

FAÇADE CREATIONS



Engineering Services

Finite Element Analysis (FEA) Services

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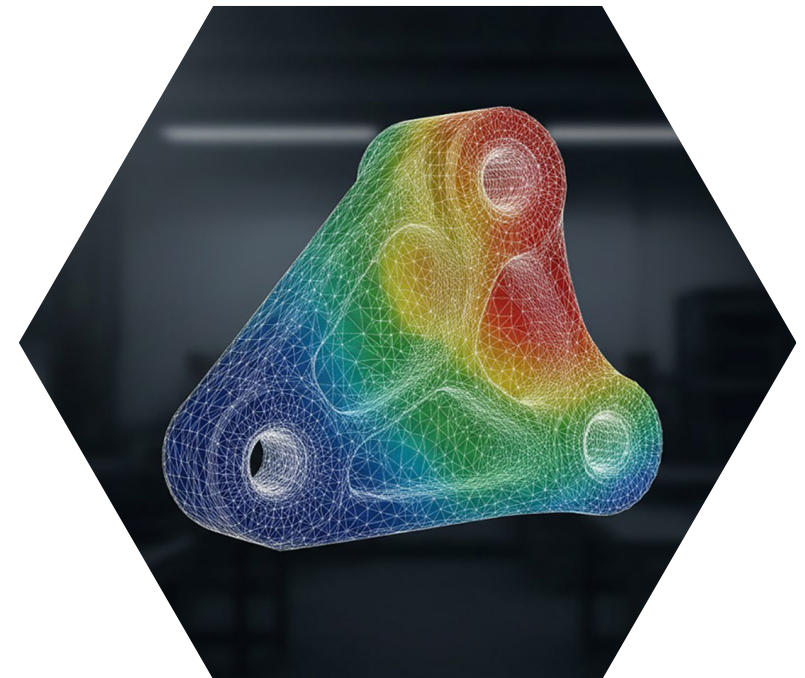
Introduction

Façade Creations operates in the engineering simulation space, working with design and manufacturing teams who need to know, with confidence, how a part or structure will perform before it is built. Our FEA practice sits at the intersection of mechanical engineering and computational analysis. We take a design, whether it is a single bracket, a welded frame, or a full assembly, and build a digital model that predicts how it will behave under real operating conditions: load, heat, vibration, fatigue, and time.

This matters because physical testing is expensive and slow, and by the time a flaw shows up on a test bench or, worse, in the field, the cost of fixing it has multiplied many times over. Our job is to find that flaw on screen, early, while it is still just a design decision rather than a manufacturing or warranty problem. We work as an extension of your engineering team, translating simulation results into clear, practical recommendations that hold up under scrutiny from clients, certification bodies, and your own internal reviews.

We built this practice around a simple principle: simulation is only useful if it changes a decision. It is easy to produce a colourful stress plot that looks impressive and says very little. Our reports are written to be read and acted on, by engineers, by project managers, and by anyone else who needs to sign off on a design. Every model we build starts with a clear question, what are we actually trying to find out, and every deliverable ends with a clear answer to that question, backed by the data behind it.

Our team has worked across small single-component checks and large, multi-week assembly studies, and we scale our approach to match. A start-up validating a first product prototype gets the same rigour as an established manufacturer running a certification programme, just applied at the right depth and pace for the project in front of us.

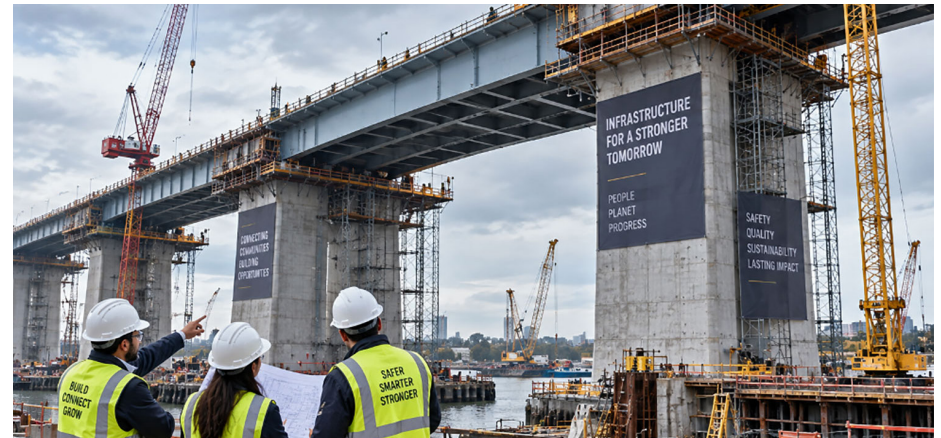


Industries We Serve



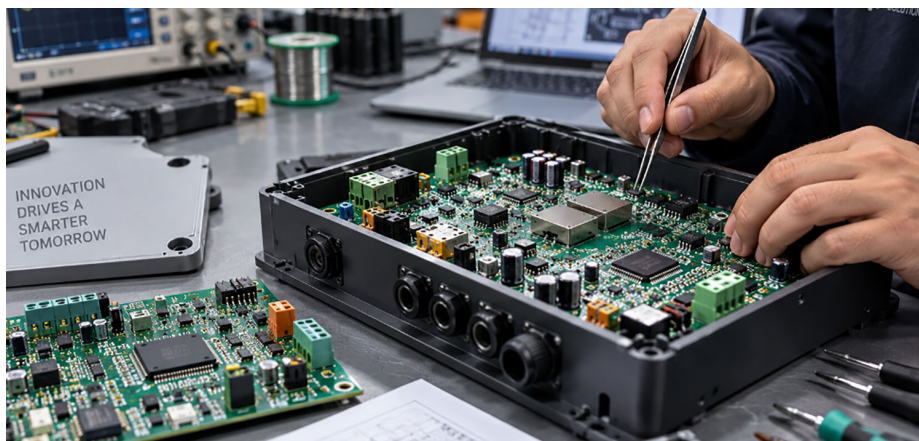
Industrial equipment and machinery

Presses, cranes, conveyors, and heavy fabricated structures that need to carry large, often cyclic, loads reliably over long service lives.



Infrastructure

Bridges, support structures, and load-bearing concrete and steel elements, including life assessment work on ageing assets.



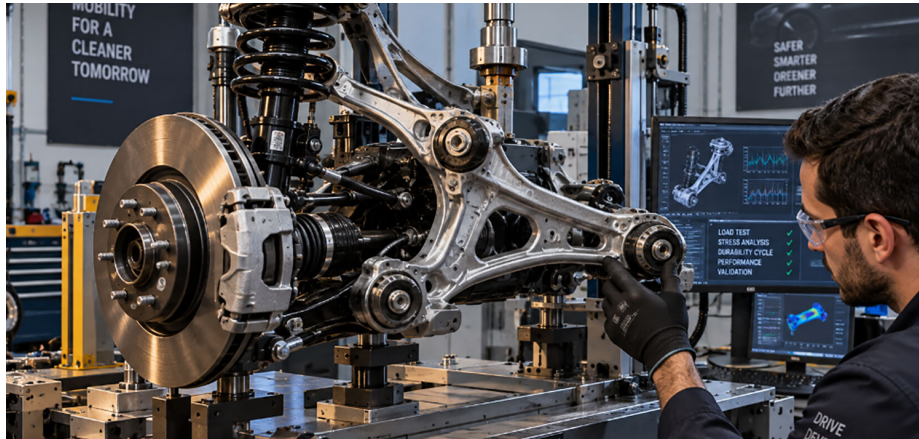
Electronics and electromechanical products

Circuit boards, enclosures, and assemblies subject to shock, vibration, or thermal cycling in demanding operating environments.



Manufacturing and process equipment

Tooling, fixtures, and custom-built production machinery designed for repeatable, high-cycle use.



Automotive and transport components

Structural and mechanical parts subject to fatigue and dynamic loading under real-world duty cycles.



Construction and structural systems

Steel and concrete elements requiring capacity checks, life assessment, or investigation following a structural concern.



Energy and renewables

Structural components for equipment that must perform reliably in harsh or remote operating conditions.



Marine and offshore equipment

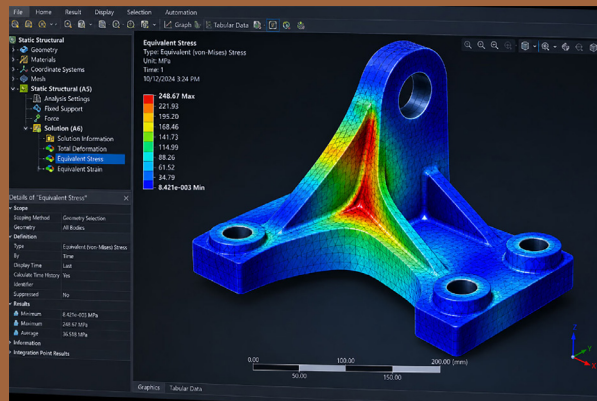
Structures and fittings exposed to corrosive environments, dynamic loading, and long unattended service intervals.

If your product or structure needs to prove it can carry a load, survive a duty cycle, or pass a certification review, this is work we take on regularly.

Our FEA Services

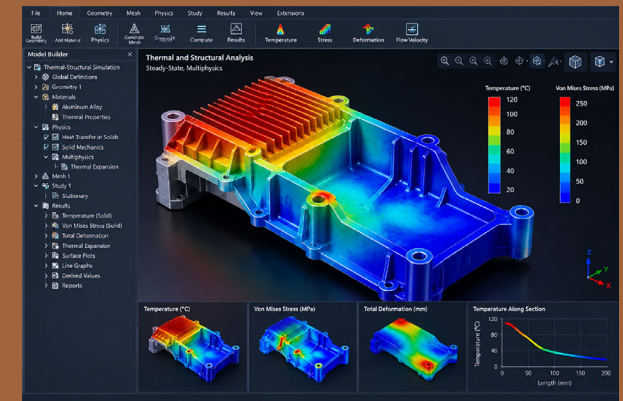
Structural Analysis

We evaluate how components and assemblies respond to static and dynamic loads, calculating stress, strain, and deflection to confirm a design meets its performance requirements with an appropriate margin of safety. This includes everything from simple bracket checks to full-assembly analysis involving multiple interacting parts.



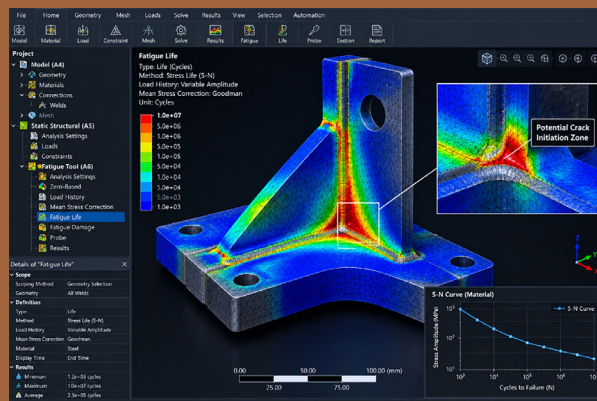
Thermal and Multiphysics Simulation

Many failures are not purely mechanical. We model coupled thermal-structural behaviour, including thermal expansion, thermal stress, and heat-driven fatigue, for applications ranging from electronic assemblies to industrial equipment operating at temperature. Where a problem involves more than one physical effect at once, we build models that capture that interaction rather than analysing each effect in isolation.



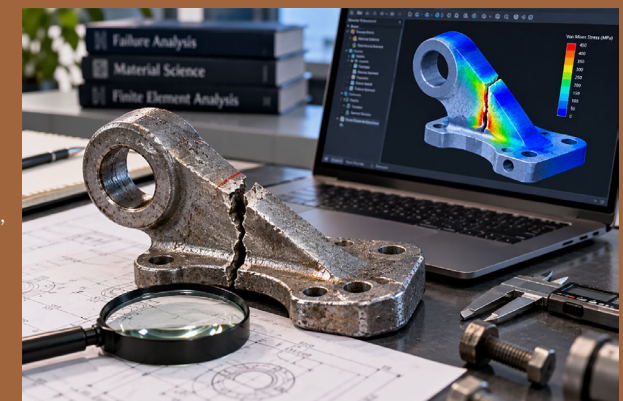
Fatigue and Life Assessment

For components subject to repeated loading, we predict service life and identify the specific features, welds, fillets, or joints most likely to initiate a fatigue crack, so design changes can be targeted rather than guessed at. This work is especially valuable for equipment expected to operate for years under cyclic loading, where a small design oversight can become a major reliability issue.



Failure Investigation and Root Cause Analysis

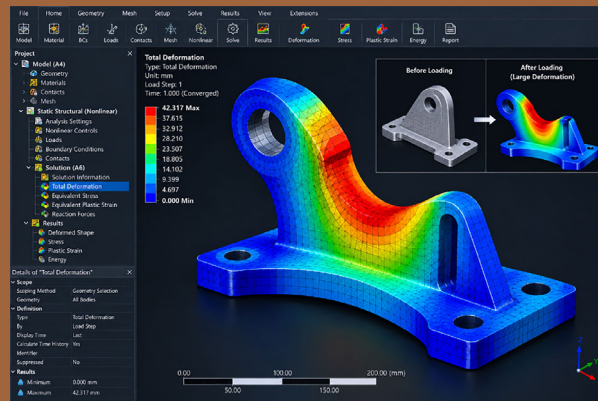
When something has already failed in service, whether through fatigue cracking, corrosion, overload, or an unexpected failure mode, we reconstruct the loading conditions and use simulation to identify the root cause, so the same failure does not repeat. This often involves working backward from physical evidence, inspection photos, load records, maintenance history, to build a model that reproduces the failure and points to the actual cause.



Our FEA Services

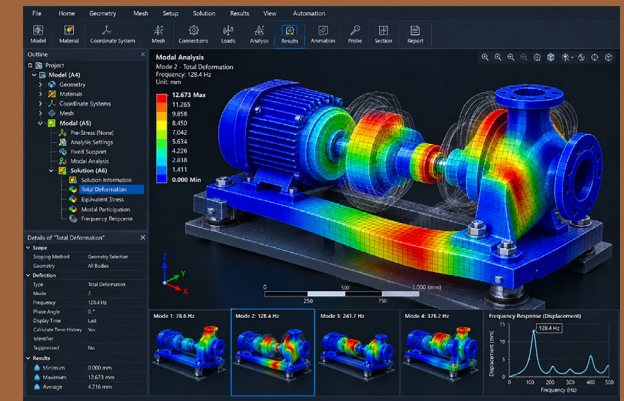
Nonlinear Analysis

Where material behaviour, large deformation, or contact between parts makes a linear assumption inaccurate, we run full nonlinear simulations to capture the real response of the system, including plastic deformation and post-yield behaviour. This is essential for anything involving impact, crushing, snap-fit design, or components pushed beyond their elastic limit under extreme loading.



Vibration and Shock Analysis

For equipment and assemblies exposed to dynamic environments, we assess natural frequencies, resonance risk, and response to shock loading, which is particularly important for transport, handling equipment, and electronics. We identify resonance conditions before they cause premature failure in service, and evaluate how a design responds to drop, impact, or transport shock events.



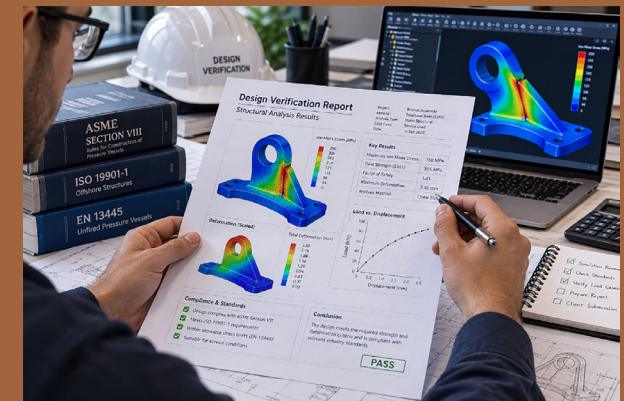
Feasibility and Concept Studies

Early in a project, before a design is locked down, we use simplified FEA models to compare structural concepts and rule out approaches that will not meet load or life requirements, saving redesign time later. This lets a project team make an informed choice between design directions before significant engineering time is invested in detailed development.



Design Verification and Certification Support

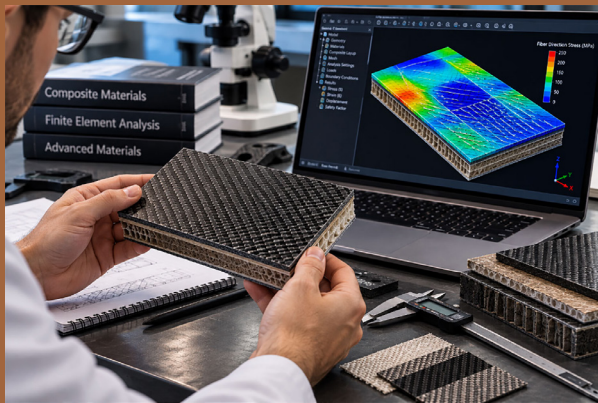
We produce structured, documented analysis reports suitable for submission to certification bodies, clients, or internal design review boards, written to be defensible and easy to follow. Where a project requires analysis to a specific standard or code, we work to that standard explicitly and document our compliance clearly.



Our FEA Services

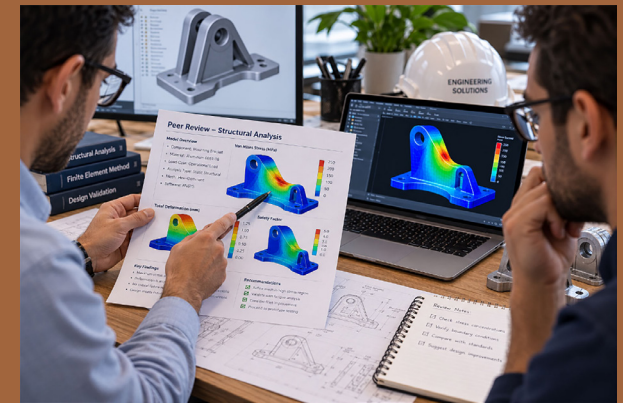
Composite and Advanced Material Analysis

For structures using composite materials or advanced alloys, we model the specific, often directional, behaviour of these materials rather than relying on simplified assumptions that do not reflect how they actually perform.



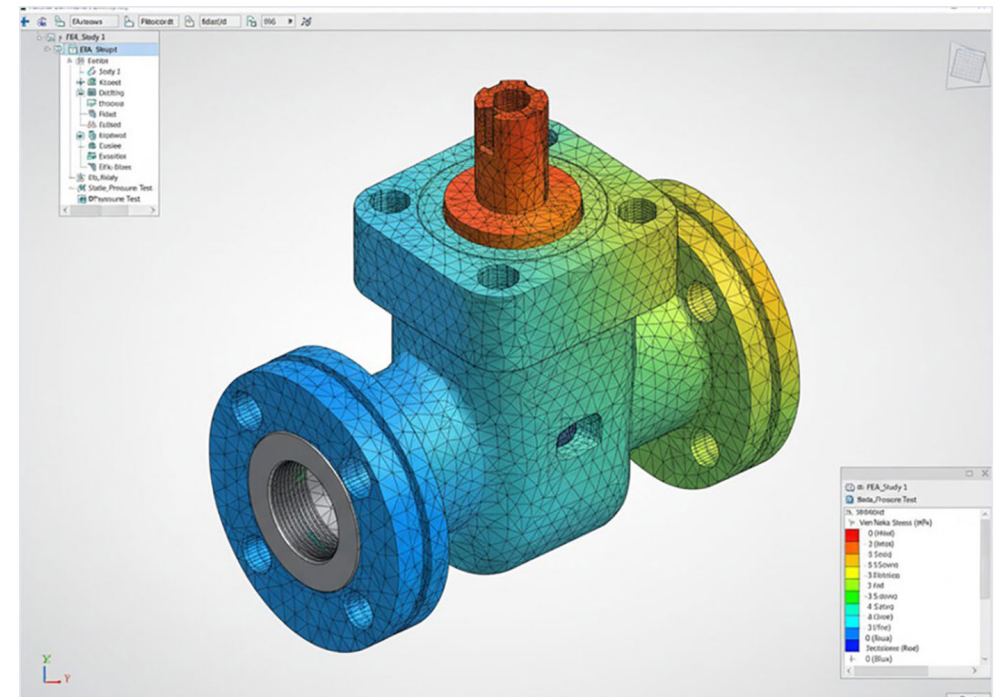
Second Opinion and Peer Review

Where an existing analysis needs independent verification, for a client, an insurer, or an internal stakeholder, we review the model, assumptions, and results and provide an honest, independent assessment.



Our Process

We typically work through a project in four stages. First, scoping: we agree exactly what question the analysis needs to answer, what loading conditions apply, and what a successful outcome looks like. Second, modelling: we build the computational model, including any necessary geometry cleanup, meshing, and definition of loads, materials, and boundary conditions. Third, analysis and review: we run the simulation, check the results for physical sense and numerical stability, and interrogate anything unexpected before presenting it as a finding. Fourth, reporting: we deliver a written report with clear conclusions and recommendations, and we remain available afterward to answer questions or run design iterations based on the results.



Frequently Asked Questions

What information do you need from us to start an FEA project?

At minimum, we need CAD geometry (or good reference drawings), the loading conditions the part or structure will experience, material properties, and the boundary conditions or supports involved.

If any of this is not yet finalised, we can work with reasonable assumptions and refine the model as the design matures.

Can FEA actually replace physical testing?

Not entirely, and we would not recommend treating it that way

FEA dramatically reduces how much physical testing you need and tells you where to focus it, but a final validation test is still good practice for critical components.

What FEA does is stop you finding out about a problem for the first time on the test bench.

How long does a typical FEA study take?

It depends heavily on scope. A single-component structural check can often be turned around in a few days.

A full assembly-level study with nonlinear contact, thermal coupling, or fatigue life prediction typically takes several weeks.

We scope and quote every project individually so there are no surprises.

Do you work with our existing CAD files, or do we need to provide something specific?

We work with all common CAD formats (STEP, IGES, Parasolid, and native files from major CAD packages).

If your geometry needs cleanup or simplification for simulation purposes, that is part of our process and does not require extra work on your end.

Frequently Asked Questions

What deliverables do we actually receive at the end of a project?

A full written report covering the methodology, assumptions, boundary conditions, results (stress, deflection, safety factors, or fatigue life as relevant), and our engineering recommendations.

Where useful, we also provide annotated result plots and animations that are easier to share internally or with clients than raw data.

Do you validate your simulation results against physical testing?

Where physical test data exists, we compare our model results against it as standard practice, and adjust the model if there is a meaningful discrepancy.

This correlation step is one of the best ways to build genuine confidence in a simulation before relying on it for a design decision.

Can you help mid-project if a design is already causing problems?

Yes.

A large part of our work is exactly this: a design is in trouble, either failing in testing or already in the field, and we are brought in to diagnose the cause and propose a fix.

We are set up to move quickly on this kind of urgent investigation.

Can you work to a specific industry standard or code?

Yes.

Tell us which standard applies to your project and we will structure the analysis and reporting to meet it explicitly, including documenting the specific clauses or load cases addressed.

Frequently Asked Questions

What happens if the analysis shows the design will fail?

That is a useful outcome, not a bad one, because it has been found before manufacture rather than after.

We do not just report a failure; we work with you to understand why it is happening and propose specific, practical design changes to resolve it.

Do you offer ongoing simulation support through a full project, or only one-off studies?

Both.

Some clients need a single focused check; others bring us in as an ongoing simulation resource throughout a development programme, running updated analysis as the design evolves. We scale to whichever fits your project.

Every building presents
unique façade challenges.



Early conversation identifies risks and opportunities
before they become constraints.

Let's discuss how independent expertise can add value to your project.

Contact Façade Creations today.



T: +44 (0) 116 2289 3343 E: info@facadecreations.co.uk W: www.facadecreations.co.uk

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