WITRON LFS SEQUENCER
Non-Linear Static Analysis

Date: November 2019

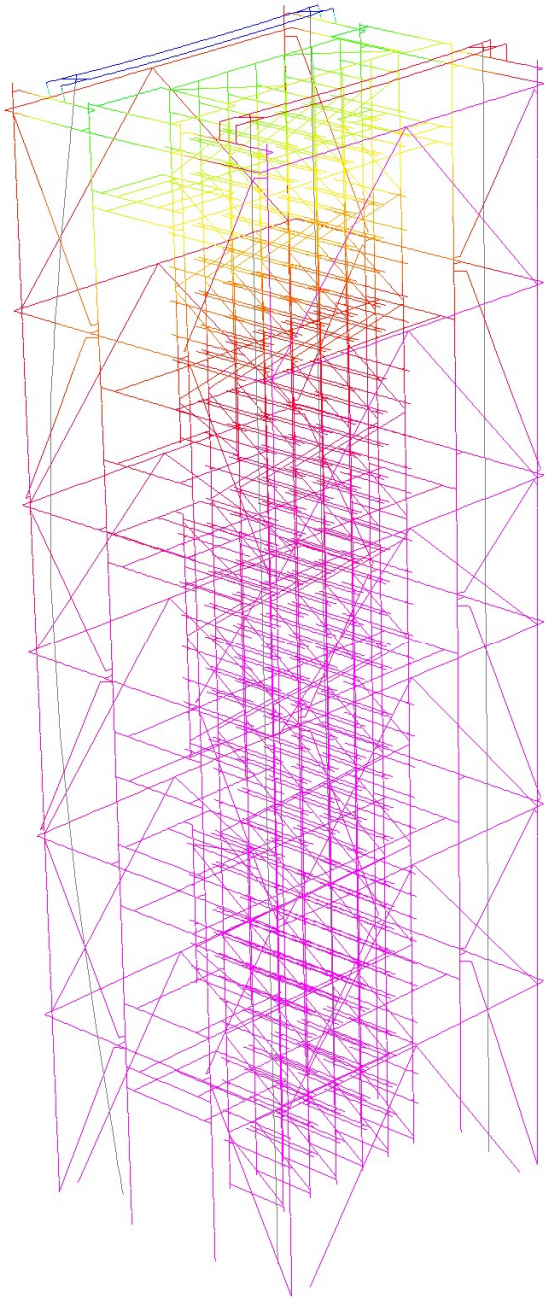
Client: Witron Germany

Project Description:

David Beneke Consulting was commissioned by Witron Germany to undertake a proof check of a LFS sequencer which forms part of a large automated distribution centre in Brisbane. The purpose of the sequencer is to temporarily store totes prior to being organised into a mixed pallet. The sequencer consists of both light gauge steel and hot rolled steel members. The hot rolled steel members are significant as they support a specialised lift which moves totes from ground based conveyors to and from the light gauge steel temporary storage compartments of the sequencer.

A 3D finite element analysis model of the sequencer was created from 1D line elements. Slender bracing elements were modelled using cut-off bars to simulate tension only behaviour. Small sections of mezzanine floor were also simulated within the FEA with 2D load patches applying the associated superimposed dead and live loads. Besides the load cases associated with storage loads and associated imperfections, the LFS also had to cope with 15 different load cases for the lift plus seismic loads not only of that for the LFS but also the surrounding mezzanine floor. A total of 71 different load case combinations were necessary to evaluate the sequencer at serviceability and ultimate limit state.

The analysis of this structure revealed that the predominant design actions were that associated with the lift - especially under emergency load case conditions.



Deflected shape LFS sequencer under emergency lift loads

Contact:
dbconsulting@live.com.au
davidbenekeconsulting.com
Ph +614 1257 5693
23 Narabang Way, Belrose NSW 2085