

COMPETITION REGULATIONS

C A D R E

MODELS OF WOODEN BRIDGE AND TRUSS

- 8th EDITION

-2022-

I. THE PERIOD. Participants

I.1. Competition period: December 8 - 10, 2022.

I.2. Students from the III, IV and Master's years, from the civil engineering faculties in Romania or from the EU-CONEXUS alliance can participate in this competition. Second year students can also enroll in the space truss section. Teams consisting of no more than 2 people can enter the competition.

I.3. Registration of participants will be done online on the website of the Faculty of Railways, Roads and Bridges within the Technical University of Constructions in Bucharest, up until December the 1st, 2022.

I.4. The competition will be held in two sections:

I.4.a. Bridge layouts section.

I.4.b. Space truss layouts section.

I.5. Each layout will be accompanied by a presentation poster (A3 format).

I.6. The models will be brought to the headquarter of the Strength of Materials, Bridges and Tunnels Department, within the Faculty of Railways, Roads and Bridges, on December 8th, 2022. Those who want to, can send the models by courier, cash on delivery (shipment cost will be covered by the faculty), until December 8th, 2022.

II. MATERIALS

II.1. Models must be made of balsa wood only.

II.2. Each team entered in the competition will use a maximum of 10 balsa wood sticks with dimensions 8x8 - 1,000 mm, both for the bridge models and for those of trusses, and a balsa wood deck with dimensions 4x100 - 1,000 mm, for the models of bridges.

II.3. International students from the EU-CONEXUS alliance can purchase their materials individually.

II.4. The bridge or truss model must not be covered, painted or colored with any other substance.

III. CONSTRUCTION RULES

III.1. The bridge model must have the carriageway on the upper side.

III.2. The span of the bridge model (measured between the supporting axes) must be 50 cm, and the total length of the model must be no more than 60 cm.

III.3. The construction height must be no more than 15 cm, and the width of the model no more than 12 cm.

III.4. The truss model must be properly made for a space truss beam.

III.5. The dimensions of the truss must be within the following limits: the truss must have only two support sections, the distance between the support sections must be 50 cm, the total length of the truss must be a maximum of 60 cm. The width of the truss will be a maximum of 10 cm, and the height of a maximum of 15 cm.

III.6. Wood glue will be used to join the elements, at the choice of each participant in the competition.

IV. LAYOUT TRIAL – December 9th, 2022

IV.1. The static scheme of the models of bridges or trusses will be of an isostatic beam.

IV.2. The models shall be tested on a universal testing machine with hydraulic or mechanical actuation, having a configuration identical or similar to that in the following figure:



Fig. 1 Universal testing machine with hydraulic drive

IV.3. The models will be placed centered on the support surfaces.

IV.4. The bridge models will be loaded by means of a semi-cylindrical mandrel device in the central section of the span between the abutments. The linear load of the mandrel will be transmitted to the deck as a load distributed over the surface, by means of a metal plate with dimensions of 12x12 cm.

IV.5. The truss models will be loaded by means of a semi-cylindrical mandrel device in the central section of the span between the supports. The load will be of the type of a uniformly distributed load on a line transverse to the longitudinal axis of the beam

IV.6. The test will be carried out until the model fails. Yielding is defined by the inability of the structure to take additional loads.

V. SELECTION OF WINNERS

V.1. In each section, the first 3 teams established in the descending order will be awarded. The first prize will be worth 800 RON, the second prize 600 RON, and the third prize 500 RON. The grading criteria used will be the ratio between the failure force and the structure's self weight

V.2. At each section, a prize will be awarded for the most beautiful model, worth 500 RON, determined based on the jury's votes.

V.3. All winners will receive a prize from the EU-CONEXUS alliance.