

## Yolles Competition Studio

### PROJECT 1.0 **tower competition** strength, economy, form

#### Assignment

Each team must construct a tower to satisfy the criteria defined below. One sheet of 1.2x 1.2 3mm aeroply and one sheet of 1.2 x 1.2 6mm aeroply may be used. No glue is allowed. No fasteners are allowed except made from the aeroply. The maximum horizontal plan dimension of the tower can be no more than 600mm x 600mm. The maximum vertical dimension of the tower can be no more than 1.6m. The head of the tower must be able to receive a vertical load transmitted through a 100mm x 100mm plate

#### Evaluation

The towers will be tested in the Structures Laboratory of the Department of Civil Engineering, and will be evaluated on the following criteria:

1. Maximum actual strength, P, defined as the maximum measured load that can be carried by the tower during the load test.
2. Maximum actual ductility, D, defined as the maximum measured vertical displacement of the tower after the maximum measured load has been reached
3. Maximum volume, V, defined as the largest contiguous space enclosed by the tower. This space will be calculated before the testing by the teams on the basis of three-dimensional drawings of the tower. (Note that the tower must enclose, not merely describe a volume. The tower does not have to be completely closed.)
4. Minimum weight, W. The towers will be weighed immediately before testing.
5. Maximum height, H. The towers will be measured immediately before testing.
6. Most accurate predicted strength, N. Teams will submit a predicted value of the maximum strength of the tower.

A composite score for Team i will be calculated for each team, based on the following formula:

$$\text{Score}_i = P_i/P_{\text{best}} + D_i/D_{\text{best}} + V_i/V_{\text{best}} + W_{\text{best}}/W_i + H_i/H_{\text{best}} + (1 - \text{abs}(P_i - N_i)/P_i)$$

where index i refers to data obtained from Team i and the index "best" refers to the best performance among all the teams.

#### Due:

**Monday February 7, 2005 1pm Department of Civil Engineering Structures Lab**

#### Prize

The members of the winning team will each receive a copy of Yolles by John McMinn and Beth Kapusta