

## Importing steel structural properties from excel worksheet

$W\_Shapes := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "W Shapes!A1:U188")$

$M\_Shapes := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "M Shapes!A1:U9")$

$C\_Shapes := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "C Shapes!A1:U30")$

$S\_Shapes := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "S Shapes!A1:U32")$

$Pipe := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "Pipe!A1:U38")$

$HP\_Shapes := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "HP Shapes!A1:U16")$

$MC\_Shapes := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "MC Shapes!A1:U41")$

$L\_Shapes := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "L Shapes!A1:U52")$

$UL\_Shapes := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "UL Shape!A1:U81")$

$Rect\_Tube := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "Rect Tube!A1:U131")$

$SQ\_Tube := \text{READEXCEL} ("..\..\text{Excel Tables}\text{Shape Prop.xlsx}", "SQ Tube!A1:U53")$

Combo Box utilized to select structure type:

$\left[ \begin{matrix} \text{steel\_shape} \\ \text{shape} \end{matrix} \right] := W\_Shapes$

```
table :=
| if shape = 0
|   | L_Shapes
| else if shape = 1
|   | UL_Shapes
| else if shape = 2
|   | W_Shapes
| else if shape = 3
|   | M_Shapes
| else if shape = 4
|   | S_Shapes
| else if shape = 5
|   | HP_Shapes
| else if shape = 6
|   | C_Shapes
| else if shape = 7
|   | MC_Shapes
| else if shape = 8
|   | Pipe
| else if shape = 9
|   | Rect_Tube
| else
|   | SQ_Tube
```

table =

"W Shapes"	"a"	"d"	"bf"	"tw"	"tf"	"ix"	"sx"	"rx"	"iy"	"iy"	"ry"
"W4X13	3.83	4.16	4.06	0.28	0.345	11.3	5.46	1.72	3.86	1.9	1
"W5X16	4.68	5.01	5	0.24	0.36	21.3	8.51	2.13	7.51	3	1.27
"W5X19	5.54	5.15	5.03	0.27	0.43	26.2	10.2	2.17	9.13	3.63	1.28
"W6X9	2.68	5.9	3.94	0.17	0.215	16.4	5.56	2.47	2.19	1.11	0.905
"W6X12	3.55	6.03	4	0.23	0.28	22.1	7.31	2.49	2.99	1.5	0.918
"W6X15	4.43	5.99	5.99	0.23	0.26	29.1	9.72	2.56	9.32	3.11	1.46
"W6X16	4.74	6.28	4.03	0.26	0.405	32.1	10.2	2.6	4.43	2.2	0.966
"W6X20	5.87	6.2	6.02	0.26	0.365	41.4	13.4	2.66	13.3	4.41	1.5
"W6X25	7.34	6.38	6.08	0.32	0.455	53.4	16.7	2.7	17.1	5.61	1.52
"W8X10	2.96	7.89	3.94	0.17	0.205	30.8	7.81	3.22	2.09	1.06	0.841
"W8X13	3.84	7.99	4	0.23	0.255	39.6	9.91	3.21	2.73	1.37	0.843
"W8X15	4.44	8.11	4.015	0.245	0.315	48	11.8	3.29	3.41	1.7	0.876
"W8X18	5.26	8.14	5.25	0.23	0.33	61.9	15.2	3.43	7.97	3.04	1.23
"W8X21	6.16	8.28	5.27	0.25	0.4	75.3	18.2	3.49	9.77	3.71	1.26
"W8X24	7.08	7.93	6.495	0.245	0.4	82.8	20.9	3.42	18.3	5.63	1.61

In Mathcad 15, the first column of the above table populates a "size" drop-down. The column length varies with each shape selected in the first combo box.

$$\begin{bmatrix} size \\ n \end{bmatrix} := \text{W4X13} \quad \text{Example}$$

The structural properties are then generated from the resulting table.

$n = 1$	$size = \text{"W4X13"}$
$Area = (table^{(1)})_n \cdot in^2$	$Area = 3.83 \text{ in}^2$
$d = (table^{(1)})_n \cdot in$	$d = 4.16 \text{ in}$
$b_f = (table^{(1)})_n \cdot in$	$b_f = 4.06 \text{ in}$
$t_w = (table^{(1)})_n \cdot in$	$t_w = 0.28 \text{ in}$

In Mathcad 15, the reference files and computations are all hidden. We select the type of structural member and then the size. The associated material properties are then available and depicted as necessary in the worksheet.

Any suggestions on how to populate the second combo box? Or if that isn't possible, a simple work around to select the structure size from the table generated from the selection in the first combo box.