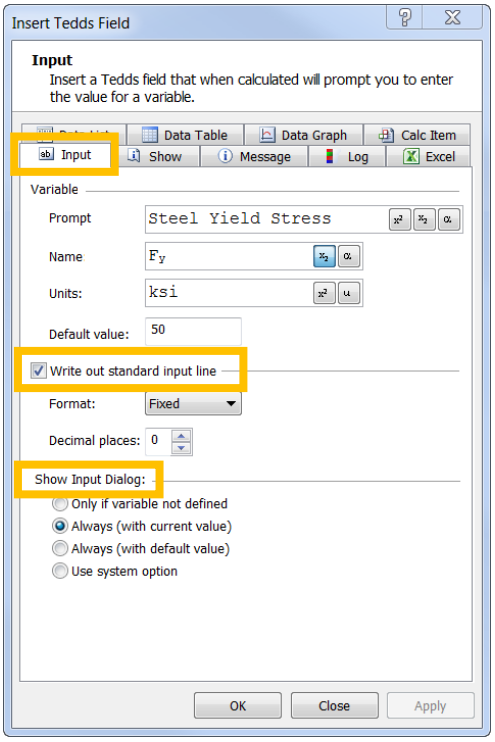
2.3.1 Tedds Input Fields

Input fields are used to define the values of variables.



- A single dialog box appears on-screen when the document is calculated allowing you to assign a value to the variable.
- Input boxes can be used to define all variables in the document
- The text for the variable description and definition are automatically output to the document.

Text boxes and settings that control input fields:



Prompt	The description of the variable
Name	The variable name
Units	The unit the value of the variable should be given in
Default value	Preliminary value to be displayed in the dialog
Write out standard input line	If this is not ticked then no text will appear in the document to show the value of the variable being defined
Format	Sets the result format for the variable value
Decimal places	Sets the number of decimal places for the result

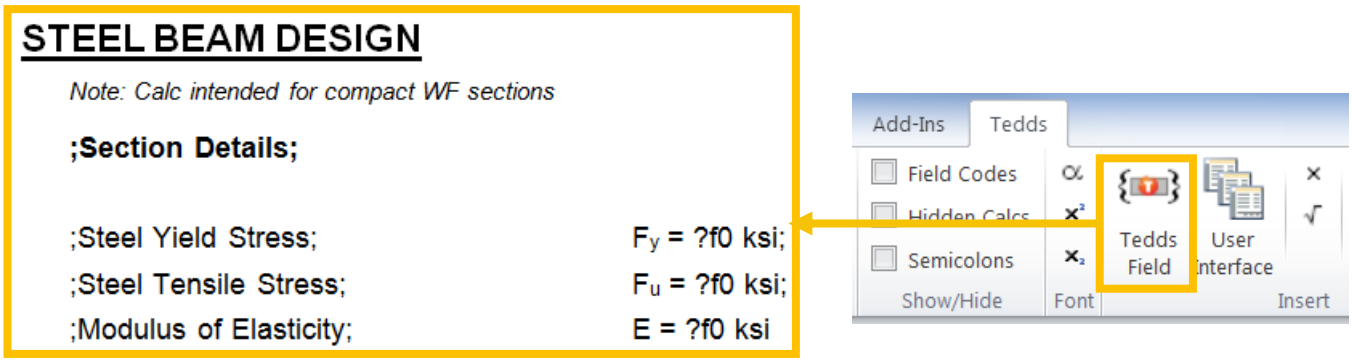
Options for the 'Show Input Dialog':

If the option is checked:

Only if variable not defined	The input dialog will only appear if the variable's value has not yet been defined
Always (with current value)	The input dialog will appear every time the field is calculated, always displaying the value that was previously entered the last time it was calculated. The value can still be changed
Always (with default value)	The input dialog will appear every time the field is calculated, always displaying the default value you have set here. The value can still be changed
Use system option	When the field is calculated it will follow whichever of the above 3 options has been set as the default. This default setting can be changed in Tedds Options.

Calculating Tedds Input Fields

- Once the Input field has been inserted, a line of text will appear in the document
- This text will look quite similar to the line of text already in the document that is being replaced by this field
- Semi-colons will appear at the start and end of the newly inserted text to show the start and end of the field
- Instead of displaying the numerical value previously entered into the document, the input field displays a '?F0'



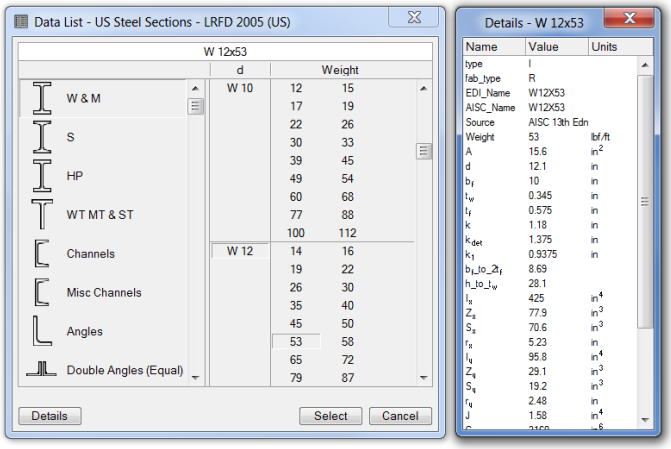
When the document is calculated the input box will be displayed based on the settings established for the field.

- Based on the input settings the dialog box will be blank, have a default value, or display the previously defined value.
- This can either be confirmed, by clicking **OK**, or changed by typing into the dialog.

2.3.2 Tedds Data List & Data Table Fields

Tedds has built-in data lists and tables that make it easy for you to input a large amount of data into your document. An example of a data list is the steel section size selection table in the built-in Beam and Column calculations. An example of a data table is the one used in the seismic loading calculation to determine the lateral force resisting system with corresponding factors.

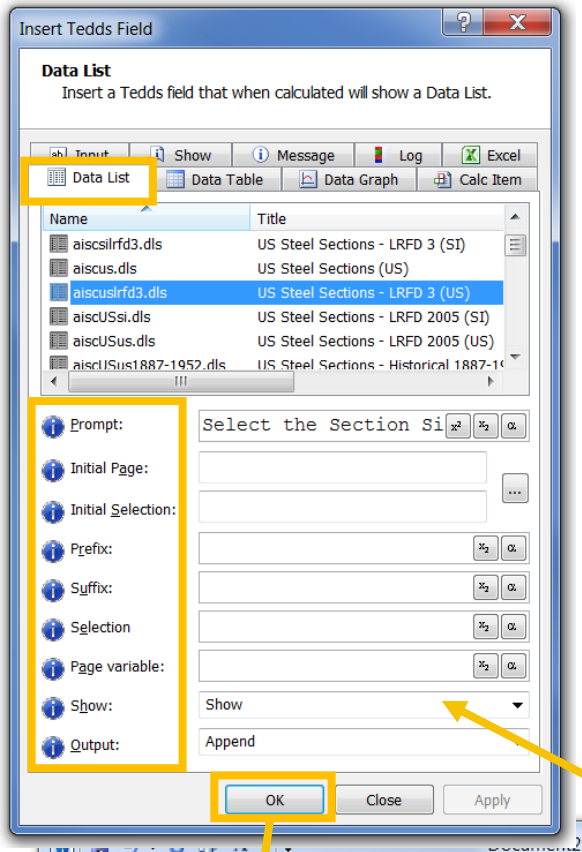
- These can be inserted in your own documents as a Tedds Fields.
- They contain items with predefined variables associated with them.
- Available lists include:
  - section properties
  - grade stresses
  - design strengths and more
- The built-in data fields cannot be modified.
- You can create your own custom data list or table
- Contact support for more information



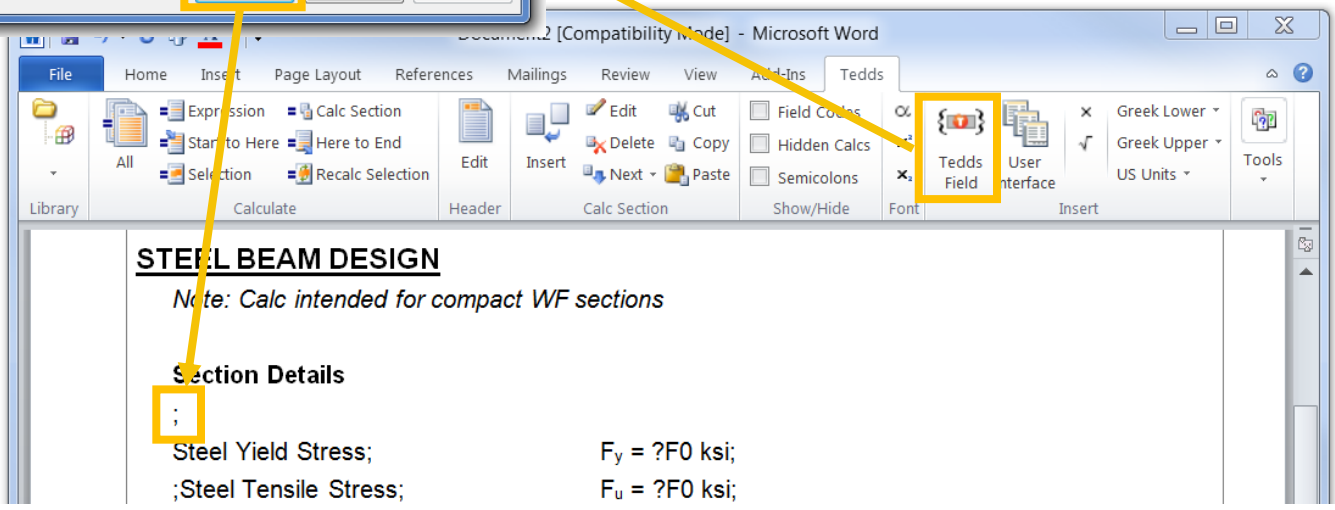
Inserting a Data List Field

Inserting a **Data List** Field is similar to inserting an **Input Field**.

- Data list fields are inserted by using the **Tedds Field** command and going to the **Data List** tab.
- The fields will be inserted into the document wherever the cursor is located when the Tedds Field command is used.



Prompt	Text that describes the selection, only displayed in Data List
Initial Page	Name of page displayed when data list is first run
Initial Selection	Default section size that is selected when first run
Prefix	Text is prefixed to selected item text written to document
Suffix	Text appended to the variable names
Selection	Sets variable name to selection that is stored for recalculating
Page Variable	Variable name used to store currently selected page
Show	Determines if Data List user interface is shown. If the value is 0 (Hide) the Data List is shown if the current selection cannot be determined, for any other value it is always shown
Output	Determines if the prefix text and selected item text are written out to the document. If this value is 0 (Discard) nothing is written to the document, for any other value the text is written to the documen

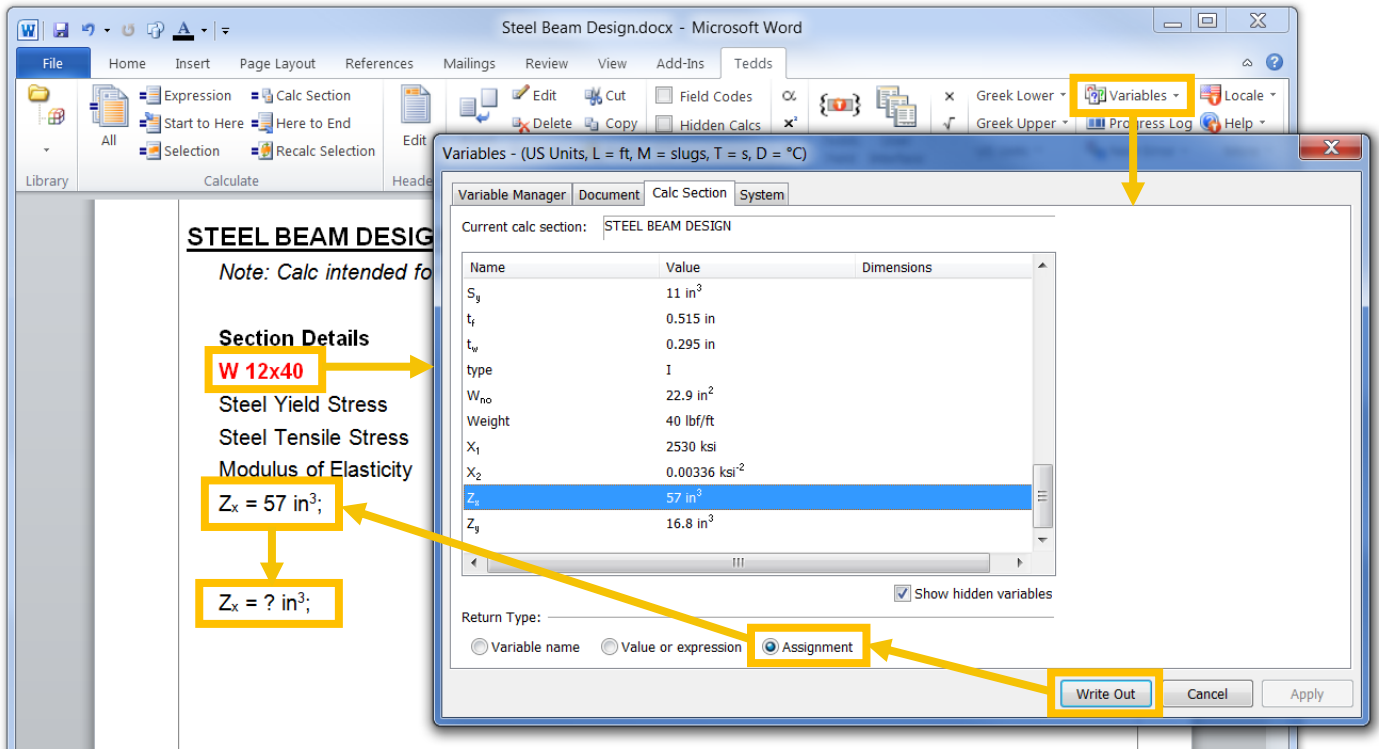


- A single semi-colon will appear in the document to show where the field has been inserted.

Calculating Data Lists and Using the Variables

Depending on the output options selected for the Tedds field, once calculated the result will display the section size that was selected. The data list must be calculated for the associated variables to be stored in the Variable Manager.

- All variables associated with the selection you make will be stored in that documents appropriate variable list.
- These variables can then be used in the same way as any other variables that you have defined.
- Key values from the data list's selection could be displayed by typing them into the document.
- Alternatively, the variable manager could be used to **write out** these variables into the document.



- The information will be placed in the document wherever the cursor is located.
- Values that are output are just values and will not be linked to the variable.
  - In order to have the value updated with the section selection, replace the value with a question mark.

2.3.3 Tedds Output Fields

Output fields are created the same way as Input Fields. The best way is using the **Tedds Field** command in the ribbon. There are three kinds of output fields:

Message Fields Displays a message during the calculation in a dialog box. The information given must be acknowledged before the calculation can proceed. No text is returned to the document except a semi-colon representing the Tedds field.

Log Fields Displays the information in the progress log instead of a separate dialog box. The information does not need to be acknowledged. No text is returned to the document except a semi-colon representing the Tedds field.

Show Fields Displays information in the document once the file has been calculated.

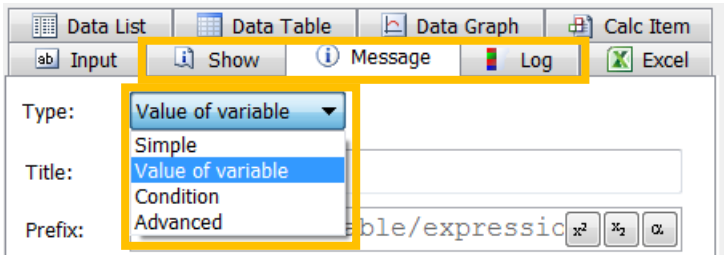
All output fields will have four options for the type of field to be created; this controls the type of information given by the field.

Simple Displays some text or information.

Value of Variable Can be used to give you the value of a specific variable already calculated in the document.

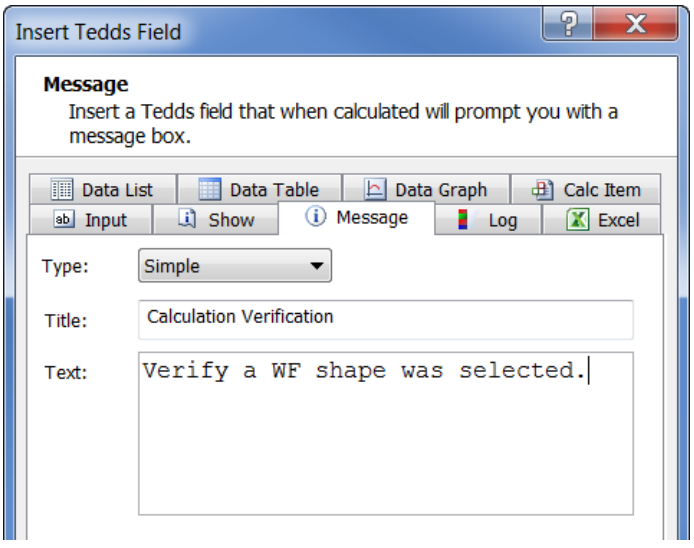
Condition Can be used to display different information that will change depending on the condition you set.

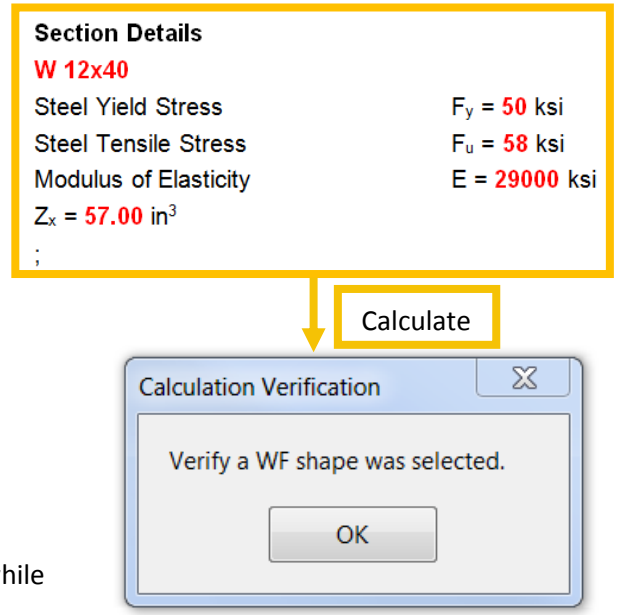
Advanced Allows you to combine the other options into a single field.



Inserting and Calcluating a Messsage Field

The purpose of Message Fields is to display information and require that the user confirm the message.

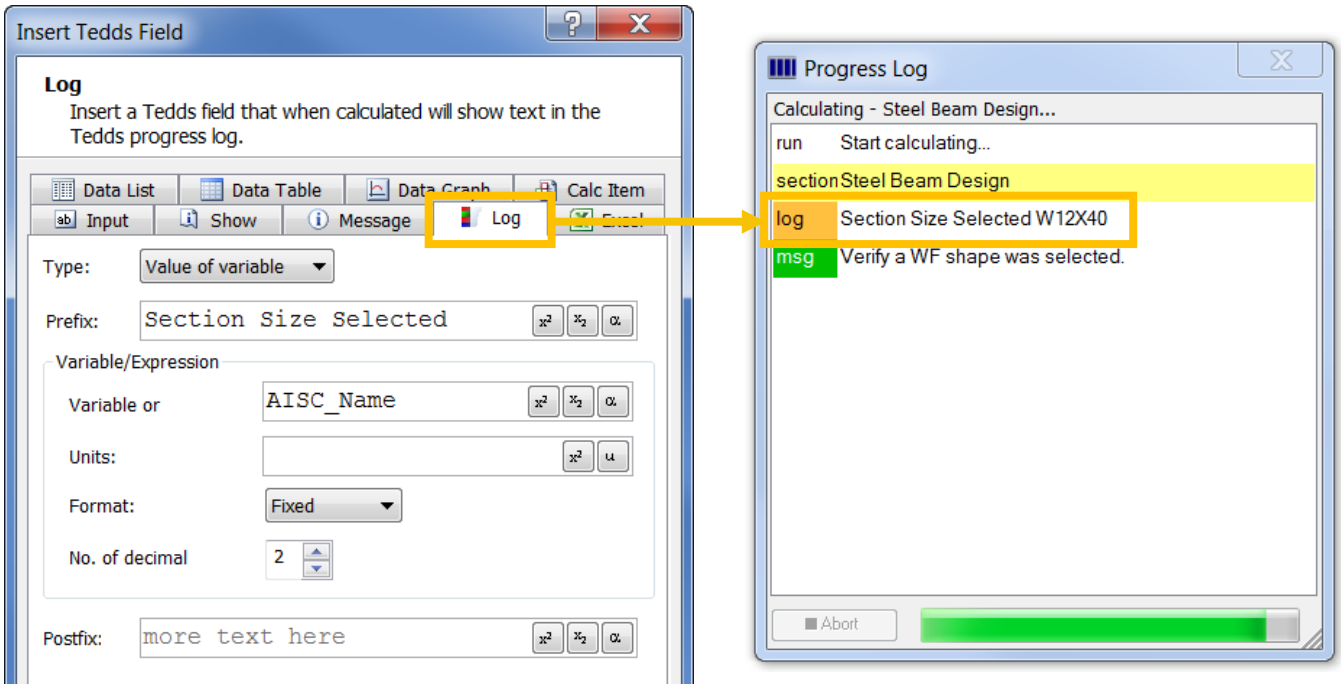




- A text dialog box will display the message while the document is being calculated.
- The message will also display in the progress log.

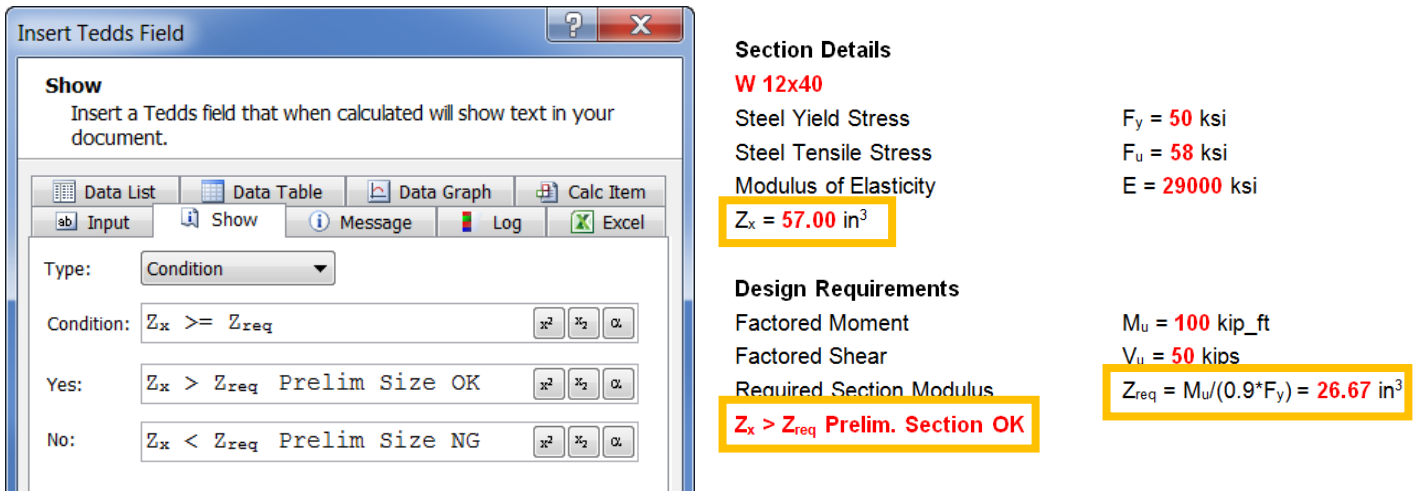
Inserting and Calculating a Log Field

Log Fields display messages in the progress log as the document is being calculated. You can use the progress log to keep track of where the calculation is in the document and also to display messages to help with the input process.



Inserting and Calculating a Show Field

Show fields can be used in lieu of message fields when you need the information to be output directly to the document.



- Once the **Show Field** is calculated the information will be visible in the output.
- Show fields are commonly used with conditional statements to display Pass/Fail messages.

LESSON 3

3 Introduction to the Excel Link

3.1 Session Topics

- Introduction to using the excel link
- How to setup the Excel file and Tedds for Word file
- Creating the link and seeing the results

3.2 The Tedds to Excel Link

3.2.1 Why use the link?

The Tedds to Excel link allows you to link your Tedds calculations with Microsoft Excel spreadsheets. The link allows you to make the most out of both of these programs.

- This is done by transferring data from Tedds for Word to Excel and from Excel back to Tedds for Word.
- The Tedds to Excel link requires at least Microsoft Excel 2000.
- Create charts and tables in Excel and send them back to Tedds for Word.
- Use Microsoft Excel to
  - Create charts and graphs
  - Analyze large amounts of data
  - Run macros
- Use Microsoft Word to
  - Write calculations
  - Create reports
  - Run Tedds modules

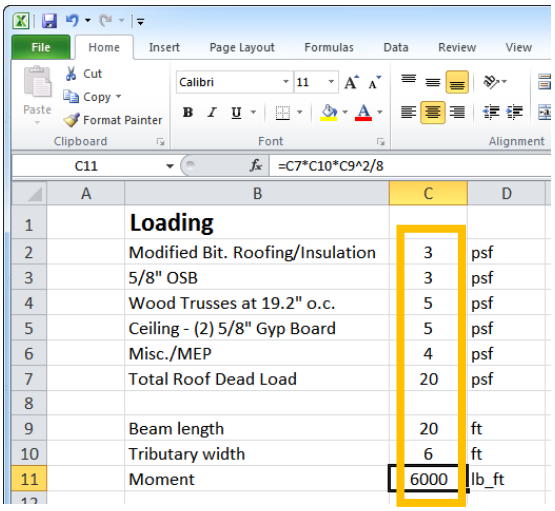
3.2.2 Setup the Documents

In order for the Tedds Field to work properly you have to setup both documents in a way that allows them to communicate this information.

Setup the Excel Spreadshet

The Excel spreadsheet can be a new document you've created for this design or an existing one your company has previously created that you want to keep using.

- Every variable value that you intend to send from Tedds for Word to Excel, or from Excel back to Tedds for Word, should have an individual cell in the spreadsheet.



Setup the Tedds for Word Document

- Every variable value intended to be sent to Excel must be defined in full in the Tedds for Word document, following the same basic calc writing rules as before.

  Beam Length; L = 20 ft

  Tributary Width; t_w = 6 ft

- Every variable value intended to be sent from Excel to the Tedds for Word document should also have their variable names defined in the Tedds for Word document, with "= ?"
  - This tells Tedds where to put the variable values in the Tedds for Word document, after it has been calculated.

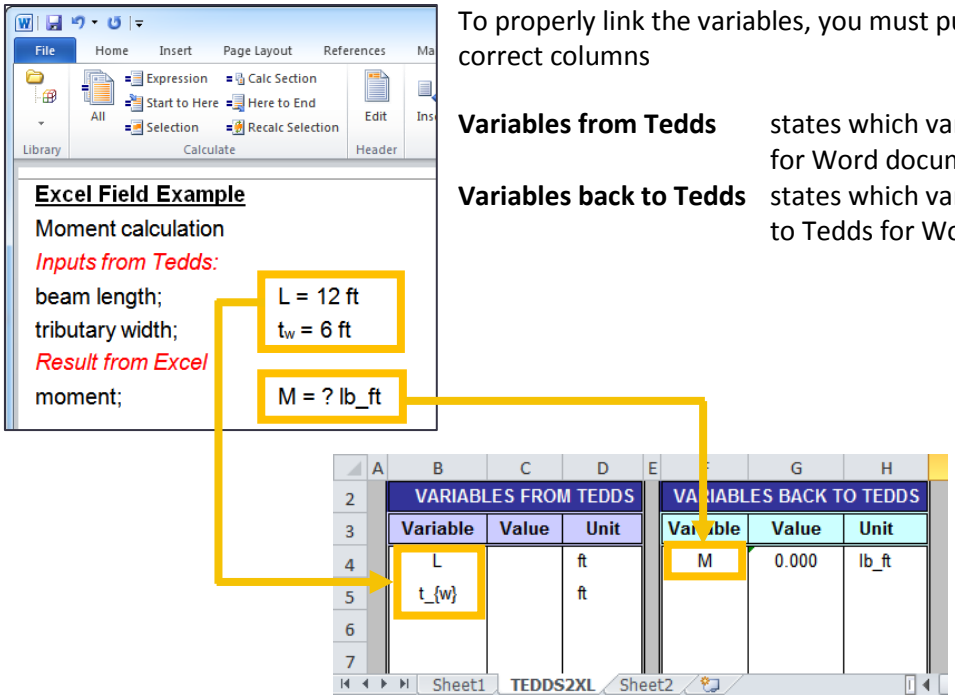
  Moment; M = ? kip_ft

3.2.3 Create the Link Table in Excel

A specific worksheet must be inserted in the Excel document.

- This sheet will contain two tables where the variables and values to be shared between Tedds and Excel must be defined
- The variables from/to Tedds must be put in their appropriate columns
- The variable names must be written in expression text.
- There are also some **Guidance Notes** given on this worksheet to help fill in the tables
  - The notes show how to write in subscript, superscript and a few Greek characters
  - A full list of text characters can be found in Tedds help
- The template spreadsheet with a blank link sheet can be found locally on your computer: C:\ProgramData\Tekla\Structural\Tedds\Excel

Linking the Variables



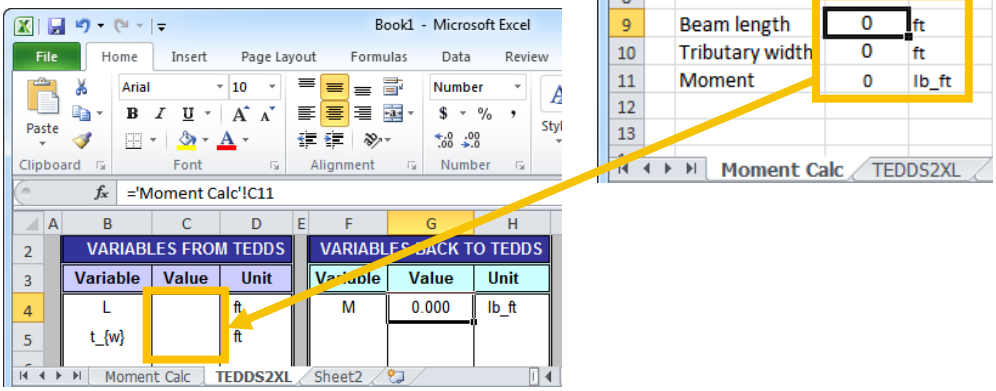
To properly link the variables, you must put the variables' name and unit in the correct columns

Variables from Tedds states which variables are taken from the Tedds for Word document to Excel

Variables back to Tedds states which variables will be sent from Excel back to Tedds for Word

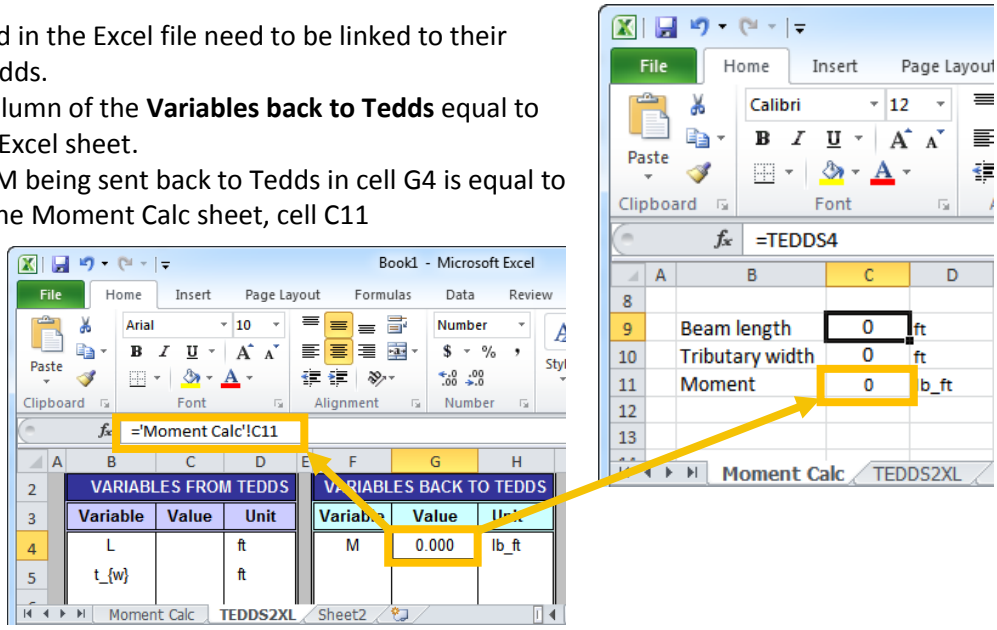
Then you need to link the appropriate cell values.
In the Excel calculation, the values that are being brought in from Tedds need to be defined.

- Set those cells equal to the **Value** column in the appropriate **Variables from Tedds** column.
- Here the beam length and tributary width cells, C9 and C10, in the Moment Calc worksheet are set equal to the blank cells in the 'Value' column of the Variables from Tedds corresponding to their variable name.



The variables that are calculated in the Excel file need to be linked to their Value cell being sent back to Tedds.

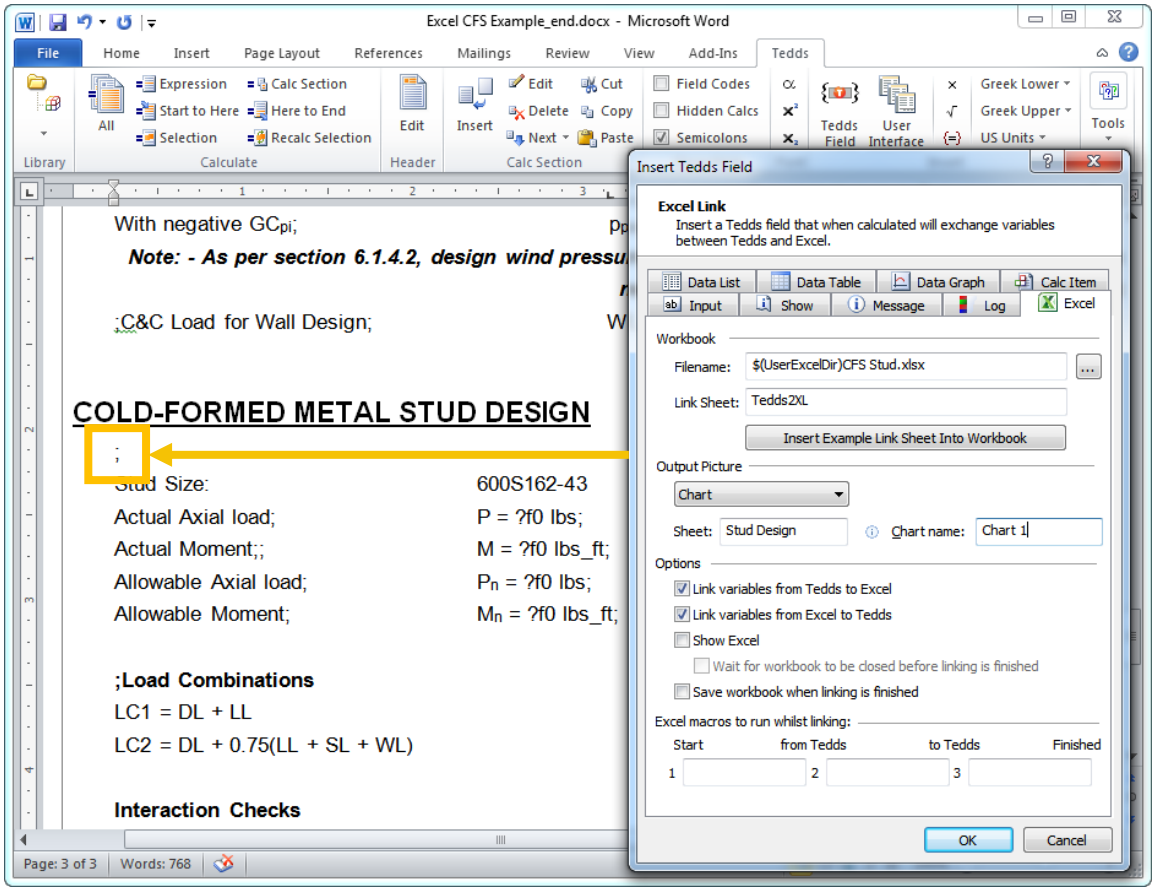
- Set the cells in the **Value** column of the **Variables back to Tedds** equal to their calculated cells in the Excel sheet.
- Here the moment variable M being sent back to Tedds in cell G4 is equal to the moment calculated in the Moment Calc sheet, cell C11



Create the Excel Field

The Excel field is created like all other fields in Tedds.

- Make sure the Excel field is placed after the variables being sent to Excel and before the variables coming in from Excel.



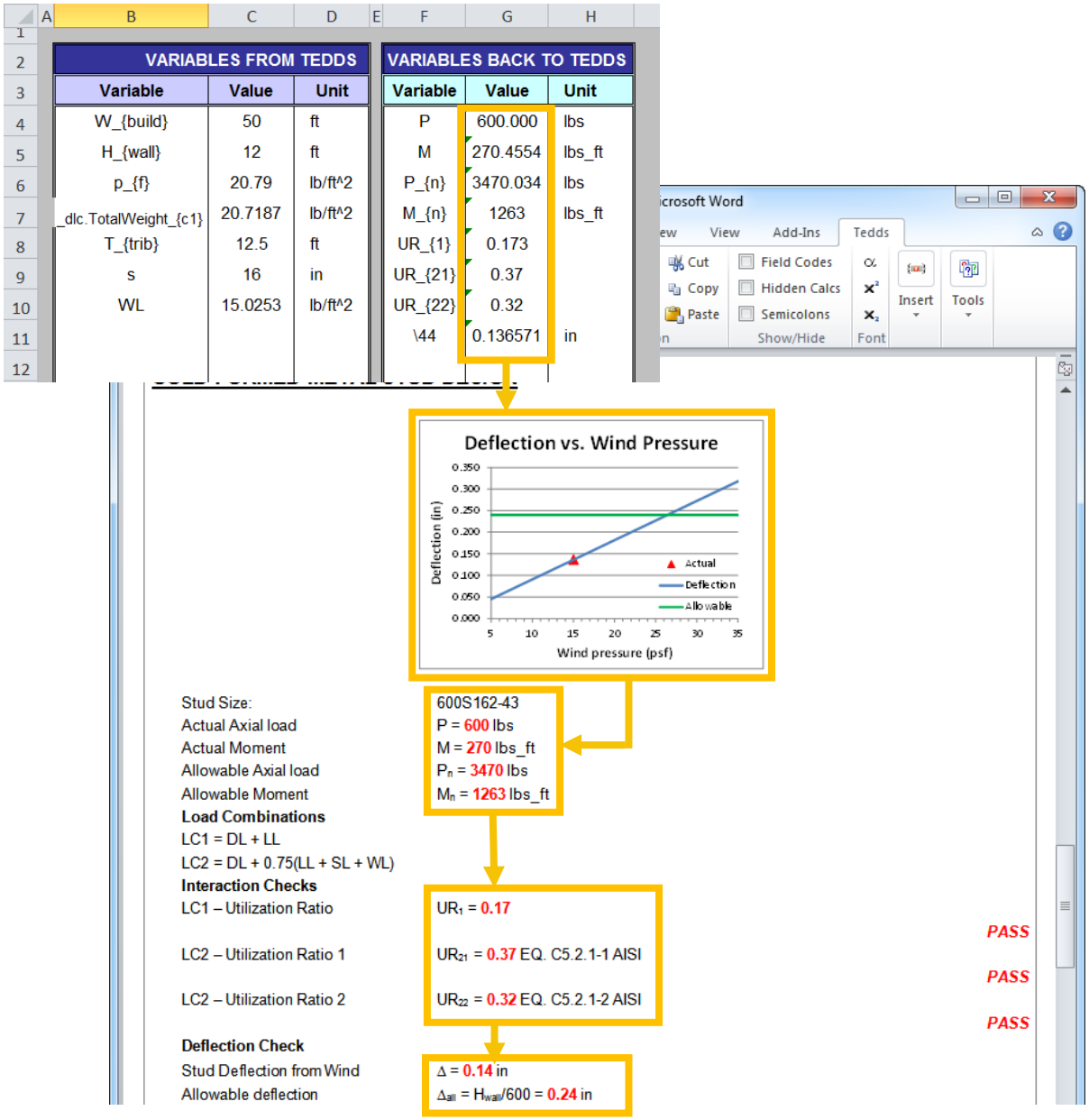
Filename	The Excel spreadsheet that the Tedds for Word document will be linking
Link Sheet	The name of the new worksheet that will be created in the spreadsheet to allow the Excel Link to work.
Insert Example Link Sheet Into Workbook	Inserts an example in the Link Sheet to help set up the actual links required.
Output Picture	Allows you to send back to the Tedds for Word a Chart or a Table Range
Link variables from Tedds to Excel	Allows variable values to be sent from Tedds for Word to Excel
Link variables from Excel to Tedds	Allows variable values to be sent from Excel to Tedds for Word. Only variables being transferred should be checked on under Options
Show Excel	If selected the Excel spreadsheet will be displayed as the Tedds for Word document is calculated. The Excel spreadsheet does not need to be open when calculating the Tedds for Word document
Save workbook when linking is finished	If selected the spreadsheet will be automatically saved once the document has finished calculating. If this option is not selected the Excel spreadsheet will not be saved and the cells will not have the values from the Tedds document.

Calculating the Document

The process that Tedds will go through is as follows:

- Tedds for Word will read the input variables defined in the Tedds for Word document
- These values will be copied to the Excel spreadsheet into the appropriate cells
- Excel will then update the calculations and any charts based on the input data
- Tedds will then copy the calculated results and any other requested out back to the Tedds for Word document
- Finally, the remaining expressions in the Tedds for Word document will output the calculated results

The Excel sheet can remain open, or can be closed while calculating the Tedds for Word document



3.2.4 Best Practices for the Excel Link

- Save the Excel document in the following directory:
- C:\Users*username*\Documents\Tedds\Excel which can be found in My Documents > Tedds > Excel
- This will ensure that the Tedds for Word document is properly linked with the Excel sheet
- When you share your Tedds for Word document with others in your office, make sure they save the Excel sheet in the same location on their computer
- Be careful with Calc Sections in your Tedds for Word Document
  - Promote Variables from a Calc Section variable to a Document Variable when necessary
  - Or use the GetSectionVar() function to promote a variable
- You can use the Excel Field multiple times in your documents
  - For example, if you have multiple graphs you want to bring into your document, you can put multiple Excel Fields into your document at the locations of where you want the graphs displayed