APPLICATION I

CONSTRUCTION ENGINEERING. WAYS OF THINKING

COLUMNS

Construct 2 compression members (columns) having different cross-sections and different lengths. The first member should be **9 cm** long and the second **24 cm** long. The columns cross-sections is shown in Figure 1. The teams should choose the cross-sections according to Table 1.

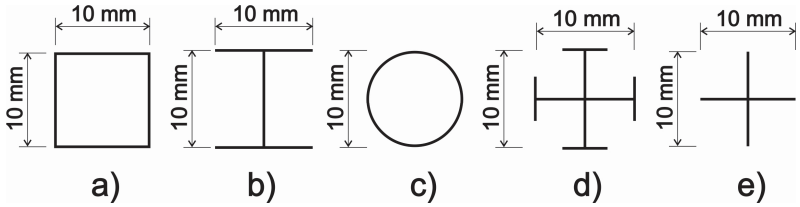

Figure 1. Column cross-sections

Table 1

Team number	**1**	**2**	**3**	**4**	**5**
Cross-sections	a), b)	c), e)	a), e)	c), d)	b), d)

The columns will be subjected to a compression experimental test.

BEAMS

Construct 2 beams having different cross-sections. The beams should have a **40 cm** span. The beams cross-sections is shown in Figure 2. The teams should choose the cross-sections according to Table 2.

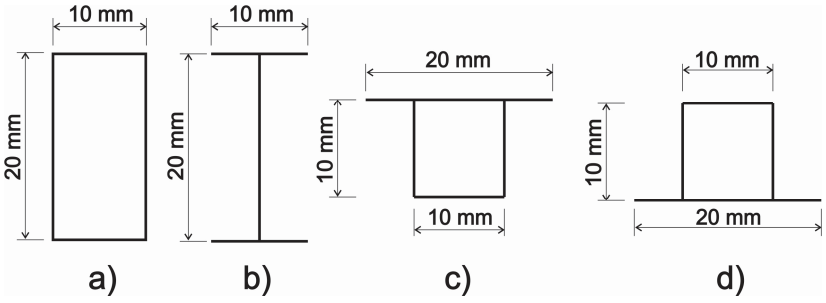

Figure 2. Beam cross-sections

Table 2

Team number	**1**	**2**	**3**	**4**	**5**
Cross-sections	a), c)	b), c)	a), d)	b), d)	a), b)

The beams will be subjected to a bending experimental test.

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The students will write a report regarding columns and beams (cross-section examples, pictures, materials used, construction details). This report should also contain notes from the design and construction process of the columns and beams, observations during the experimental test (failure types: material failure/stability loss) and conclusions.

MATERIALS:

- Folding carton sheet (180 g);
- Scissors;
- Double-sided tape;
- Pencil;
- Ruler (>40 cm).