Roark's Formulas for Excel – Superposition Wizard

UTS are proud to announce the introduction of Roark's Formulas for Excel. The 7th Edition of "Roark's Formulas for Stress and Strain" has been totally coded and made available within Excel. This popular handbook has been in existence for over sixty years and used by engineers the world over. UTS have fully computerized the contents allowing you to undertake calculations and report on them. It includes interactive calculations for all cases and tables with accompanying diagrams that help streamline the design process and reduce design iterations as well as the need for complicated finite element analysis.

Some key features include:

- o All Chapters, Tables and Cases made available in Excel through a bespoke menu.
- o Product available for use in Excel 2000 and greater.
- o Simply load the model you want, enter input data and view the calculations including Plots – deflections, stress etc.
- o UTS have also included a Superposition Wizard to aid multiple load calculations on beams and plates. This document provides further details on this key time same feature.

UTS Offering

1)   Roark's Formulas for Excel software.
    a.   Requires Excel 2000 or greater
    b.   User Manual available in PDF format
2)   7th Edition of "Roark's Formulas for Stress and Strain" by Warren Young and Richard Budynas.

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Further details at www.uts.com and www.roarksformulas.com

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| **Contact UTS today if you want a free trial of the software – try before you buy!** |

The following provides brief details on using the product. A Powerpoint presentation and flash demonstration is available on request.

The Superposition Wizard (SW)

Creating a means of entering data quickly and allowing multiple loads to be handled simply, were two goals for this release of this product. As a result, a simple series of data entry windows have been created to facilitate this. We call this a wizard and Roark's Formulas for Excel, the Superposition Wizard has been created.

The Superposition wizard (SW) is contained with the Roark's Formulas for Excel product and consists of two icons:

Beam Superposition Wizard
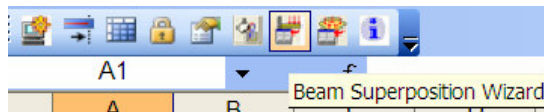
Plate Superposition Wizard
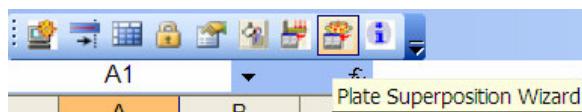
Each is similar in their approach and can be activated if any multiple load calculations on either a beam or plate as required. Simply click the appropriate icon. Let us focus on the Beam Wizard to ee how it operates:

Step1 – Select a Working Unit

2
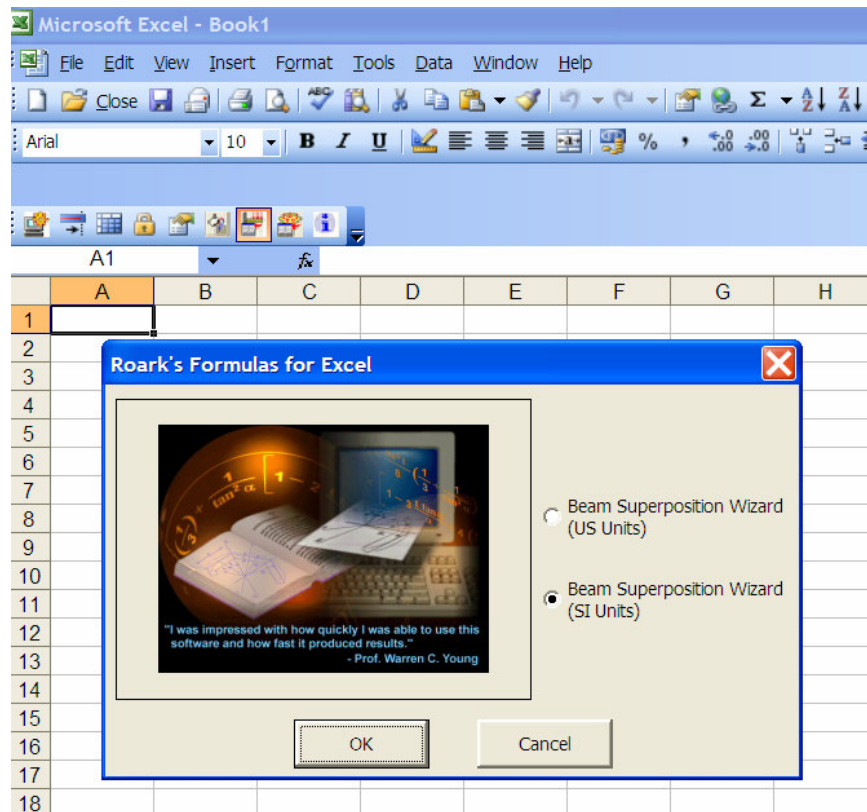
Step 2 – Data Entry

Beam Type. Select from all the various cases that are available from the pull down menu and note that the Table reference and description provided are references to the actual 7th Edition of Roark's Formulas for Stress and Strain. In addition, to further clarify, a diagram of the system is shown with nomenclature.

Support type and Load type. The beam support type and load type are made available in a pull down menu. The options available are dependent on the Beam type selected. This choice made will be shown in the diagram of the system.

Material. Various materials are listed within the material pull down menu and include metals, woods, concretes and other material types. For each material type, the Young's modulus and the Gamma value (if appropriate), are automatically populated upon material selection.

If the material type is not available or specific Young's Modulus and or gamma values are required, then these can be directly entered.

At this point, the case has been selected and specific dimensions can be entered and data solved.

The entry data that appears is specific to the case selected and is mainly dimensionally related.

Enter dimensional data

All of the data that appears in the boxes next to the diagram can be directly entered. Some data (Area moment of inertia and Elastic Section Modulus) are dependent on the shape of the cross section of the beam and this can be determined after clicking on **Load Cross Section...** which opens a new Window:

The **Cross Section** is selected from a pull down menu and a diagram is shown below with full nomenclature. The data can be simply entered and once complete, the **Done, Return to Beam Inputs** is clicked allowing the Area Moment of Inertia and the Elastic Section Modulus to be calculated.

Once all the data has been entered, the condition for this beam type can be calculated by clicking on **Solve for Load Condition**. This calculates various data such as deflection, bending moment, shear angle etc.

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Adding further loads

If further loads need to be added to the beam, then this can be done within the SDEW.

In the lower left portion of the SDEW is a data entry field for the load number. When a second load is entered (enter 2), this "greys" out all fields that must remain constant for the second load.
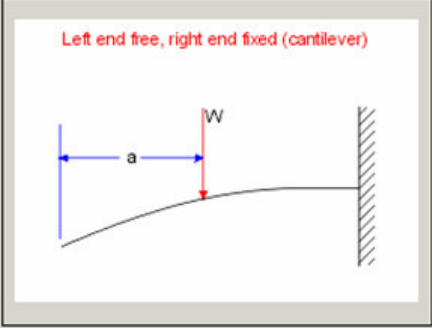
After the data has been entered for the second load, the **Solve for Load Condition** is clicked. This combines the result data for the two load conditions.
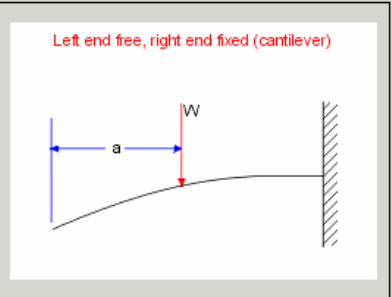
Step 3 – Reporting

To view the model report, click on **Show Combined Report…** (below is the single load case):

A bespoke report is created that includes the input data, calculated outputs and plots including:
Bending moment, Stress, Shear, Deflection & Slope. This can be saved in either PDF or RTF format.