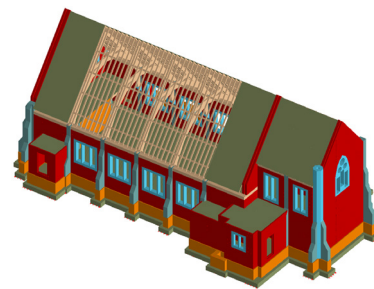
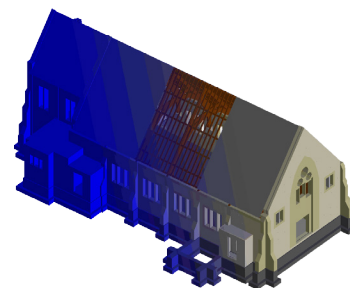


1



2



3

1 Model of an estimated partial collapse. 2 Full scale model. 3 Animation of principal stress.

ADVANCED NUMERICAL ANALYSIS OF CHURCH BUILDING

Harrison Grierson for the Catholic Diocese of Christchurch

Project Location: Christchurch

In January 2016, Harrison Grierson was engaged by the Catholic Diocese of Christchurch to undertake a detailed seismic assessment of its 80 year old brick church in Geraldine, to determine whether the building was earthquake prone under the Building Act.

The Immaculate Conception Church had previously received a seismic rating of approximately 14% of New Building Standard using traditional modelling techniques.

Using our proprietary Extreme Loading® for Structures (ELS) software with the applied element method (AEM), we modelled the church with approximately 150,000 Applied Elements, including true brick and mortar elements to represent the most accurate and realistic performance of this structure. Progressive damage assessment and its dynamic effects were evaluated using time-history analysis under a methodology developed by Harrison Grierson.

This approach is the most advanced structural analysis available to engineers for seismic design and damage assessment as it pinpoints, with high accuracy, where a building's potential weaknesses are during real ground motion, and where it will fail or collapse. It enables accurate identification of where to efficiently strengthen a building and where to put egress routes away from potential collapse areas.

Our analysis removed the church's earthquake prone rating, saving millions of dollars on strengthening work.

The project is considered a significant breakthrough by the international engineering community as it is the first full scale brick building application of this technology anywhere in the world. This will revolutionise the method for seismic assessment of existing buildings and has significant benefits to the community as building weaknesses can be efficiently rehabilitated and lives can be saved with planning of safe evacuation routes from occupied buildings.



Judging & Copyright Statement

This project is an entrant in the 2016 INNOVATE NZ Awards of Excellence competition. The winners will be celebrated at our Awards Gala Dinner on Saturday, 12th August 2017 in Taupo.

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