



# GENERAL MECHANICAL ENGINEERING

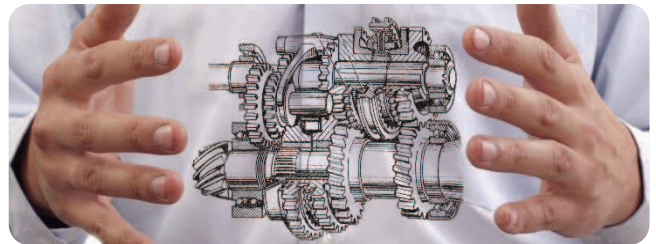
*Reducing safety and operational risk by ensuring integrity and optimising availability, utilisation and useful life of critical equipment.*

## SERVICES

- Design reviews
- Failure investigation and analysis
- Strain monitoring, fatigue analysis, and remnant life assessment
- Simulation and analysis
- Project engineering

## BUSINESS CHALLENGE

Businesses require a high level of confidence in the safe, reliable, and optimal functioning of their operations and the underlying equipment. For these reasons, it is important to have the requisite assurance that equipment is designed fit-for-purpose, assets are managed effectively, and that solutions are evaluated and implemented timeously and cost effectively.



## SOLUTIONS

### Design reviews

Our engineers are experienced in performing independent reviews of the design intent of engineered systems or processes, as defined by documented standards and aim to identify errors or failures in the design or operation.

We typically provide two types of systematic design reviews according to the needs of our clients:

- 100% appraisal of the design against relevant design standards; and
- A verification, or sampling, review against standards defined by the facility operator.



Specialist engineers assess all safety aspects of the plant design and check the compliance with international standards and requirements. The design appraisal is performed through a review of the design documents prepared by the designer or manufacturer, including the drawings, calculations, specifications and functional diagrams. The review includes independent analysis such as checks on design calculations, detailed inspections of drawings and specifications.

### Failure investigation and analysis

Our engineers are experienced in investigating and identifying the root cause of failures and putting forward appropriate corrective actions to prevent potential reoccurrence. Some of the techniques employed include fatigue analysis and fracture mechanics, whereby the propagation of cracks in structures or components is investigated and the driving force on such cracks is determined.

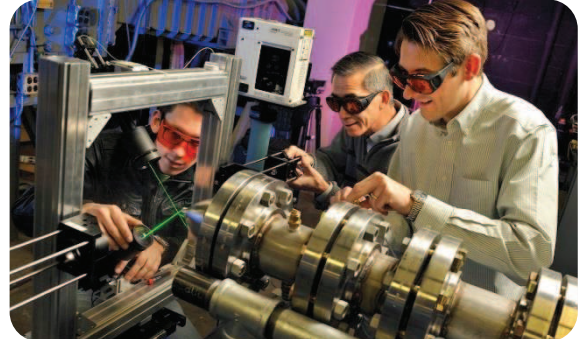
## Simulation and analysis

We have the ability to perform a wide range of engineering simulations and analysis, including:

- Mechanisms and dynamic behaviour. These simulations are typically used to simulate and analyse the dynamic behaviour of mechanisms and bodies, for example impact and moving loads, accidents and fatalities.
- Finite element analysis and structural analysis.
- Thermal and hydraulic analysis.

## Strain monitoring, fatigue analysis, and remnant life assessment

We employ different measurement and monitoring techniques to validate simulations, improve reliability, throughput and performance of new and existing equipment. By measuring and monitoring the strain on the critical components of assets, we are able to determine the component fatigue and calculate the estimated remnant life of these assets, based on the relevant duty cycle. This enables our clients to perform targeted, proactive maintenance, take the necessary steps to extend the asset life and plan ahead for asset replacement.



Based on the outcomes of our fatigue and finite element analysis, we can put forward appropriate design solutions to rectify problems and improve or resolve fatigue problems, thereby extending equipment life.

## Project engineering and integration

Our team of engineers are skilled in providing integrated project engineering and management support. We ensure that all work, documentation and deliverables comply with the highest standards and offer a number of differentiators including on-going support, managed and implemented by specialists who deliver integrated engineering solutions. These services include:

- Discipline specific project and engineering management; and
- Implementation of technology.

## TOOLS

We are able perform technical simulation and analysis using the following software tools:

- ADAMS
- Nastran
- Ansys
- Prokon
- Flownex

