



DARLING WALK TANKS

Non-Linear Geometric Analysis

Date: June 2010

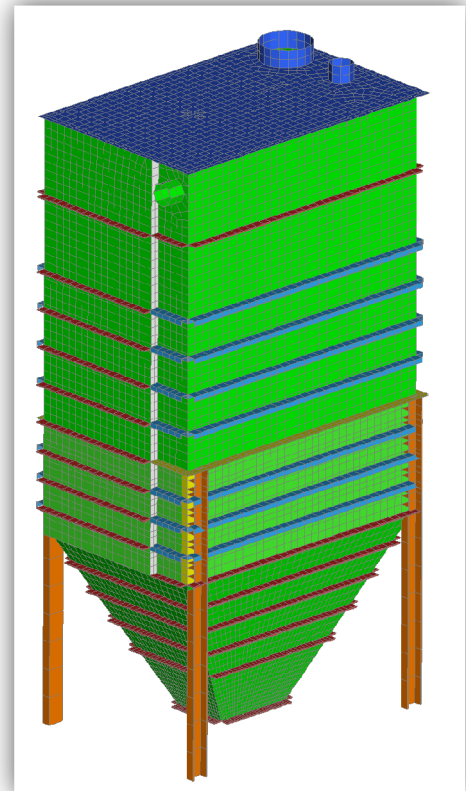
Client: Wright Barrat

Project Description:

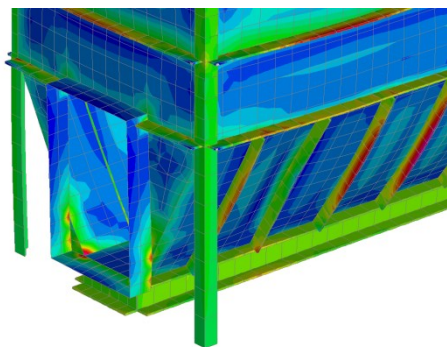
David Beneke Consulting was commissioned by Wright Barrat Civil and Structural Engineers on behalf of DTD Engineering to undertake a finite element analysis (FEA) of three rectangular above ground water storage tanks to be used in a water treatment plant at Darling Walk, Sydney. These three tanks consisted of an MBBR, MBR and buffer tanks. All three tanks are manufactured from Grade 304 and 316 stainless steel and generally consist of wall panels with intermediate stiffeners and internal tie rods. The purpose of the FEA was to facilitate a proof check of the tanks to ensure that their design satisfied the requirements of AS/NZS1170.0 and AS4100.

The geometry for each tank was generated by hand and meshed using QUAD4 plate/shell elements for the wall plate and 1D line elements for the wall stiffeners and internal tie rods. Penetrations roof access and piping were included in the FEA model as with hatches in the lower sections. The stainless steel material was modelled as linear elastic with stress limits as per AS4100 and deflection limits as per AS/NZS1170.0.

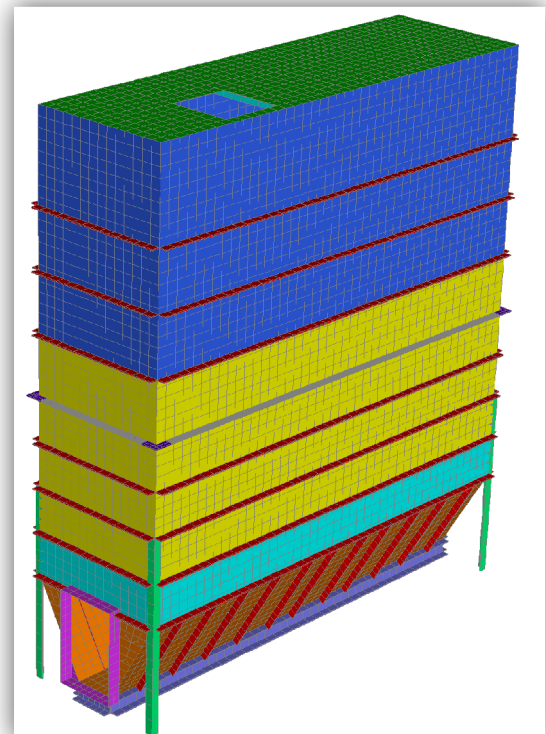
Based on a series of non-linear geometric analyses, our proof check examined ultimate limit state stress limits, buckling instability at ultimate load & serviceability deflection.



FEA Model of the MBR tank



Ultimate stress contour around the lower hatch of the buffer tank



FEA Model of the Buffer tank

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