



Stress Analysis

EASL are experts at stress analysis, with our highly trained, specialised team of engineers and scientists comprising graduates through to PhDs, we can deliver a whole range of stress analysis, offering bespoke and specific services to our clients.

With over 250 man years' experience analysing stresses, strains and deflections in structures, systems and components, EASL offer services to a wide range of industries. With experience in civil nuclear, power generation, defence, oil and gas, our niche expertise can be applied to provide the right analysis for whatever project our client has in mind.

Whether designing or trying to better understand the response of engineering structures, it is integral that the stresses are analysed to ensure safe working and to ensure compliance with all relevant regulations. EASL are proud to provide a solutions-focussed approach to our work, where we take into account a client's overall needs to deliver stress analysis that is clear, concise and uses real world inputs and conditions for realistic and honest assessment.

What is Stress Analysis?

Stress (and strain) analysis is a process of evaluating the performance of structures, systems and components to withstand a combination of applied loads against potential failure modes. The process involves:

- Classical strength of materials hand calculations
- Design code compliance assessments
- Simple linear elastic finite element analysis or complex non-linear finite element analysis.

We know that each client is as different as their problems, and so depending on the industry and client requirements or specifications we offer comprehensive checks on all types of potential issues that could arise. The resulting loads, stresses, strains and deflections are compared against design code allowable limits intended to guard against all potential failure modes including yielding, plastic collapse, incremental plastic collapse (ratcheting), buckling, fatigue, creep rupture, creep-fatigue interaction, fast fracture, crack initiation and crack growth (or crack propagation).

This may also involve fitness for purpose and inverse code assessments, generally for existing components.

EASL utilise a relationship-driven approach to our work to ensure that we understand the context which we're working in, so as to provide a cost-effective and appropriate service.

Loads are many and varied, hence, it is important to identify all lifetime applied loads and stresses resulting from manufacture, fabrication (e.g. welding residual stress), construction (e.g. lifting), test, operation and decommissioning.

- pressure
- dead and imposed (or live) loads – self-weight, cladding, etc. and wind, snow, etc.
- constrained or differential thermal expansion
- dynamic – relief valve operation, pipe whip, wind, earthquake, impact, blast, etc.

These can be static, transient or dynamic lifetime loads and may be grouped according to their effect:

- 1 and 2 are primary (or sustained) loads resulting in primary stresses
- 3 are secondary loads generally alternating resulting secondary stresses
- 4 occasional (or exceptional) loads.

Applied loads may be further divided into normal, upset, emergency, fault and hazard loads each with a different level of acceptability. From this analysis work, we then prepare a report, giving you a clear and honest insight into the current, potential and future stress analysis results.



Our work has gone on to help clients make significant decisions for lifetime extension, remedial action and operation development, saving time, money and in some extreme cases, lives.

To find out more about our previous stress analysis work, have a look at our case Studies.

EASL's Stress Analysis Services

EASL has extensive experience in the stress analysis of structures, systems and components such as pressure vessels, piping systems, steel structures large or small, and steel and concrete building structures by hand calculation or by finite element analysis to a variety of design code requirements, in a wide range of industries, subject to a variety of loading conditions.

With our highly trained and capable team, we have developed long-standing, strong relationships with our clients, allowing us to quickly and efficiently maintain and provide the latest and most effective stress analysis. We can provide our solution-focussed, cost effective service to a wide range of structural integrity areas, should you have a need for stress analysis of any shape or size.

If you'd like to find out more about our previous work, take a look below at our case studies. If you'd like to find out more about our related services, take a look below at our solutions and other services. To see how EASL can help with your stress analysis needs, email us on enquiries@easl-stress.co.uk

Related Services

- Fracture Mechanics
- Pipe Stress Analysis
- Seismic Analysis