



# STRUCTURAL ENGINEERING

*Helping ensure compliance and avoid the risk of failure on structures.*

## SERVICES

- Structural engineering consultation
- Design reviews and audits
- Oversight and assurance
- Failure and problem investigation
- Structural inspection and maintenance management

## BUSINESS CHALLENGE

Companies employing structures in the running of their operations are under pressure to comply with regulations regarding integrity and safety. Even moderate structural failures can result in injuries, fatalities, damage, as well as losses in asset value, production and reputation. It is particularly important for organisations to be able to manage the future risk of structural failure or fatigue. Independent assessments formally assess and classify these risks and validate warranties, among others for insurance requirements.

A structure can be defined as any permanent or temporary construction using brick and mortar, steel, aluminium, reinforced concrete or timber, including any formwork, false work or scaffolding.



There are a number of causes that influence or jeopardise the integrity of a structure. These include:

- Incorrect design or construction;
- Unauthorised changes or modifications to the design or structure;
- Aging, corrosion, or deterioration of a structure; and
- Inappropriate use.

The effective management of structural integrity ensures timeous maintenance and repair, which in turn helps to manage safety risks, minimises the cost of repairs and optimises the value of the asset over its lifetime.

## SOLUTIONS

The main objective of our structural engineering service is to ensure regulatory compliance, reliability and safety of structures in operating environments as well as operations that have been placed under care and maintenance. Bureau Veritas provides structural engineering services, from the design phase, through construction, to on-site inspections of an asset throughout its operational lifetime.



Design reviews and audits are conducted specifically on concrete building structures, steel structures, foundations and pipe bridges. This process is performed in accordance with SANS 10160 (loading code), SANS 10100 (design of reinforced concrete) and SANS 10162 (design of hot-rolled steelwork). These codes are applicable to South Africa, but the appropriate codes and client standards can be adopted to suit specific client or project requirements.



Structural management services of a physical installation or equipment involves the inspection, review and analysis of the design, including FEA analysis to understand the structural loads on the system. The outcome of the analysis would typically inform the appropriate management methodology of the structure or equipment, which could include periodic inspections, instrumentation and monitoring etc.

Failure analysis services involve the identification of root cause(s) of structural failures through inspection, sampling and laboratory analysis, documentation auditing and/or first principal engineering analysis such as FEA.

Structural inspection and maintenance management are performed on plants, shafts and underground structures as well as major plant or mobile equipment. The ISO 13822 code (assessment of existing structures) forms the basis of these assessments. A structural certificate is issued on completion of the assessment as well as any remedial work that is required on the structure. The assessment of existing structures is conducted in specific stages, involving:

- Status quo inspections, where the overall condition of a structure is evaluated to determine the need for any further remedial action;
- Detailed inspections that deliver data and remedial procedures;
- Financial cost estimates; and
- Site supervision of a contractor performing remedial work.

## KEY BENEFITS

Bureau Veritas is recognised as a reputable industry service provider in the field of structural engineering analysis, inspection and assurance and operates in accordance with recognised industry standards, providing our clients the assurance that a structure is safe and reliable for use. Our services deliver peace of mind as well as:

- manage the risk of structural failure;
- increase the safety performance of structures;
- extend the asset life and value of the structure through sound engineering and analysis;
- Provide predictable of proactive maintenance programs;
- reduce structural maintenance costs; and
- establish the root cause of structural failures to prevent future reoccurrence.



## RELATED SERVICES

- Project management
- Post-construction support services

### INDUSTRIES

- Industrial
- Mining
- Commercial structures

## CONTACT

For details about this service, please contact Bureau Veritas:

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## FOR MORE INFORMATION

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