

MASTER'S DISSERTATION AT STRUCTURAL MECHANICS

DEPARTMENT OF CONSTRUCTION SCIENCES | FACULTY OF ENGINEERING LTH | LUND UNIVERSITY



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PRESENTATION

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**THE WORK IS PERFORMED AT
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STRENGTH ANALYSES OF REBUILT WINDOWS IN HISTORICAL BUILDINGS BY THE FE-METHOD



Photo: Kent Persson

BACKGROUND

Magasinet 211 is a close to hundred-year-old building in Varvsstaden, which has been converted from an industrial property into a modern office building through a unique, careful renovation. It is one of the buildings that has been given new life in Kockum's old shipyard area in central Malmö.

Renovation and rebuilding of the buildings at Kockum's shipyard area is a current project that is carried out by Varvsstaden AB. In the project the old windows have been supplemented with a two-glass insulation unit inside the existing cast iron-framed window. This solution has to be validated in terms of the indoor climate and that the old window will not be harmed by the new load situation. The challenge is rebuilding without changing the exterior appearance of the building.

At Lund university there is a research project about Magasinet 211 in Kockum's area which is jointly carried out by research from several scientific fields. The research project is aimed at analysing the window solution in terms of energy efficiency, air tightness by pressure testing of part of the building

with and without the new interior window, measurement of air flow, temperature measurements inside, between the glasses and outside the building and thereby identify thermal loads on the old window. This master's thesis is a part of this research project.

AIM

The aim of this master's thesis is to determine if the strength of the old windows are sufficient to withstand the loads that may have changed in the new setting. The objectives to reach this aim will be to develop a calculation model of old cast iron-framed windows and utilize knowledge from the project about loads and strength to analyse whether the large windows can handle the new loads that occur after renovation.

METHOD

The modelling and analysis of the windows will be performed by the finite element analysis tool Abaqus. The geometry will be determined from existing windows and material properties will be determined from destructive tests that have been performed in the research project.

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