

**UBUCmember** is an Excel Template for the design of Universal Beam & Column section members. It also stores data for retrieval and changes when designing members subject to axial load, shear and moments.

In general, the methods used and results obtained are as in the Steelwork Design Guide to BS 5950-1:2000, Volume 1, 6th Edition, The Steel Construction Institute, BCSA, 2001.

### Features

- ◆ UBUCmember helps design and check rolled UB, UC , RSJ and UBP steel section members to BS 5950-1:2000
- ◆ Number of UB, UC & RSJ sections that can be selected for design are over 140.
- ◆ Steel grades can be S275, S355 & S60. Grade selection is via pull-down values of a cell in the table-header.
- ◆ The colour of table cells in the first 3 left columns and 3 header cells change to indicate the selected grade; red= S275, green= S355 & yellow= S460
- ◆ Supports can be simply supported, cantilever or continuous at one or both ends. The selection is via pull down list in a header-cell. As stated in Cl 4.2.5.1, this is to avoid irreversible deformation under serviceability loads. The values of  $M_c$  are limited to 1.5 py Z generally and to 1.2 py Z in the case of simply supported beam or a cantilever.
- ◆ The effective lengths  $L_x$ ,  $L_y$  &  $L_{ET}$  affecting the member capacities can be defined to suit the design details.
- ◆ Member loads can be combined shear, bending and axial force in both the x and y direction.
- ◆ The checks are carried out with using the 'simplified method' given in BS5950-1:2000.
- ◆ Reduction in bending moment capacity is taken into account for "high shear" condition, for both X & Y direction.
- ◆ When in axial tension, the lateral-torsional buckling check in the 'simplified method' is applicable and used.
- ◆ The cross-section capacity check is " $F_c/P_c$ " when the axial force is compression and " $F_t/P_t$ " when in tension.
- ◆ Data for well over 3000 members can be stored within its file for later retrievals & revisions. Rows can be added and or deleted in multiples of 10, starting from a minimum 200 rows.
- ◆ Using a reference number starting from 1001 upwards, each member data can be retrieved, changed and re-saved with ease at a later date.
- ◆ The data in the worksheet STORE is visible to the user. Using spreadsheet features of Excel, new data can be generated and the existing one examined and or modified.
- ◆ The template has Excel user interface. The printed Output matches the Screen Display. Knowing how to use Excel and the ability to verify results as a designer is sufficient for using UBUCmember.
- ◆ Shaded cells in the spreadsheet signify User-Input. Un-shaded cells signify Spreadsheet-Results. This permits easy checking at a glance by the users and the checkers of UBUCmember output.
- ◆ To assist in the design processes, the template allows preparatory design calculations for Equivalent Uniform Moment Factors  $m_x$ ,  $m_y$  &  $m_{LT}$ .
- ◆ The template includes an interactive table that gives values of member strength for over 140 sections based on steel grade, 3 effective lengths in buckling, support types and levels of axial load in the member.
- ◆ Buckling resistance moment capacity can be  $M_b$  for normal design or  $M_{bs}$  for columns in simple construction. The selection of  $M_b$  or  $M_{bs}$  is via pull down list in a header cell.
- ◆ A worksheet %Web Bearing Buckling+is included to help calculate Unstiffened Web Bearing Capacity  $P_{bw}$  to Clause 4.5.2.1, Unstiffened Web Buckling Capacity  $P_x$  to Clause 4.5.3.1 and Shear Capacity of the Section  $P_v$ .