



Choose certainty.
Add value.

Lifetime assessment and extension

Optimise availability and reliability
over the long term.

Your challenges

As power plants age and face challenges such as poor quality during construction, maintenance budget cuts, shortage of on-site experts and increased load cycles to meet market demand, their lifetime performance is adversely affected. The market is also seeing an increase in forced shutdowns, greater competition and added emphasis on environmental compliance. It is important for owners and operators to assess and optimise the lifetime performance of their power plants, as unscheduled plant downtime and other unexpected costs will impact their revenue. Unfortunately, conventional inspections of industrial plants are only sufficient to evaluate the current condition of a plant, not its long-term performance.

What is lifetime assessment and extension?

TÜV SÜD's lifetime assessment and extension strategy determines the remaining service performance of various types of industrial plants. Our experts recommend optimisation solutions and inspection procedures

tailored to the specific needs of each power plant or a particular component.

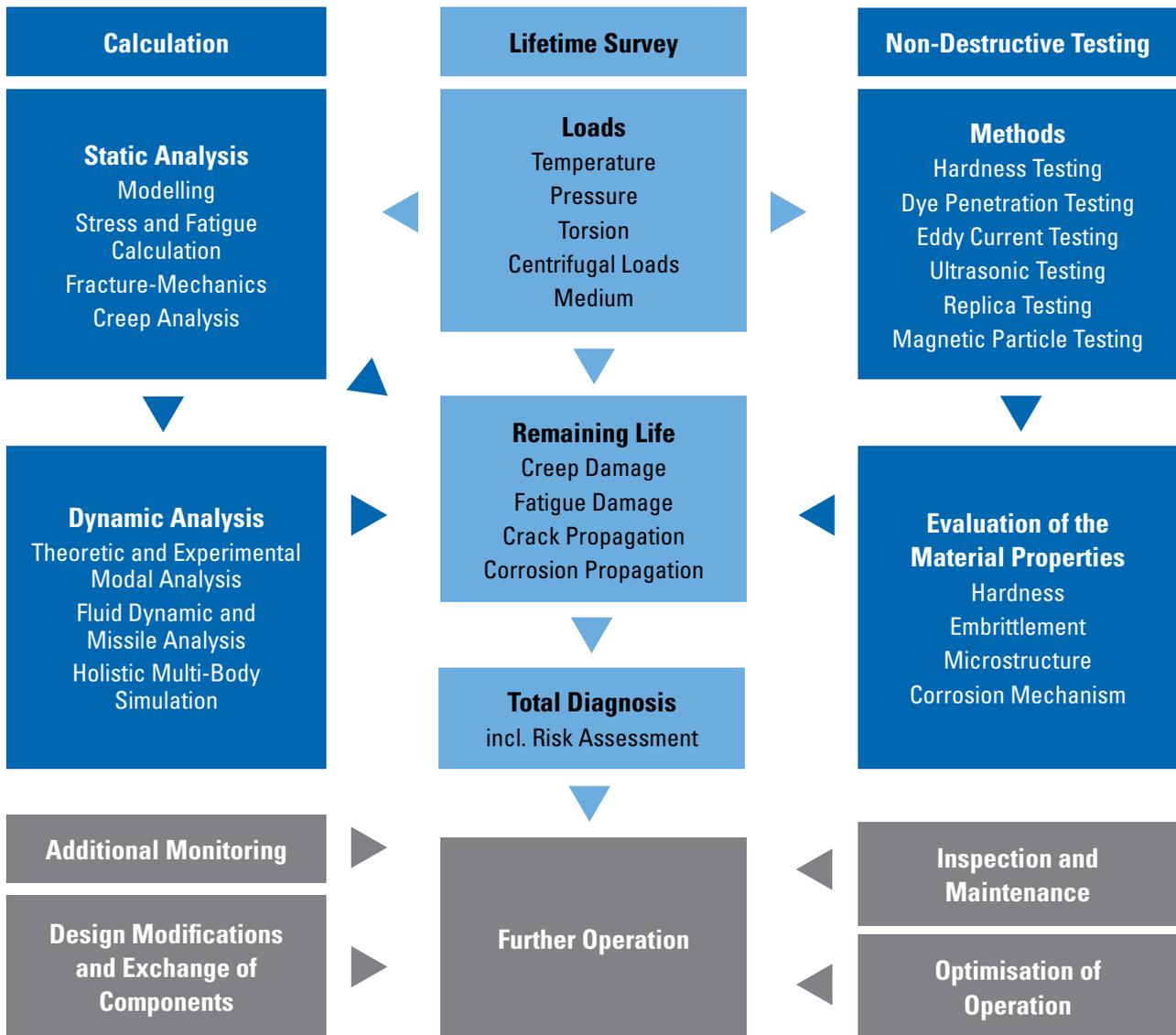
Why is this service important for your business?

Our lifetime assessment and extension solution provides you with crucial information about the current state of your industrial plant, as well as solutions for the future safe operation of various components affected by new operating conditions. This helps you to avoid revenue loss due to machinery damage and accidents resulting in injuries.

How can we help you?

TÜV SÜD offers industry-specific expertise to help our clients compete efficiently while meeting the demands of national and international standards. We provide solutions to prolong the lifetime of your industrial assets, taking into account power plant design, layout and operating conditions. Our approach normally starts at a significantly earlier stage than conventional

TÜV SÜD LIFETIME ASSESSMENT AND EXTENSION SOLUTION



inspections, enabling us to identify weaknesses early on and avoid unscheduled downtime. That said, it also applies to power plants that have operated long term. This strategy includes planned repair and replacement actions for damaged equipment, as well as checking and acceptance of repair plans to comply with code requirements.

Our approach to lifetime assessment and extension

■ Lifetime Survey

During plant operation, power plant components may suffer decreased strength and reliability due to continuous exposure to high temperature, pressure, torsion, centrifugal loads and the cooling medium. The remaining lifetime of power plant components is

determined by damage mechanisms such as creep damage, fatigue damage, crack propagation and corrosion propagation. TÜV SÜD uses a combination of methods such as non-destructive testing (NDT) and Finite Element Method (FEM) calculation for risk assessment to come up with a total diagnosis for assessing the condition of power plant components and the suitability of a power plant for further operation.

■ NDT

Beyond detecting flaws and cracks, we evaluate damage mechanisms with conventional NDT methods in order to obtain a comprehensive analysis of a power plant component's condition. Our NDT methods include:

- Dye penetration testing
- Eddy current testing
- Ultrasonic testing



- Magnetic particle testing
- Hardness testing
- Replica testing

NDT also helps to assess the extent of degradation of power plant components due to damage mechanisms by evaluating the hardness, embrittlement, microstructure and corrosion mechanism of its material properties. We evaluate the plant's operational history (including temperature and pressure data) and perform an analysis of material properties to determine the remaining lifetime and future operation of a power plant.

■ **FEM calculation**

As some failure mechanisms cannot be detected by NDT methods, another key approach in assessing the condition of a power plant component is the use of computational methods such as FEM calculation. TÜV SÜD develops a holistic view of the related components and a reliable extrapolation of future material degradations through the use of FEM modelling, stress and fatigue calculation, fracture-mechanics, creep analysis, modal and dynamic calculations (including multi-body simulation), fluid dynamics and missile analysis services.

■ **Further operation**

We support you in making informed decisions regarding the safety of a power plant's continued operation as well as its potential for future operation.

This assessment is based on the operational history of power plant components, various NDT methods and FEM calculation. Our understanding of how power plant components degrade with different factors enables us to assess the remaining lifetime of power plant components and determine the appropriate strategies (additional monitoring, design modification, exchange of power plant components, inspection and maintenance, optimisation of operation) required for lifetime extension.

Your business benefits

- **Optimise power plant availability** – with our services that identify weaknesses before they result in unscheduled downtime by estimating the remaining life of particular components and recommending a schedule for repair or replacement of components based on this estimation.
- **Gain a competitive edge** – by applying the TÜV SÜD optimisation strategy over the entire lifecycle of a power plant.
- **Third-party certification and assurance** – demonstrate plant efficiency and availability by working with a trusted, impartial service provider.
- **Optimise investment** – with cost optimisation, certainty in planning and reliable forecasting results.



Why choose TÜV SÜD?

TÜV SÜD's world-class expertise includes extensive knowledge of national and international standards and legislation. We have a presence in locations around the world, with an international reach that allows us to draw on best practices from across the globe, while also taking into consideration your special local needs. We are widely known as an independent third-party solutions provider capable of impartial and unbiased inspection and assessment services on which you can base your decisions. Our sophisticated inspection strategy can be tailored to the needs of your business.

Choose certainty. Add value.

TÜV SÜD is a premium quality, safety and sustainability solutions provider that specialises in testing, inspection, auditing, certification, training and knowledge services.

Represented in over 800 locations worldwide, we hold accreditations in Europe, the Americas, the Middle East, Asia and Africa. By delivering objective solutions to our customers, we add tangible value to businesses, consumers and the environment.

Related services

TÜV SÜD provides the following related services:

- Rehabilitation management
- Fitness for service
- Operations and maintenance management
- Risk-based inspection and maintenance
- Non-destructive testing
- Performance tests