

GLOBAL ROTOMOULDING - UNDERGROUND SEPTIC TANKS

Non-Linear Geometric and Material Optimisation Analysis

Date: June 2014

Client: Trymak

Project Description:

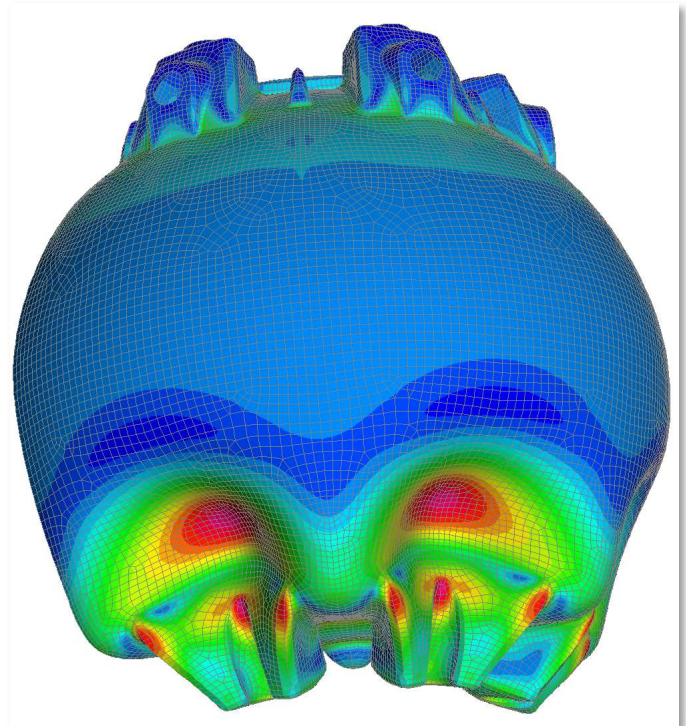
David Beneke Consulting was commissioned by Trymak Product Development to undertake a finite element analysis and material optimisation of a 3,000 litre and 5,000 litre underground septic tanks. Both tanks were to be manufactured using the rotational moulding process and as such it was important to reduce material costs to a minimum.

Each septic tank was modelled using 2D plate/shell quad4 elements. The loading applied to the septic tanks was based on AS/NZS1546.1-2006 and consisted of the following:

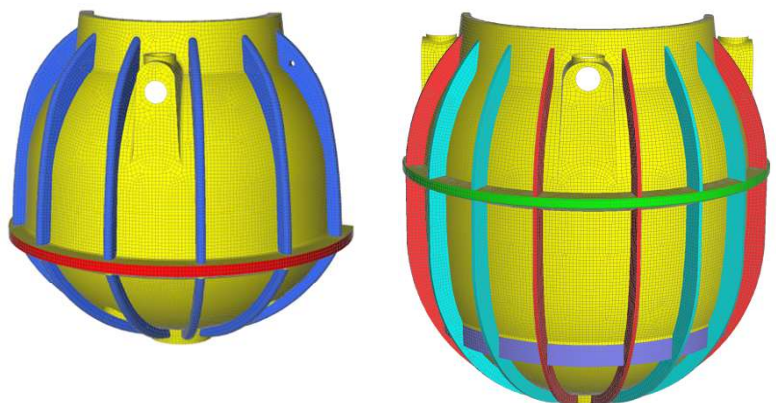
- Simulated top Simulated pallet masses for earthquake loading
- Simulated lat
- 11 kPa/m depth design load

These loads were then factored in accordance with limit state design principles with assigned material properties dependant of time of loading.

Non-linear geometric analysis was used to analyse the septic tanks. Early analysis runs indicated that global buckling dominated the design thus requiring changes of the geometry to ensure that buckling at ultimate limit state did not occur. Once this had been addressed the material thickness for each septic tank was optimised.



Global buckling of an earlier version of the 3,000 litre septic tank



Final versions of the 3,00 litre and 6,000 litre septic tanks

Contact:

dbconsulting@live.com.au

Ph +614 1257 5693

23 Narabang Way, Belrose NSW 2085