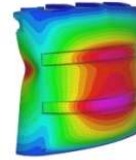


**Date:** June 2026  
**Client:** CSR Building Products



**David Beneke Consulting**  
Finite Element Analysis for Engineering

## FIRE SIMULATION OF 110 REDIWALL

David Beneke Consulting was commissioned by CSR Building Products to undertake a simulation of a fire test on a section of 110 RediWall.

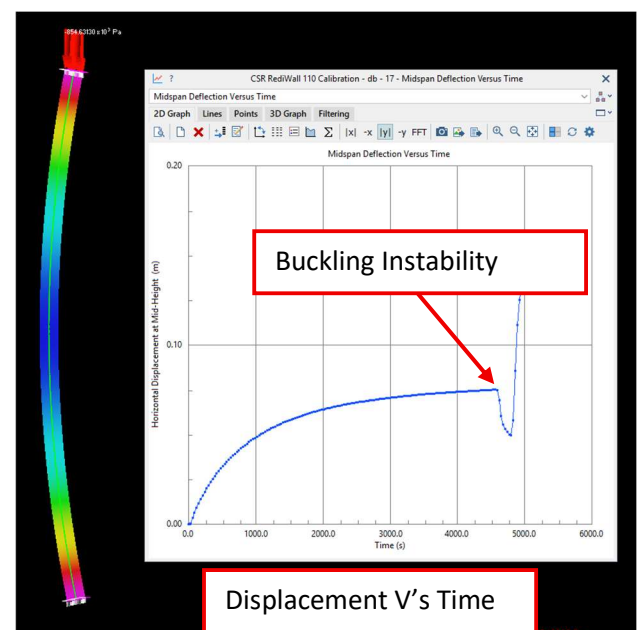
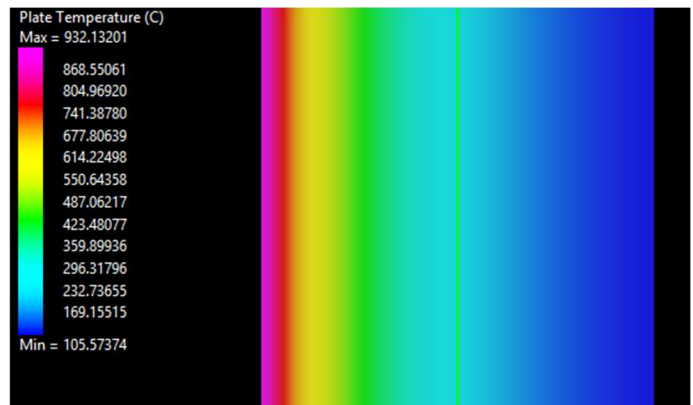
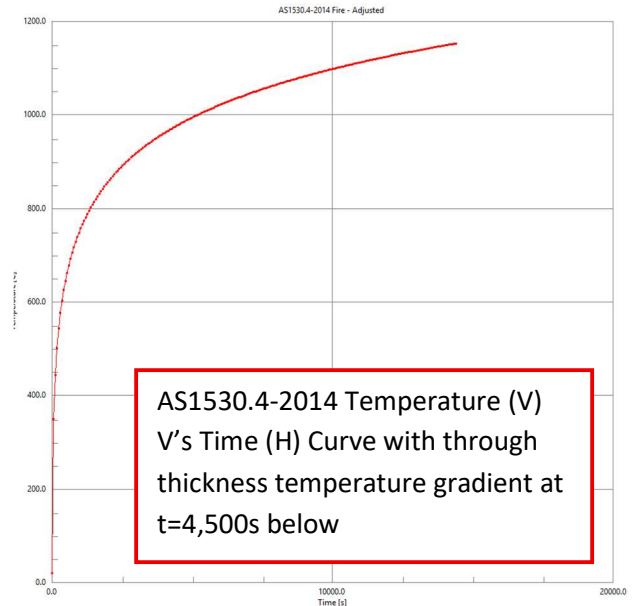
A full scale fire test was conducted by Exova Warrington Fire on section of standard height 110 Rediwall, being exposed to the AS1530.4-2014 fire whilst having an axial compression load applied over. Unfortunately, the specimen survived a time period that was less than anticipated. Our role in this project was to simulate the same fire event yet decrease the height of the wall by 10% to see if the survival period could be suitably enhanced.

The finite element analysis (FEA) model used in this project was relatively simple – 2D plain strain plate elements representing the concrete wall with a line element up the centre representing the embedded reinforcement. The analysis conducted was a coupled thermal/non-linear transient dynamic analysis incorporating material, geometric and boundary contact non-linearity.

For the initial calibration FEA model, the thermal gradient through the thickness of the 110 RediWall was established using a method previously published by Beneke, Chant and Hua (2004) in conjunction with the AS1530.4-2014 fire curve and the recorded temperatures on the unexposed surface of the specimen.

The calibrated thermal gradient was then applied to the FEA model in conjunction with the structural loads in a time-stepping non-linear transient analysis. Concrete elastic modulus versus temperature data was varied to achieve buckling in the FEA model consistent with the full scale test. Wall curvature limits immediately prior to failure was established also.

Once the FEA model had been calibrated, it had it's height reduced to see if this improved structural adequacy for an enhanced time period.



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