Finite Element Analysis (FEA)
Capabilities Statement

MISSION STATEMENT

To deliver results of business advantage for our customer through the application of world class technical computing solutions backed by leading professional expertise, responsive customer relations and long-term business partnerships

SOFTWARE SOLUTIONS

Abaqus/Standard, Abaqus/Explicit, Abaqus/CAE, Abaqus composite modeller, FE Safe
UGS FEMAP, NX Nastran

EXPERTLY TRAINED AND EXPERIENCED CAE PERSONNEL

Don Campbell
- BSc, BE(Hons), PhD, MIPENZ (Mech), CPEng, IntPE, NAFEMS Advanced Registered Analyst, over 45 years CAE/FEA experience across many industries.

Paul Bosauder
- BE(Hons), NAFEMS Advanced Registered Analyst, over 20 years FEA/CFD experience, specialisation in CFD, heat transfer, non-linear, and composites.

James Cheng
- BE(Mech), ME(Mech), over 18 years in FEA, fracture mechanics, material and structural failure analysis, pressure vessel design, plastics injection molding.

James Hamilton
- BE(Hons), PhD, MIPENZ (Mech), CPEng, IntPE over 20 years FEA, experience in acoustics, aerospace and software customisation, rigid and flexible body dynamics, composites and highly non-linear simulation.

EXAMPLE FEA CONSULTING PROJECTS

Power Generation
- Non-linear static analysis of generator end rings allowing for shrink fits, centrifugal loads and thermal loads due to differential expansion
- Stress and fatigue analysis of hydro intake screen bars subjected to hydrostatic pressure and cycle loadings due to vortex shedding
- Static analysis of turbine blade to compare different repair scenarios
- Fluid-structure interaction dynamic analysis of separator with vortex shedding loads.
- Low speed shaft and gearbox casing fatigue analysis for wind generator

Plant and Process
- Explicit dynamic analysis of tube bundle impact onto safety net structure
- API579 code life assessment analysis, corroded pressure vessel and thick tubesheet, non-linear elastic/plastic large displacement analysis
- Transient dynamic analysis of rotating rock crusher with out-of-balance loads
- Non-linear heat transfer/thermal stress analysis, furnace fan taking into account radiation, convection and conduction
- Creep analysis of critical high temperature reformer components
- Multiple analyses of pressure vessels to BS5500 and ASME VIII using latest non-linear approach, where the dimensions or position of the nozzles lie outside the code
- Multiple code based analyses of milk silos including seismic loads and fatigue from fill/empty and CIP cycles
- Assessment of thin walled driers under powder explosive loads to assist with vent design.
- Design/optimisation of sheet metal vessel for transporting milk powder

FEA Capabilities Statement, *continued*

EXAMPLE FEA CONSULTING PROJECTS, continued

Biomedical and Healthcare

- Highly non-linear analysis of hyperelastic membrane for squeezing the aorta
- Design of forming machine to manufacture tools for removing polyps.
- Simulation of deformation of multistrand wire to be inserted in catheter.
- Design and prototype manufacture and testing of flexible ankle walker

Marine

- Analyses of variety of components including, masts, booms, winches, keels etc. Includes stability (buckling) and fatigue assessments.
- Stress analyses of over 20 global yacht models for both composite and alloy yachts.
- Hull and rigging analyses for Team NZ and development of analysis procedure for America's Cup campaigns since 1995.

Geotechnical

- Life assessment of damaged (corrosion and soil settlement) buried sewer line
- Design and analysis of buried tanks under soil and traffic loading
- Response spectrum analysis of dam taking into account the water mass

Automotive and Transportation

- Non-linear elastic plastic analysis of roll over protection structures
- Design and analysis of composite luxury vehicle for desert travel
- Numerous fatigue analyses of cast aluminium wheels
- Optimisation of car wheel to raise natural frequency and minimise weight

Engineering Design

- Design and analysis of rubber seals for large PVC piping joints
- Simulated drop test of large water filled container with fluid explicitly modelled
- Dynamic analysis of compressor flapper valve
- Design of covered conveyor structure for wind, seismic, dead and live loads.
- Design and analysis of over 100 tanks to AS/NZS 4766:2006
- Design of new roofing profile (with patent) and subsequent physical testing

Defence

- Non-linear impact analysis of missile container with shock mounts
- Transient dynamic analyses for the ANZAC Frigates. Work verified by Amecon, Blohm & Voss and the Australian Defence Force
- Analysis of lifting lugs for landing crafts

OTHER CAE SERVICE

- Introductory and advanced training courses on CAE methods
- Benchmark evaluations of CAE methods, applications and software
- On-site CAE best practices seminars, workshops and tutorials

ADDITIONAL CONSULTING CAPABILITIES

- Computational fluid dynamics
- Composites analysis
- Design & optimisation including DOE and other statistical methods
- Fitness for service assessment

WE UNDERSTAND TECHNICAL COMPUTING

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