

# **Trials on beams in metal trestle buried in concrete**

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Objekttyp: **Article**

Zeitschrift: **IABSE congress report = Rapport du congrès AIPC = IVBH  
Kongressbericht**

Band (Jahr): **11 (1980)**

PDF erstellt am: **11.08.2024**

Persistenter Link: <https://doi.org/10.5169/seals-11284>

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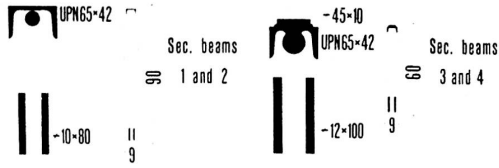
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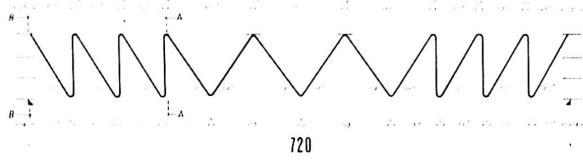
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TRIALS ON BEAMS IN METAL TRESTLE BURIED IN CONCRETE

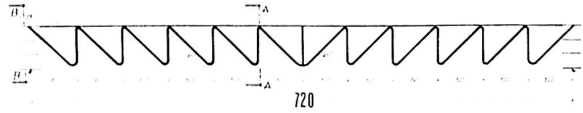
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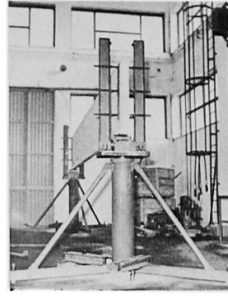
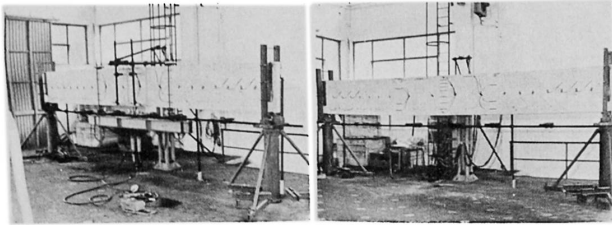
TRESTLE OF THE BEAMS 1-2



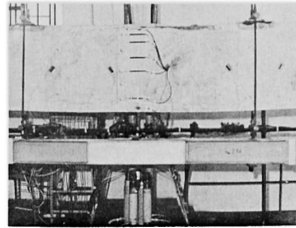
TRESTLE OF THE BEAMS 3-4



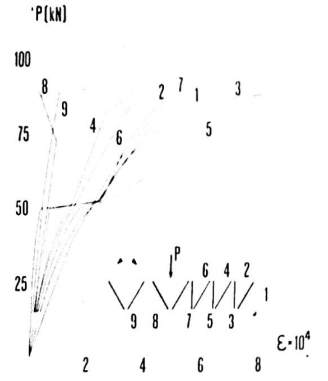
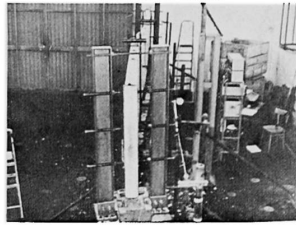
LOAD DEVICES AND BEAM AFTER CRACKING



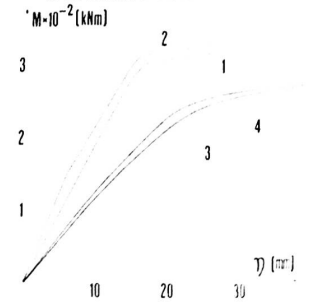
BEAM WITH BEARING DEVICES



BEAMS AFTER FAILURE



STRAINS IN VERTICAL RODS AND DIAGONALS OF THE TRESTLE OF THE BEAM 1



DIAG. MOMENTS - DEFLECTIONS FOR THE BEAMS 1 2 3 4

## TRIALS ON BEAMS IN METAL TRESTLE BURIED IN CONCRETE

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SUMMARY

The research aims to investigate in theoretical and experimental way the behaviour of beams, with rectangular cross section, made by a welded metal trestle buried in concrete.

Have been tested four beams on a span of 7,20 m; the first two (n.1 and n.2) have a cross section of 9x90 cm while the other two (n.3 and n.4) have a cross section of 9x90 cm. Such beams must be considered as the webs of structural elements to complete during the installation by means of an upper slab in such way to give them a T section. They are to be used for a particular prefabrication system of multistoried buildings in which beam and partition are made by an only prefabricated block.

In the poster are shown the construction details of the prototypes, the load and bearing devices and the beams after failure.

Special "diapason" bearings have been designed to prevent only the beam rotation around its longitudinal axis and loads have been applied by means of previously calibrated hydraulic jacks.

Experimental results obtained point out that the considered beams have a behaviour very near to that of reinforced concrete beams, both under exercise loads and up to the rupture. In fact, as it is possible to see from the diagram shown in the poster for the beam 1, not only the diagonals near bearings, but also the vertical rods have resulted stretched; besides stresses in the former have always been higher than in the latter, as commonly happens for bended bars and stirrups. Rupture experimental moments, besides, are near enough to the theoretical ones valued by means of limit design theory for reinforced concrete beams, with deviations respectively of 1,5% and 7,5 for the beams n.1 and n.2 and of 5% for the beams n. 3 and n.4. Also compression strains in concrete and steel have been near enough to the theoretical ones. Failure announced by the appearance of many cracks, manifested itself through a sudden lateral buckling of structures under loads lightly higher than those for which strains in stretched steel, corresponding to yield point, had been measured. Thus it is to think that collapse happened just for reaching, in center line, of theoretical crisis situation and that only consequently, because of beams slenderness, lateral buckling occurred with contemporary instability of compressed stringer.

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