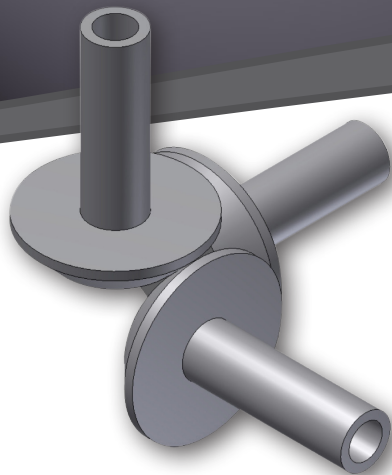
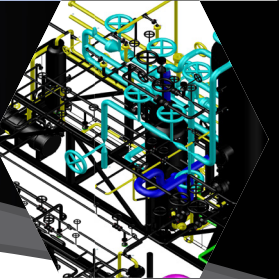
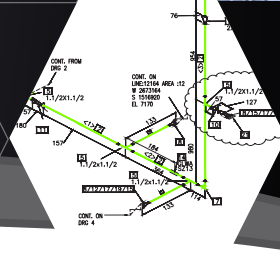
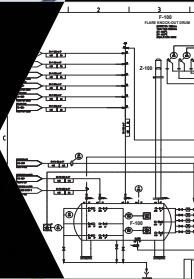
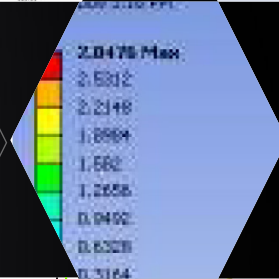
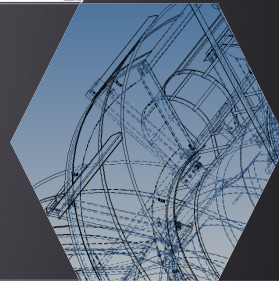
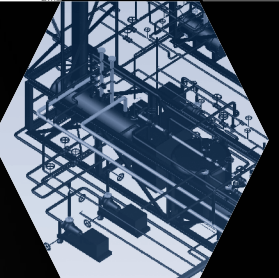
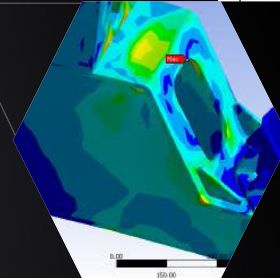
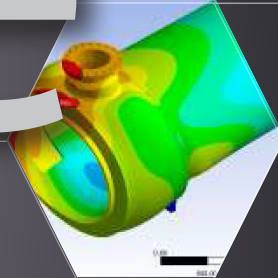
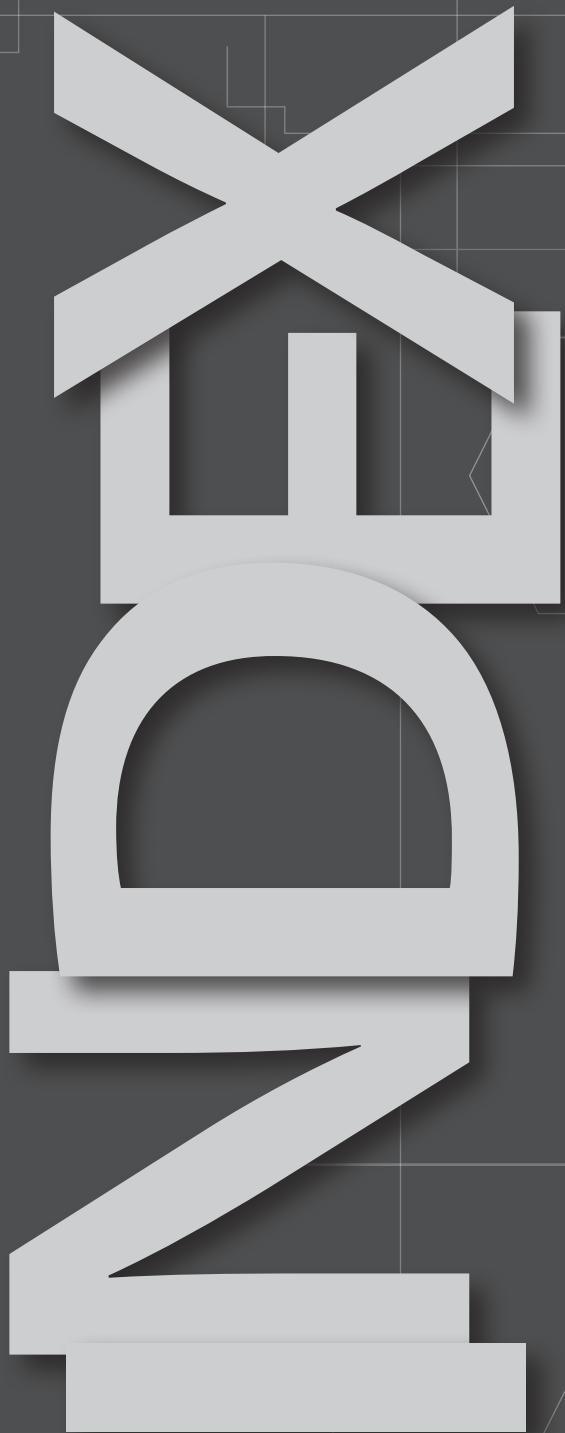


Company Profile



AXIS DEVELOPMENTS CC



Overview

p3

Piping Engineering

p4

Petro-Chemical

p5-6

Nuclear & Alternative Energy

p7-8

Transport

p9-11

HVAC

p12

Manufacturing

p13

Contact

p14



OVERVIEW

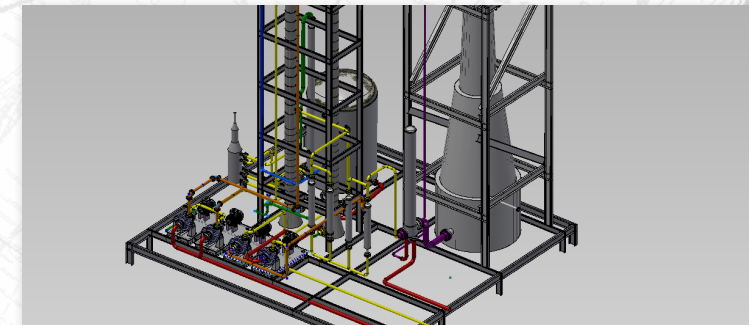
Axis Developments is a consulting engineering company performing designs of machinery, pressure vessels, structures, vehicles for the following industries:

- Piping Engineering
- Petro-Chemical
- Nuclear
- Defence
- Transport
- Security
- HVAC
- Manufacturing

Axis Developments does work, for mainly the South African industries, but also has experience working for the armoured and leisure vehicle industries in the USA.

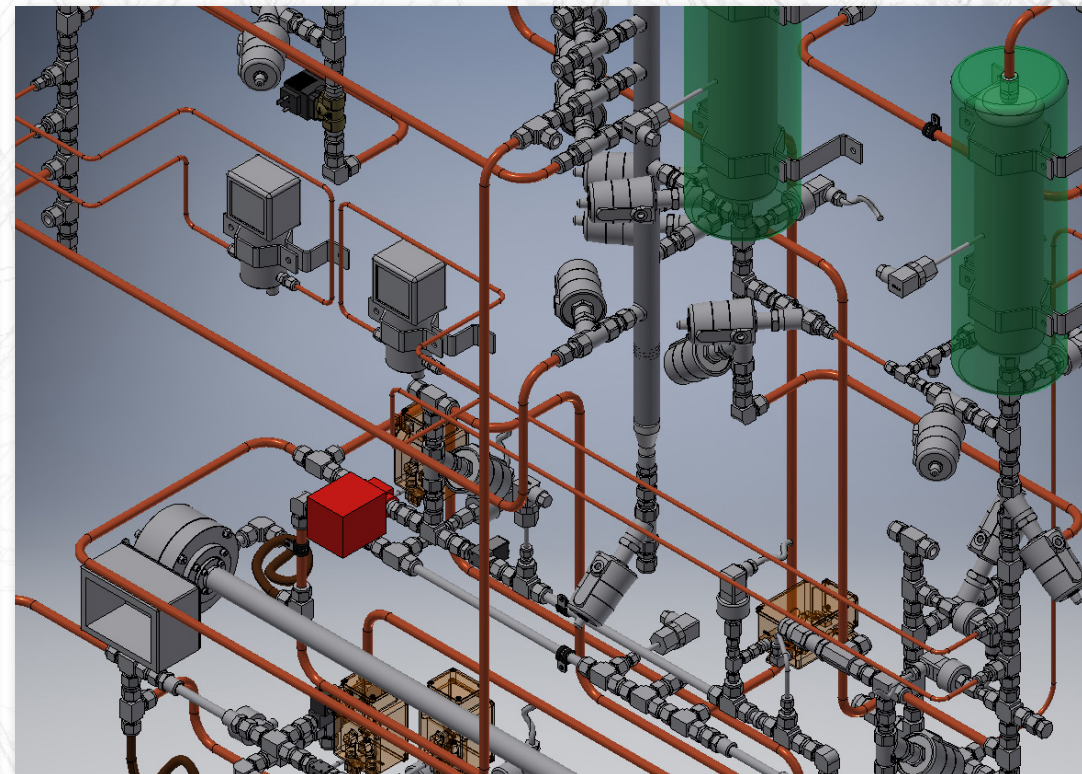
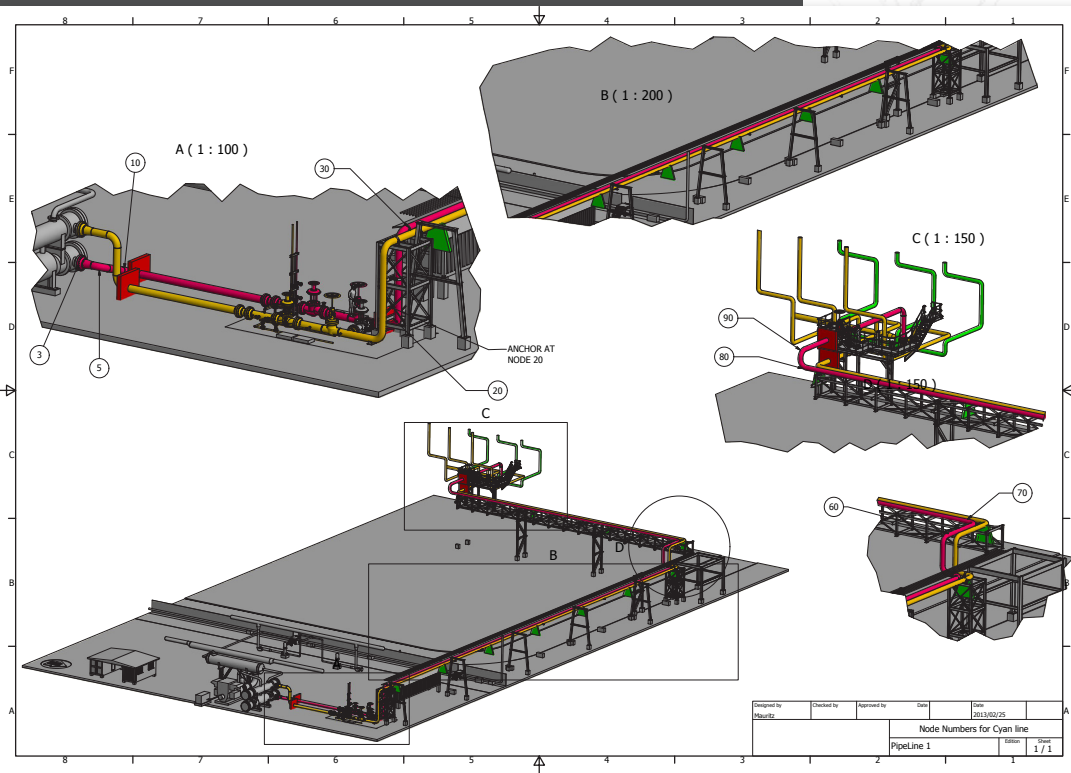
The firm was established in 1991 specialising in the design of special machinery and vehicles. The projects undertaken then were typically the design of fire engines and special vehicles and special testing facilities for the military. The CC gradually moved from design only, to both design

and manufacture. The manufacturing capabilities started in 1994 when the firm was contracted to manufacture anti riot water canon vehicles for crowd control during the 1994 elections. Manufacturing and fabrication continued till 2009 when it was decided to scale down the company's activities to consulting engineering only. By then the company had vast experience of both design and manufacture to serve the industry with experience driven design and planning.



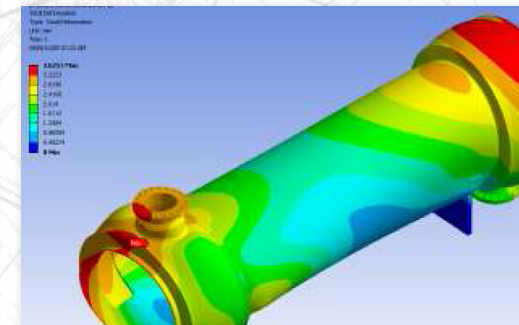
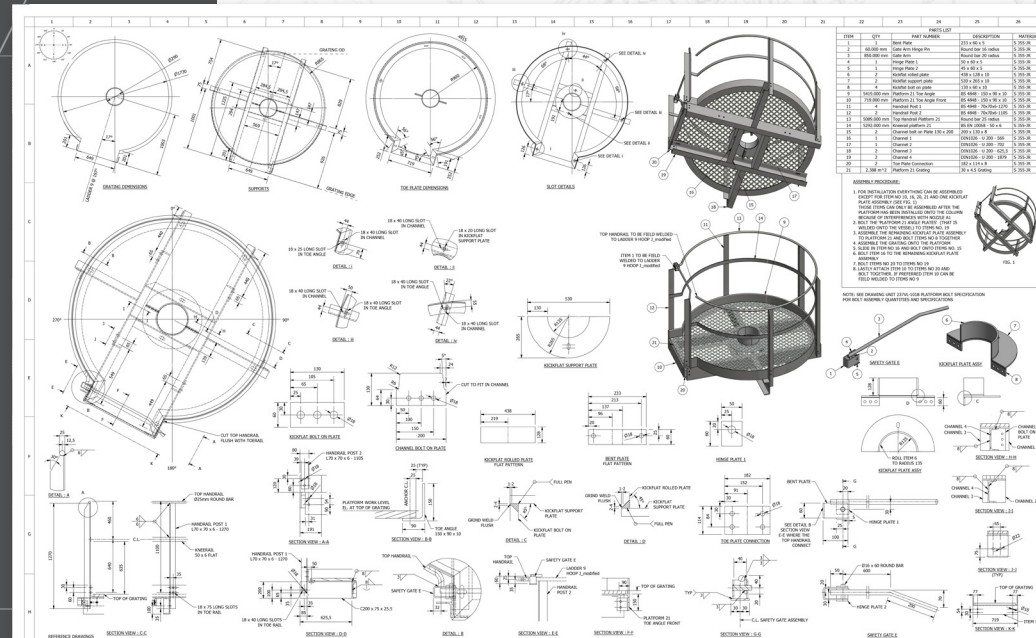
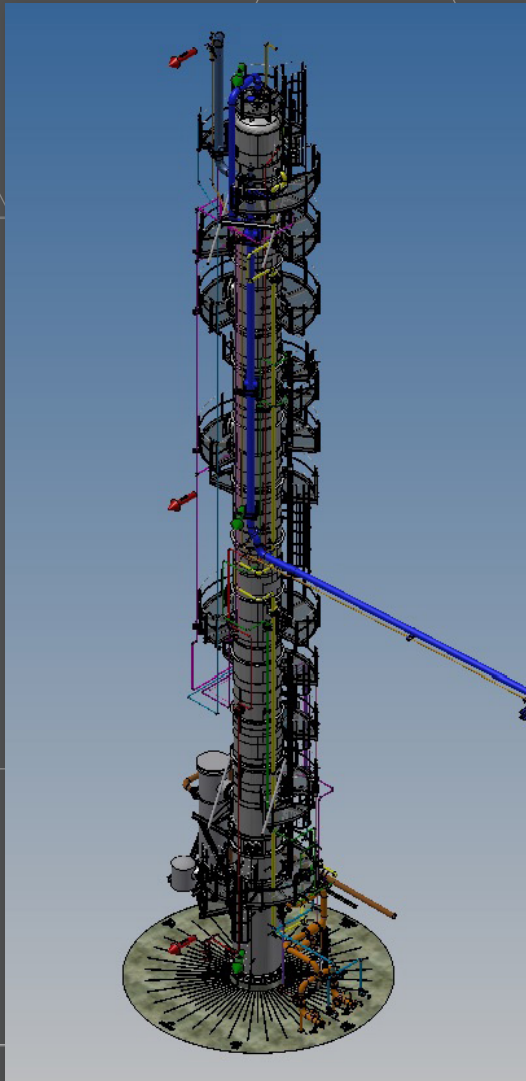
PIPING ENGINEERING

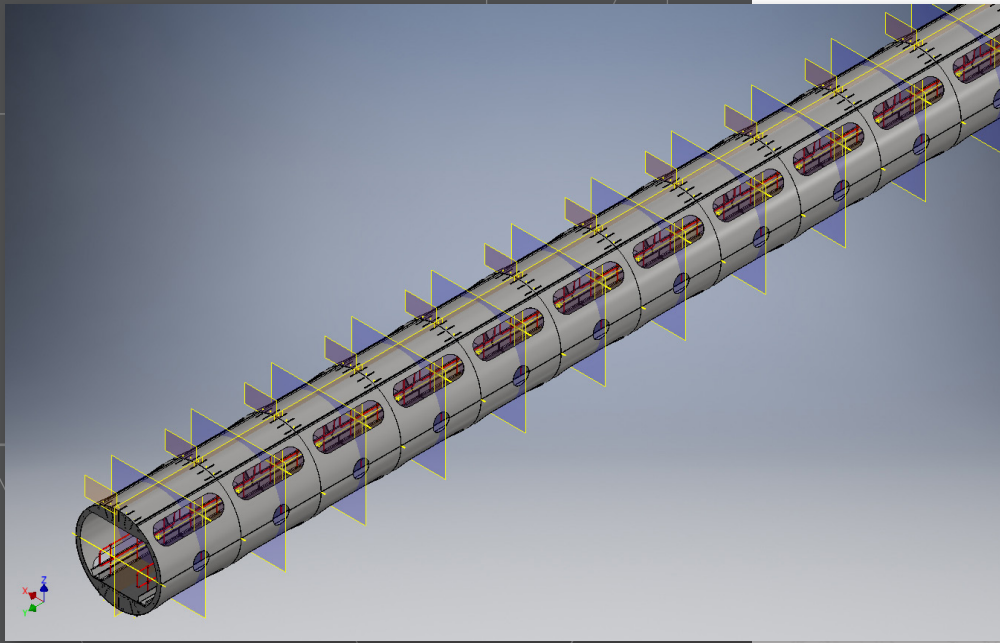
Design and stressing of piping systems happen on a continuous basis in our office. We use CAESAR piping stress software for the stressing of the pipe systems. Where the situation calls for more sophisticated stress analyses we do numerical stressing using ANSYS Finite Element Analysis software.



- Stress verification on pressure vessels and heat exchangers is done according to the ASME and other related codes. Typical customer SASOL and PBMR.
- Mechanical design is done on pressure vessels and heat exchangers, piping systems, distillation columns and more. This is done to the level of fabrication drawings. Typical customer SASOL. Software used for the evaluation of pressure vessels in accordance with the ASME VIII pressure vessel code is COMPRESS.
- Finite Element analyses are done on special pressure vessels for the petrochemical industry.

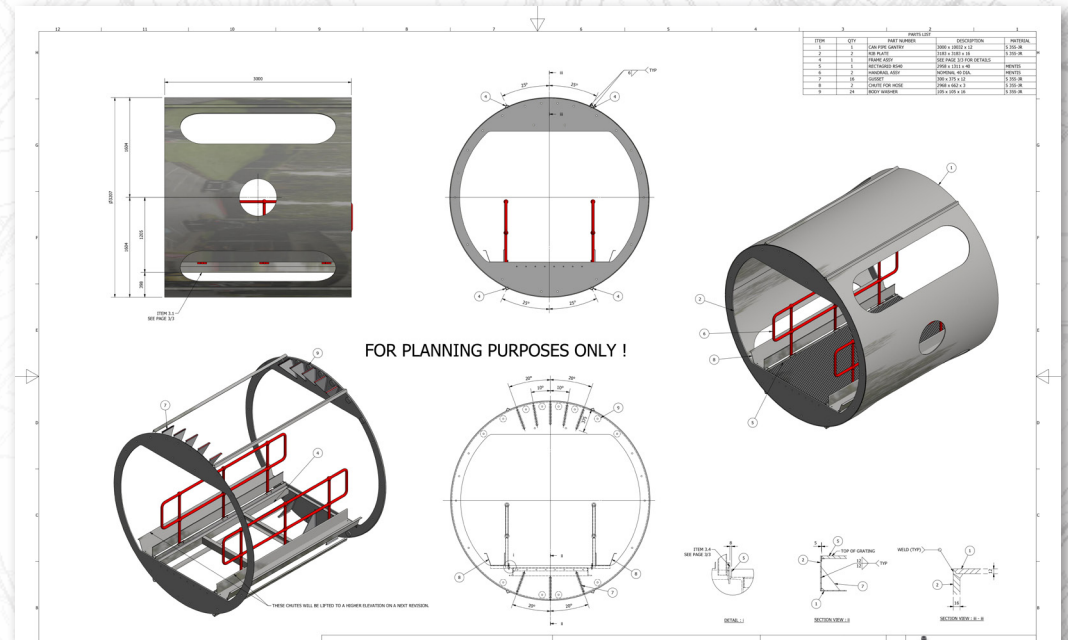
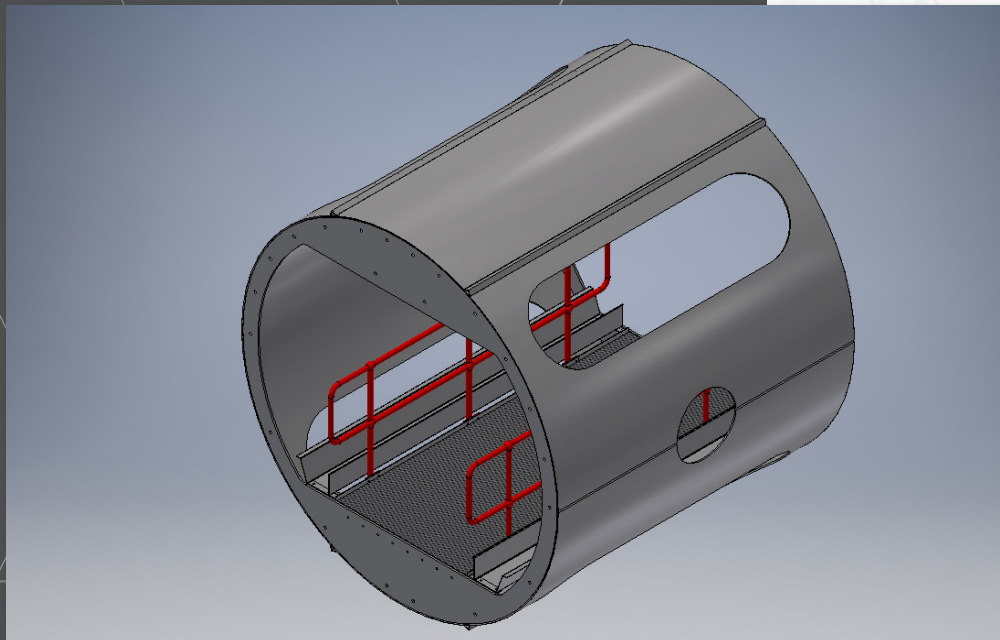
These are dynamic analyses of distillation columns and static stress analyses of distillation columns and heat exchangers.





Currently we are busy with the detail engineering for Basil Read on a new fuel storage depot on the island of St Helena. The disciplines what we are responsible for are:

- Pipe line design
- Structural design
- Tank design

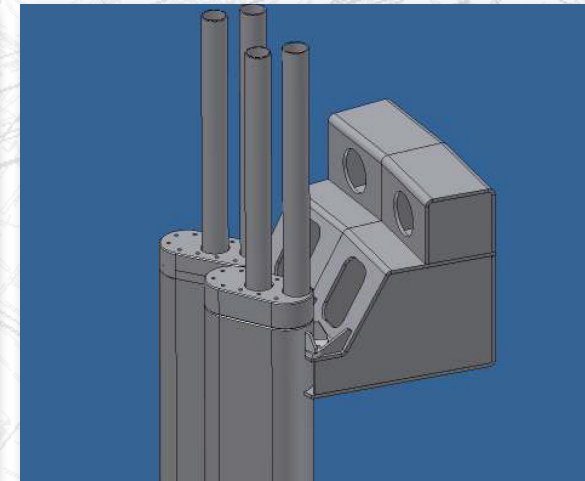
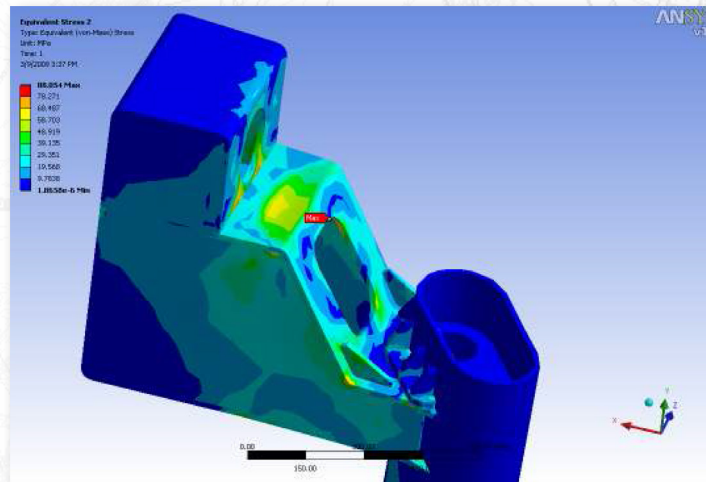
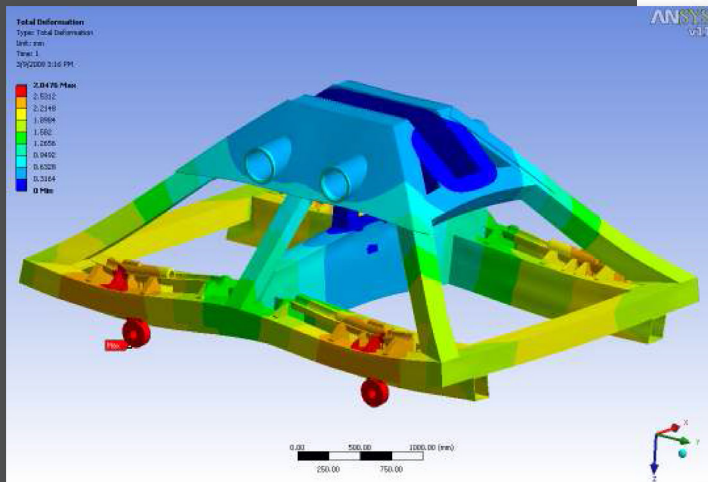
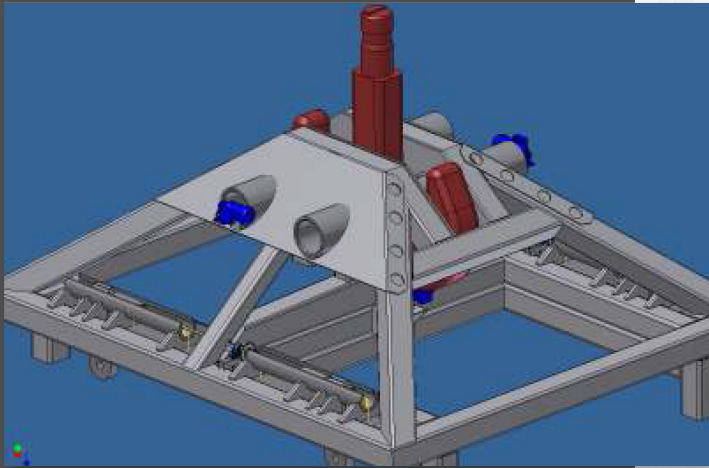


NUCLEAR & ALTERNATIVE ENERGY

NUCLEAR

From September 2008 till March 2009 work was done for the PBMR (Pebble Bed Modular Reactor, Company) in Pretoria on structural and component design of nuclear safety critical components and structures, mainly according to the ASME pressure vessel codes. Designs were verified and optimised making use of finite element analyses (FEA) methods.

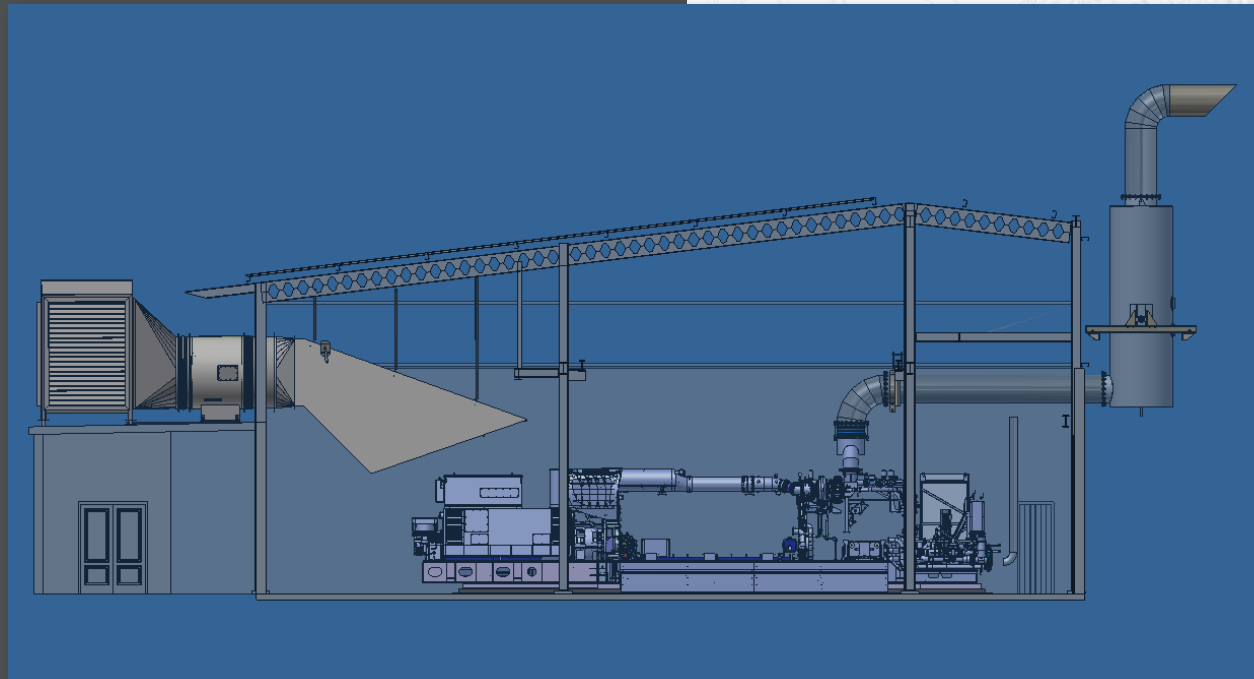
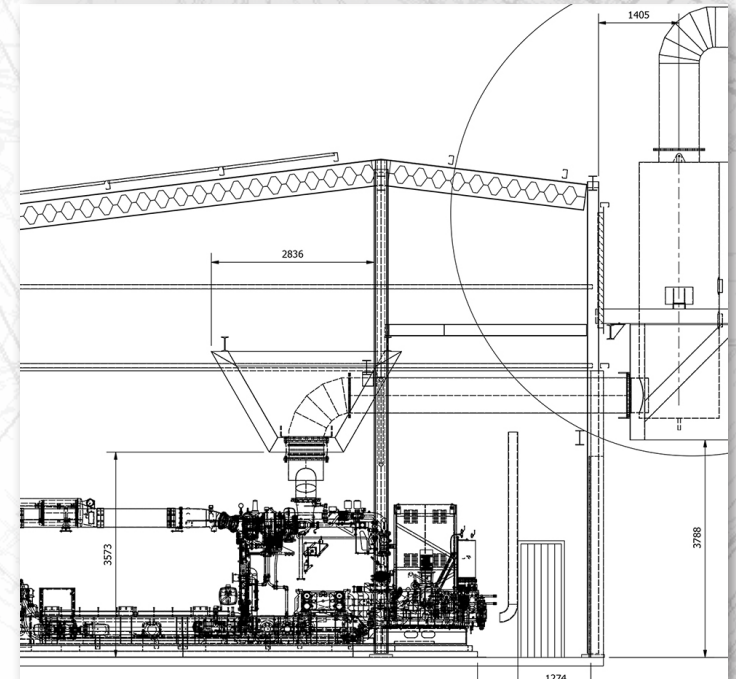
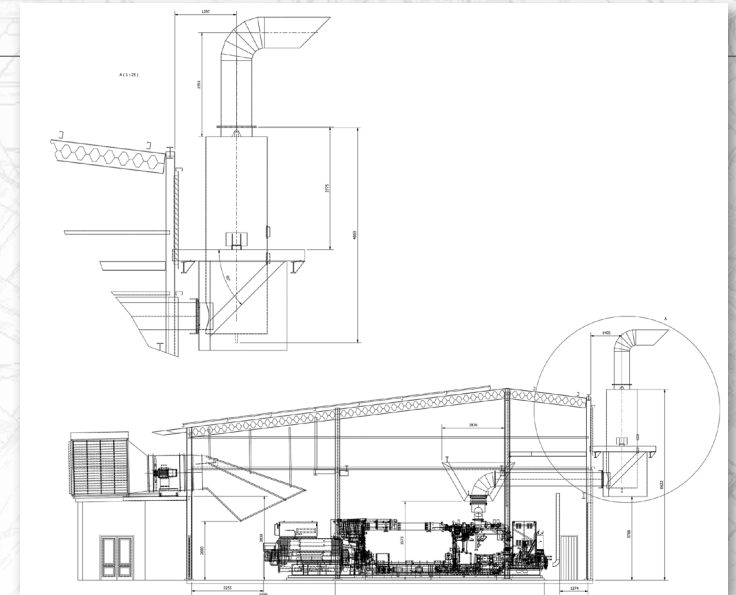
- A lifting frame with a capacity of lifting a 200 ton load was designed. The design was optimised with ANSYS finite element analysis (FEA) software.
- A support structure for a cooling system required to protect the concrete of the reactor building was designed. These weld assembly designs were also optimized making use of FEA software.



GAS POWER GENERATION

In 2015 we have been involved in the detail engineering of a gas engine power station built by Group Five in Mozambique at Kuvaninga. The disciplines which we were responsible for were:

- Ventilation
- Filtration of air
- Services pipework
- Exhaust of combustion gases\
- Substructures of services



TRANSPORT

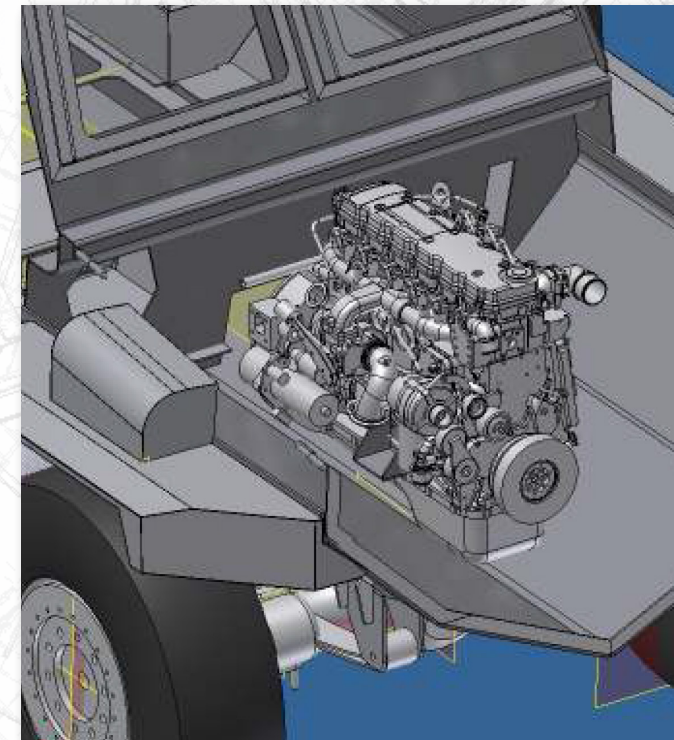
Military

Design of various mine resistant armoured personnel (MRAP) vehicles.

These included the design of the following subsystems:

- Drive train combinations including dynamic and performance calculation and simulation of vehicles with different combinations of engines, transmissions and final drives.
- Design of suspension sub-systems
- Design and sizing of engine, air to water heat exchanger (radiator)
- Design and sizing of engine turbo charger intercooler
- Design and layout of air conditioning subsystem.
- Design of vehicle hull structure, with optimization and verification utilizing FEA techniques.

- Design entire cash-in-transit (CIT) vehicles as well as VIP carriers armoured against various levels of gunfire.
- Design of overpressure and particle / gas filtration systems to protect against nuclear, bacterial and chemical (NBC) warfare attacks.
- Design of, and equipping a 6x6 all terrain vehicle for monitoring of NBC contamination.
- Design of suspension testing system for the testing of aircraft undercarriage systems.
- Design of driver control systems for 2 types of main battle tanks
- Design of 2 tracked logistic vehicles for support of main battle tanks: one a recovery vehicle and the other a mobile workshop.
- Design of fatigue testing machines for the testing of fatigue characteristics of helicopter blades and oversight of building and commissioning.



TRANSPORT

Load bodies

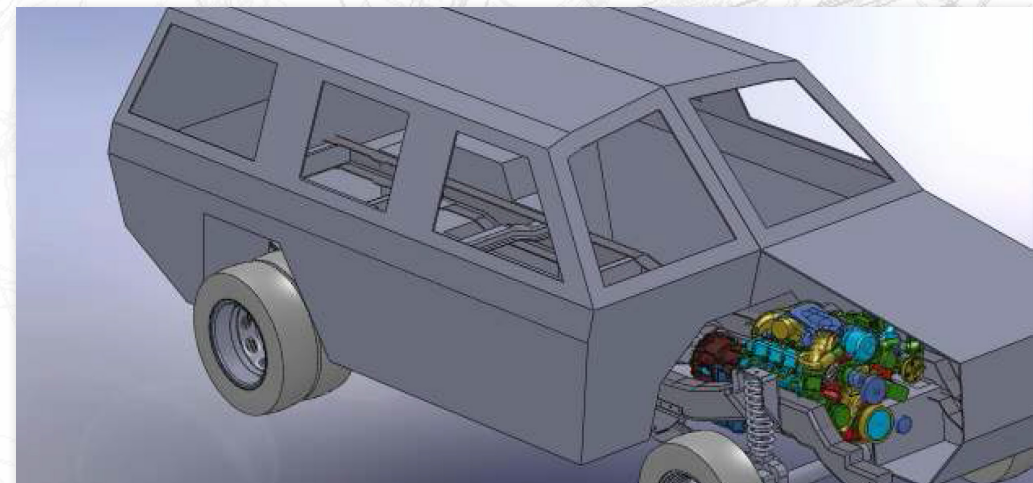
- Design and building of Low Mass load bodies for heavy-duty trucks to maximise legal payload on public roads. These load bodies are made of either Aluminium or high strength steel. To minimise the weight, finite element analysis (FEA) had to be implemented to cut away all unnecessary material. 12-heavy-duty-lightweight.pdf



- Design and build of low mass trailers (25 tonne payload) fabricated entirely from aluminium to be used in combination with light bodied trucks to maximize the legal payload on public roads.
- Design and build of cryogenic testing chambers for an automotive electronics company to test lead free soldering crystal growth below minus 40 ° C.

These chambers could operate at below minus 50° C and made use of 2 refrigeration circuits in tandem using R22 and R23 refrigerants.

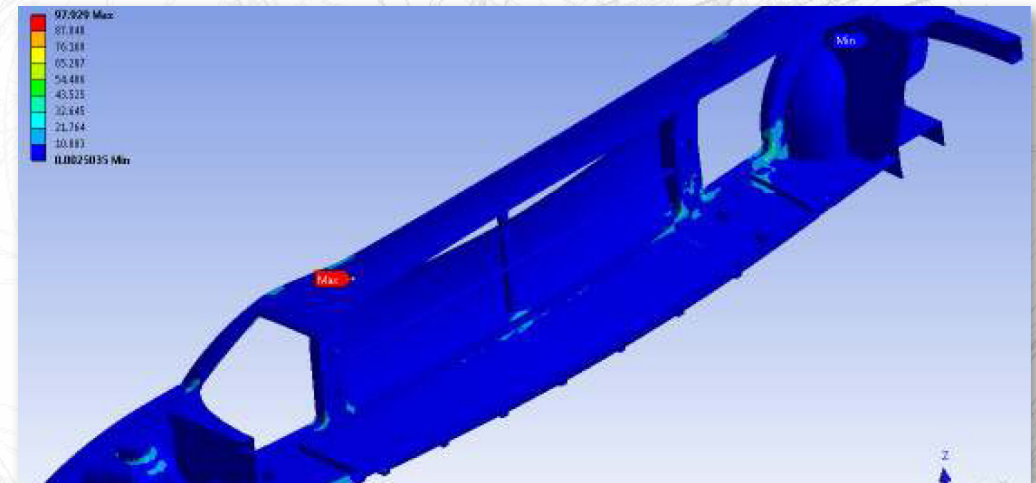
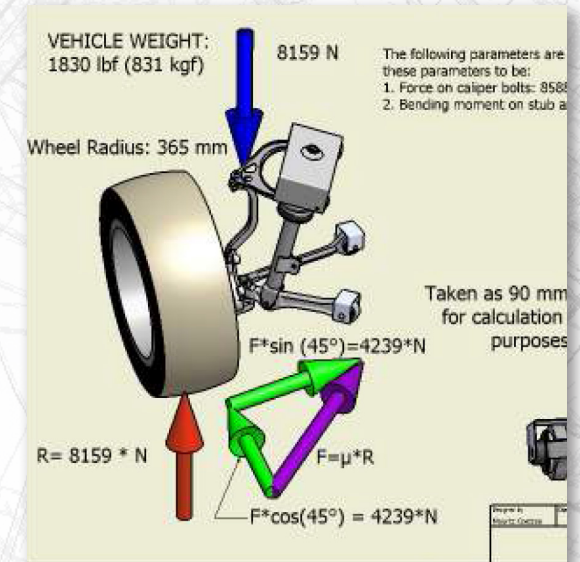
- Investigation into the design integrity of a stretched Chrysler 300 limousine, making use of FEA methods. This was done for a coach building company in Springfield Missouri in the USA.



TRANSPORT

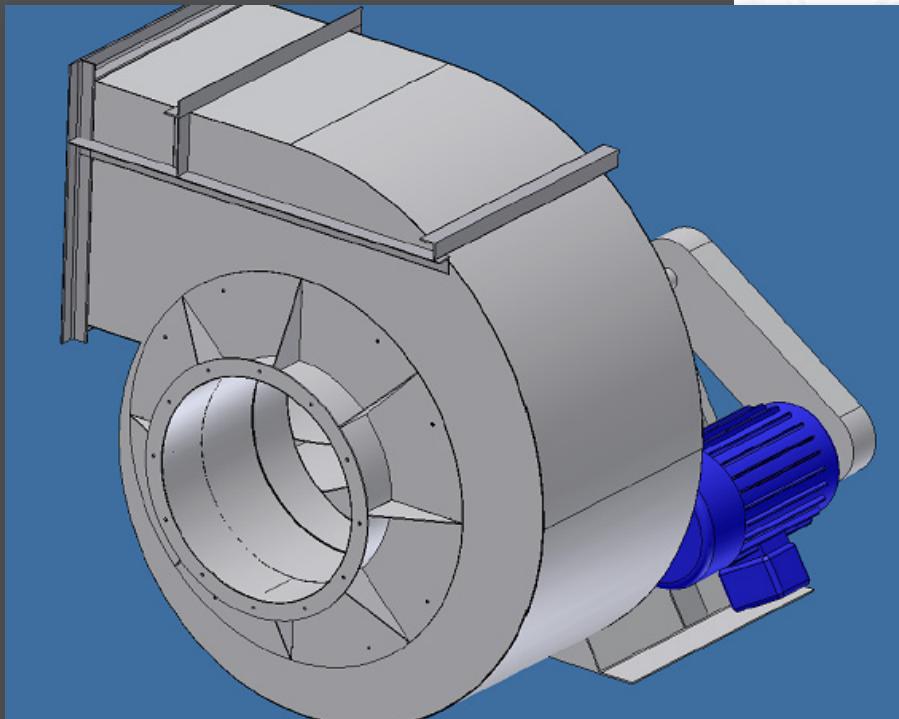
Certification of the stretched Chrysler limousine, of which 20 had been sold to a British customer, was required by the British Automotive authorities. Structural analyses on the suspension components, and the stretched hull, using finite element analysis (FEA) techniques was done to determine safety margins on the vehicle.

- Modelling up the suspension components of the stretched Chrysler Limousine and verify the integrity using FEA methods.
- Design and manufacture of the air conditioning systems for the Transnet Blue Trains (2 train sets)
- Design and development of a revolutionary new lightweight heavy haulage NTST trailer system for Scully-Coetzee Trailers.



HEATING VENTILATION & AIR CONDITIONING

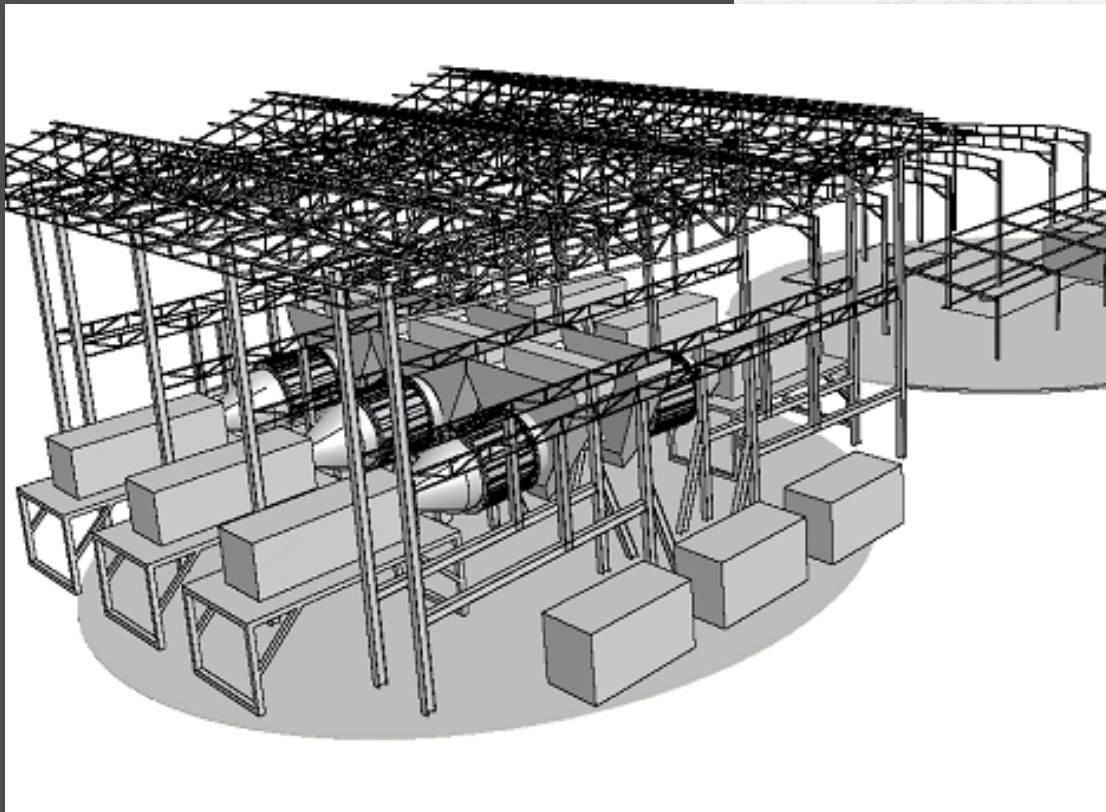
- Low cost water chilling machines for the bakery industry
- Water chillers for train air conditioning
- Shell and tube heat exchangers



- An air conditioning system for 2 luxury tourist train sets including the compact air handling units for each individual compartment.
- Centrifugal fans and blowers for ventilation up to 25 cubic meters/sec (size limited by factory electrical installation capacity limit) These are both single as well as double inlet centrifugal fans
- Cyclones for particle separation, for wood industry as well as for coal fired power stations.
- Air handling and filtration plants.
- Design of mechanical building services for a new hospital complex including air-conditioning, heating, special clean air filtration, medical gasses layouts, morgues, steam heating and reticulation installations, the steam generation installation and the incinerator facility. (This was done in capacity as a consulting engineer and applicant was not involved in manufacturing)
- Design of a wet scrubber plant for a fertilizer manufacturer

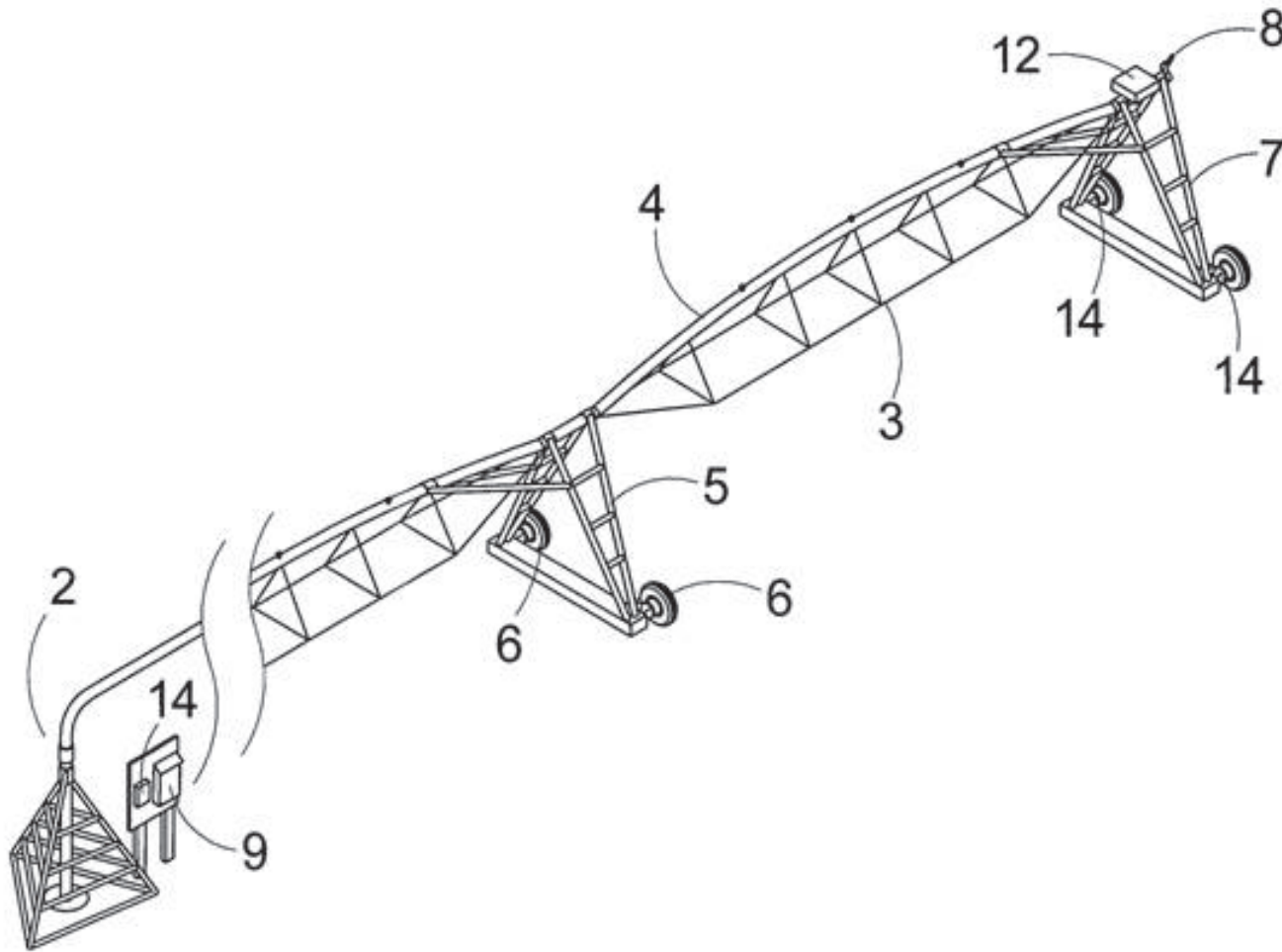
DESIGN + BUILDING OF GENERAL MACHINERY & STRUCTURES

- Various machinery structures and bases for general industry, minerals processing industry and mining applications.



- Rotary drying kilns for a fertiliser manufacturing plant.
- Conveyors: various types: Belt conveyors, screw conveyors, shaft less screw conveyors, conveyors and turn tables for the food industry, conveyors for baggage handling systems at airports, conveyors for the automotive part manufacturing industry.
- Various blenders and mixers for general industry
- A vegetable washing machine for the fresh produce packaging industry.
- Low cost re-usable collapsible hydraulic struts for the underground mining industry.
- A debarking and de-branching machine for wood log harvesting, which also could cut the harvested logs to specific lengths. One prototype of this machine was built.
- Drying machines to dry sporting (cricket) fields after rain for quick resumption of games (for the cricket world cup tournament in South Africa)

PIVOT POINT IRRIGATION SYSTEMS



In the field agricultural machinery, we have experience in the development of pivot point irrigation systems. An alternative method of construction was developed and intergrated into an existing operational system for a farmer in the Christiana District.

REVERSE ENGINEERING & 3D SCANNING

- 3D scanning service, effortlessly capture the 3D shape of any object
- Reverse engineering of 3D captured point cloud to CAD file

RAPID PROTOTYPING

VIRTUAL METALCASTING

- Virtual experimentation and optimization in all metalcasting applications
- Optimising processes from design to final product
- Improving casting quality and optimisation of yields

VIRTUAL MOLDING

- Detailed optimization of injection molding processes
- Analyze and optimize your processes and molds
- Increased efficiency and part quality
- Resolve problems before they even appear
- Predict part warpage and to avoid mechanical weaknesses in the part.
- Optimizing cycle time and to precisely predict the cooling behavior

MANUFACTURING PROCESSES

LASER SINTERING PROCESS (SLS)

- Nylon and Metal powders

FUSED DEPOSIT METHOD (FDM)

- ABS / PLA / Flexible / Nylon / Wood

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