

HAUKI-HALL

SPORTS AND MULTIPURPOSE HALL
AT HAUKIVUORI



BADGE OF HONOUR TO
THE SUSTAINABLE DEVELOPMENT



Research and testing



Truss test

Truss halves made with local timber were joined using metal couplers on the floor of the hall. The first truss was load tested for 50 tons.

Structural integrity testing

Moisture movement test in a public house window: the moisture technical behaviour of the support planking structures was investigated over a two-year period. This movement was thoroughly investigated, using a variety of testing methods, such as extreme conditions chamber, final exterior wall structures, various wood types and thicknesses in completed exterior wall structures. Result: required thickness of timber should be 25-32 mm's which optimises nailing, plank spacing and moisture movement.

The more insulation and other layers used, the better the structure will be.

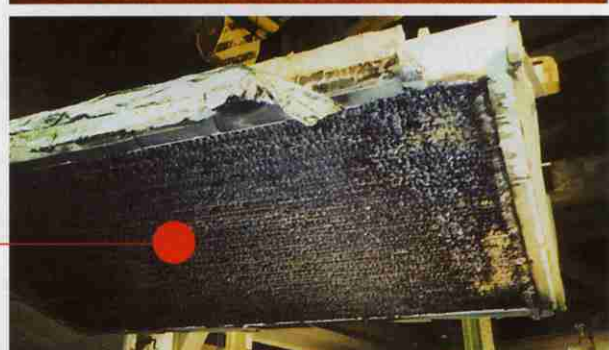
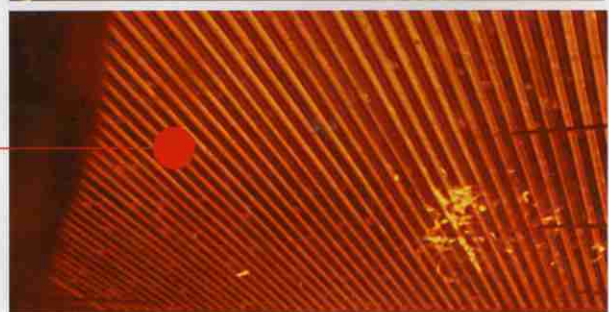
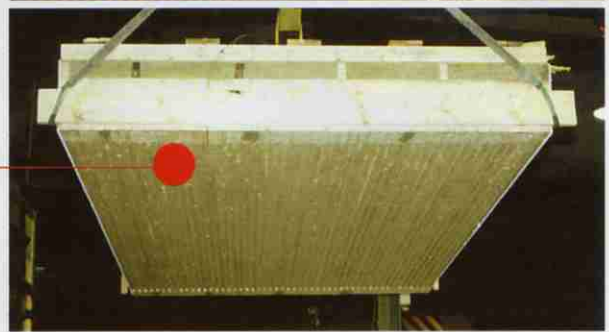
Fire resistance tests performed at VTT – Technical Research Centre of Finland

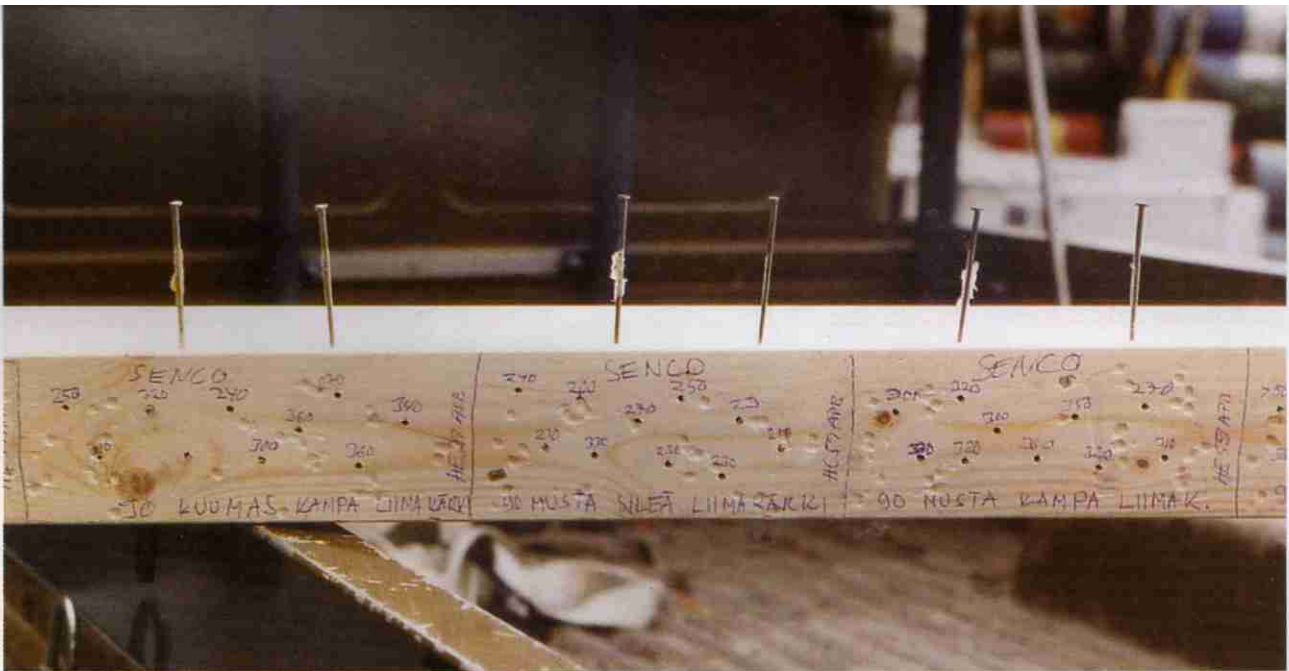
The purpose of the tests (2) was to demonstrate that, using massive solid wood structures mounted on support planking elements, it is possible to build norm compliant wall and roof structures capable of maintaining their structural integrity while on fire for a period of 30 minutes. These were the first such tests performed in the world. Tests were made according to an ISO 834 standard in order to achieve global acceptance. The bearing interior wall withstood 90 minutes of burn time. The burn duration of the upper base was 75 minutes.

Upper base burn test piece prior to testing.

Upper base burn test piece at first ignition (2 minutes 41 seconds).

Upper base burn test piece after 75 minutes burning - oven temperature was for this test 970 degrees Celsius while the outer surface of the test piece was only 20 degrees Celsius.





Choice of nails for stacked plank elements

In co-operation with nail suppliers, break out strength tests were performed. Due to tests a smooth, zinc-electroplated, glue-tipped 3.1 x 90 nail was selected. There are approximately 140 nails per square metre in the stacked plank structure, resulting in a combined holding strength of approximately 40,000 kg/m² (in the entire structure - 80,000 tons).

LON follow-up monitoring system

During the construction phase of Hauki-Hall, just over 100 sensors were installed to measure the structural physical properties at different points in the structure. Temperature and moisture data are collected for computer analysis, using the LON data transfer system. (LON = local operating network)

The data provided by the follow-up monitoring system assists in guiding ventilation. During night-time the ventilation is used to maintain the structures.



Hauki-Hall technical specifications

Floor area 1,740 m²
 Useable area 1,550 m²
 Volume 11,700 m³
 Wood 600 m³
 Construction costs FIM 13.7 million

Main design and product development:

Municipality of Haukivuori - Technical Section
 Markku Suomela, Marita Majaharju

Structural engineering

Marita Majaharju, Markku Suomela
 Bois Consult Natterer SA, CH
 Julius Natterer
 Stefan Trinkl

HVAC engineering

Engineering office Urho Moisala

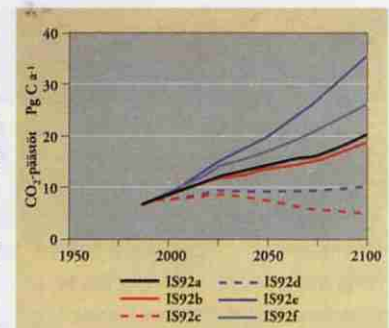
Electrical engineering:

Jaakko Pöyry -HVAC -technics, Markku Flöjt

Automation and follow-up monitoring equipment:

Engineering office Harri Forsberg

Human activity has doubled the presence of carbon dioxide within 100 years. Various scenarios depend upon our actions: building with wood reduces CO₂ levels.



Development of carbon dioxide levels caused by human activity as presented in the scenarios drafted at IPCC/WGI (1992).