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Investigation of Highwall Carrier Made of Wood

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1. Summary

Experimental research of bearing power and deformity of highwall carrier made of wood has been displayed in this paper. These structures are often found in wood constructions but their bearing power is mostly not used. This understanding motivated research of surface highwall carriers at the Faculty of Civil engineering, University of JJ Strossmayer in Osijek. Experimental and theoretical researches were done within the scientific project "Investigation of surface highwall carrier". The research of relation $H/L=1/2$ carrier was accepted as a starting point at which highwall carrier effect begins at isotropic material.

2. Introduction

Wood is not homogenous material. It is mechanically anisotropic-orthotropic. These characteristics, are making difficulties in mathematical description of respond material and construction on outside forces. Mathematical modelling of surface problems in wood constructions requires hard work and powerful computer support. Theoretical results of researching don't make sense without experimental confirmation. Modern powerful computers, by using finite elements program, make possible access to problem of surface wood constructions.

Highwall carriers in wood constructions are made in two levels. One is made of grillage member elements, on which lining is made of panels based on wood. Connection of those two systems is made by nailing or gluing, what is technologically possible only in a factory.

Highwall carrier constructions are mostly visible in forming vertical boulders at high building constructions, at floor and roof constructions. We find lining made of wood panels, as primary construction for overtaking outside forces, perpendicular on its planar structure. Cognition of stiffness of highwall carriers in plane can make using for overtaking of actions on its planar surface possible. Most of actions come from mail carrier's stabilisation, wind force, earthquakes etc.

There is a practical question: can the stiffness of highwall carriers be used for overtaking of actions, which are mentioned, while bracing for room's stability could be left out? Positive answer to this question is making building more economical.

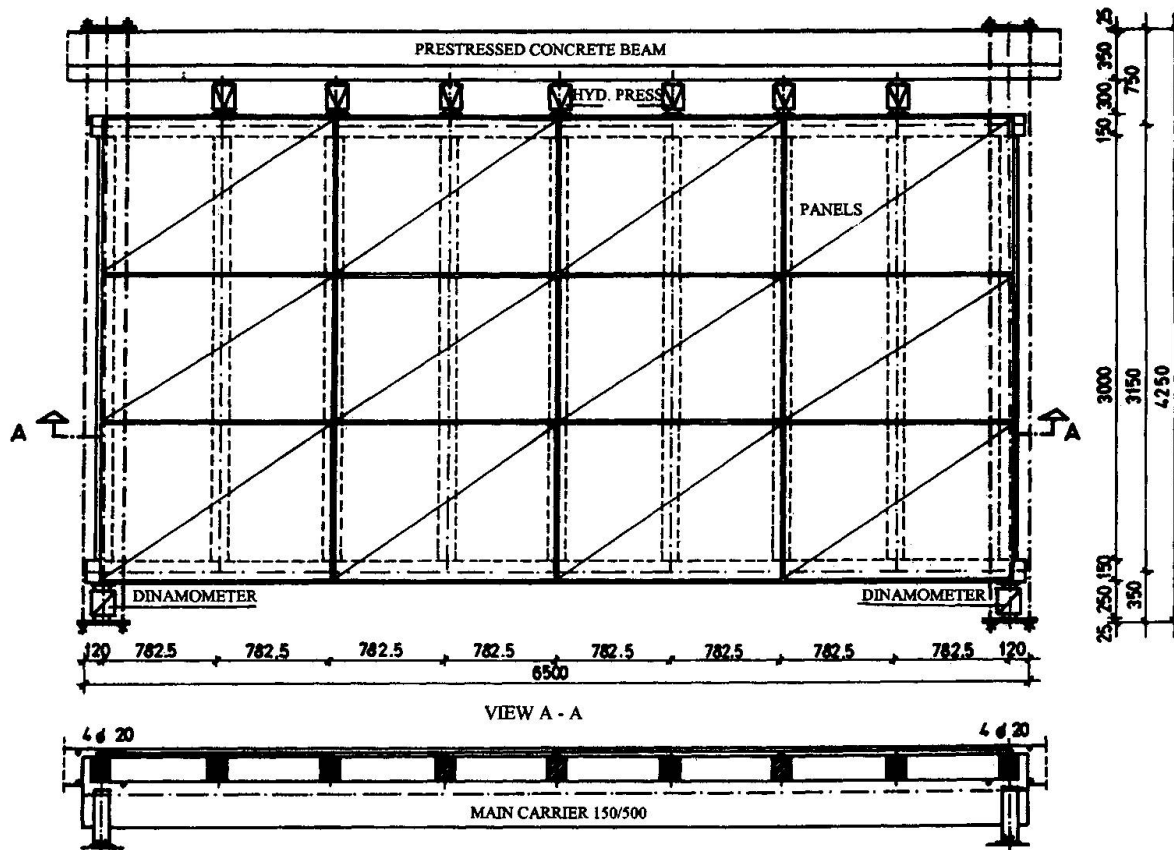


Fig. 2 Model of highwall carrier

3. The Process of Model Testing

The experimental research is done on four models:

- model I : the main grillage wooden beam (Fig. 3)
- model II : truss carrier formed on model II (Fig. 3)
- model IIIA: surface carrier, panels obesity 20 cm, nails on interval 20 cm
- model IIIB: surface carrier, panels obesity 28 cm, nails on interval 10 cm

Loading of the model was made by the system of hydraulic press, placed on connection with secondary beams.

Intensity of loading is directed to the value of mid-span displacement and is defined in norms HRN.U.C9.220 and also in DIN 1052 part 1.