NEW COLD 2 – HIGH BAY SATTELITE RACKING
Non-Linear Global Analysis

Date: September 2016

Client: Dematic

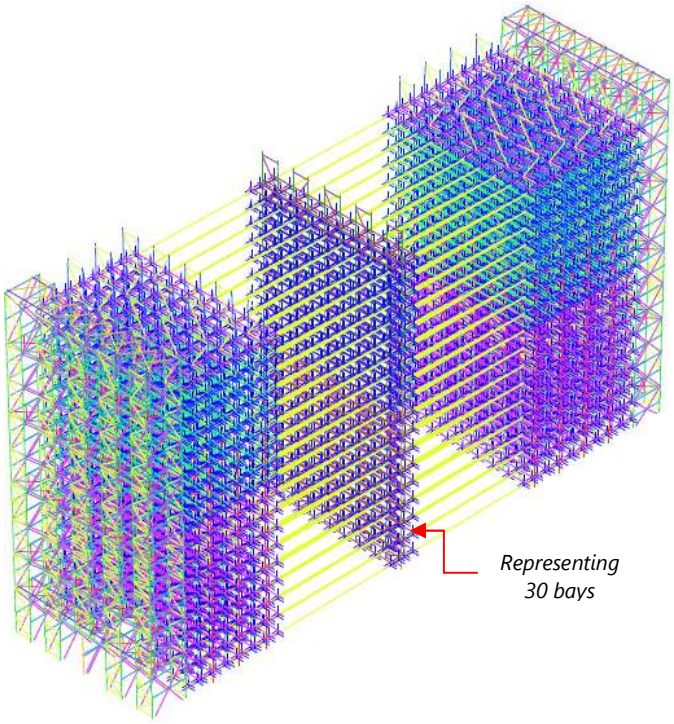
Project Description:

David Beneke Consulting was commissioned by Dematic to undertake a proof check of a high bay satellite racking system for their client New Cold.

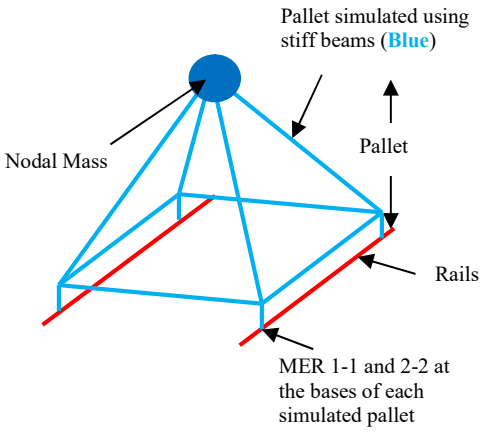
Individual 3D FEA models were created for the Static, Cross-aisle seismic and Down-aisle seismic analyses. The FEA models were created using 1D line elements representing uprights, frame braces, rails, sigma beams and bracing tower members. The inner 30 bays of the rack were represented by a single plane of frames with 30 times the mass and stiffness of a typical frame. This was done in order to reduce model size and computation time.

For the seismic analyses, the pallet masses were modelled at the centroid location of the pallet mass. Out of plumb, placement and impact loads were incorporated in the respective models in accordance with AS 4084 -2012. Seismic loads were calculated following NZS 1170.5:2004 and were applied as equivalent static loads at the mass centres of the pallet masses.

Geometric non-linear elastic analyses were carried out, from which member forces were extracted and the members were checked for ultimate strength following AS/NZS4600:2005. SLS deflections were computed with down-aisle and cross-aisle sway buckling followed by connection checks based on maximum combined actions derived from all three analyses cases.



Global 3D FEA model of the high bay satellite rack



Simulated pallet mass

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