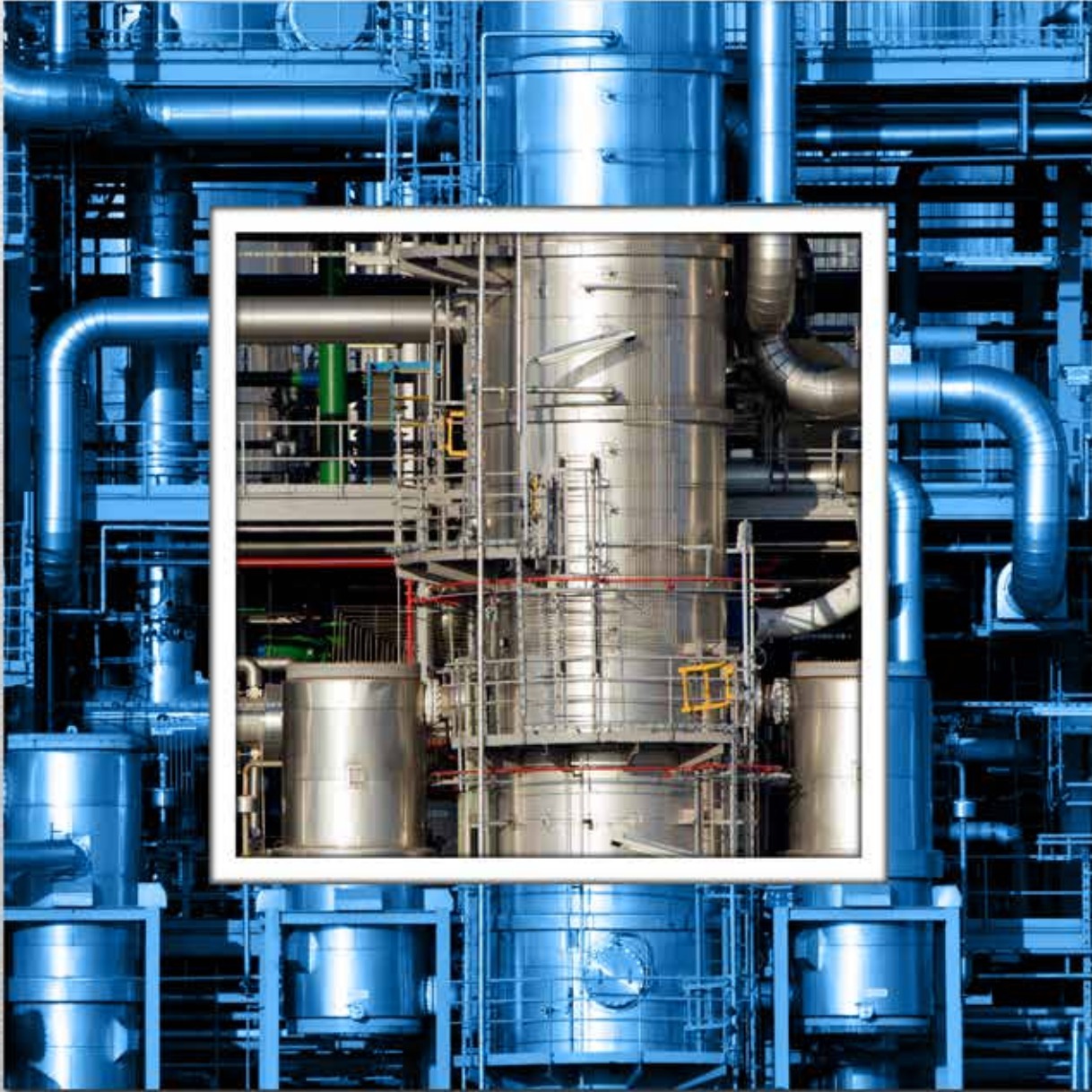
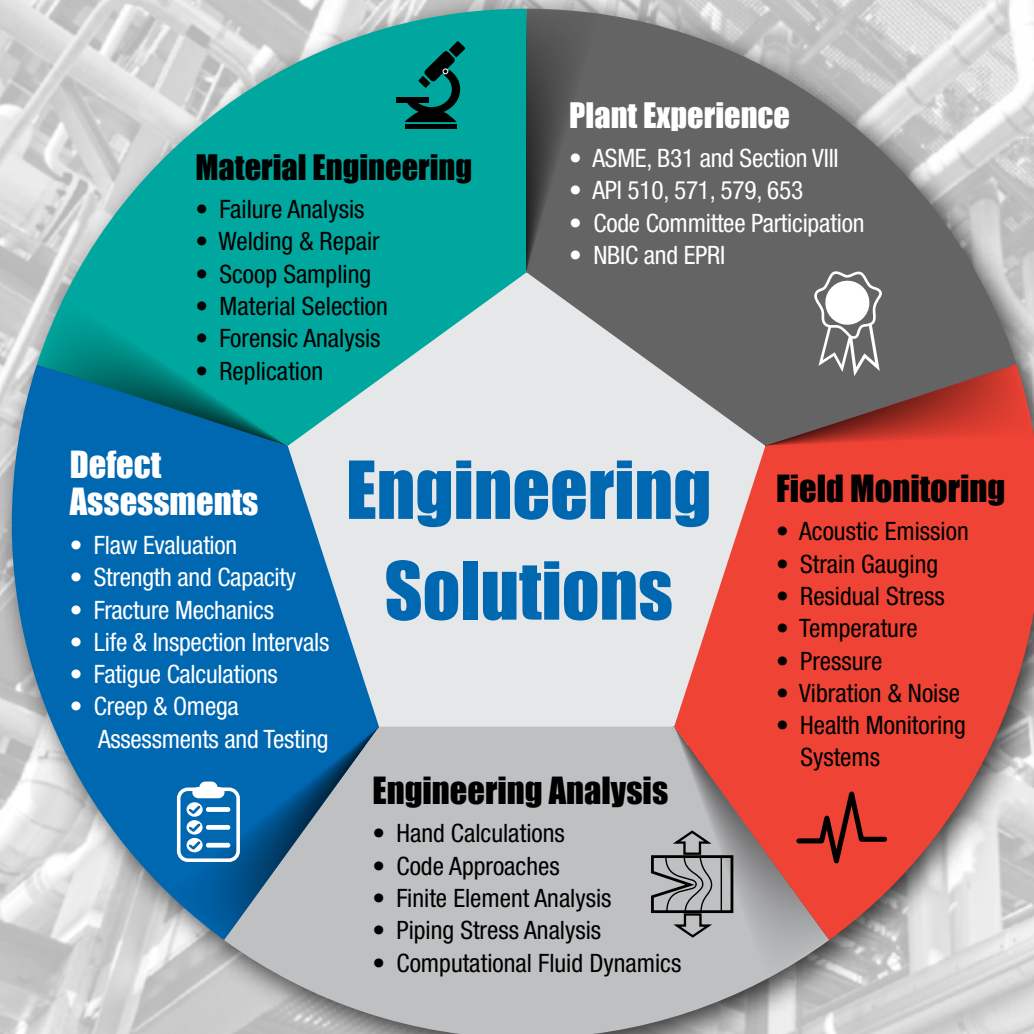


# Downstream: Plant Services



Practical Engineering Solutions

# Multi-Disciplinary Approach



At Stress Engineering Services, we specialize in solving complex problems using a multi-disciplinary approach. We also understand the critical need to keep your plant online. With that understanding comes a responsibility to be experts in monitoring, analysis, assessment, and design of plant process equipment.

# The Right Solutions

We utilize our vast industry experience to assist you in solving problems in a timely fashion. In many situations a multidisciplinary effort may be required (e.g., mechanical engineering expertise in combination with process engineering and material science considerations). We have the perfect staff, with numerous Subject Matter Experts (SMEs), to accomplish this. We pride ourselves in our ability to keep your plant components safe to operate both now and in the future. Our areas of expertise include:

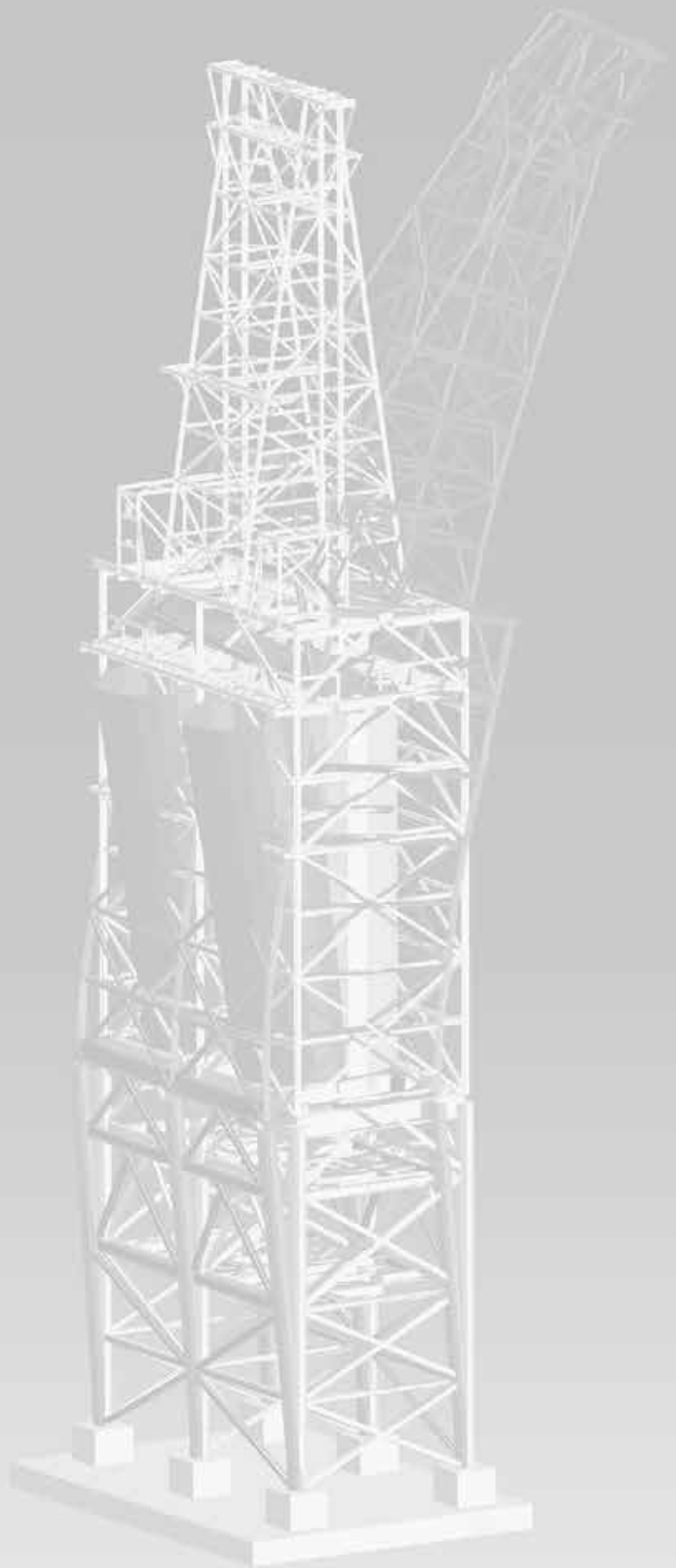
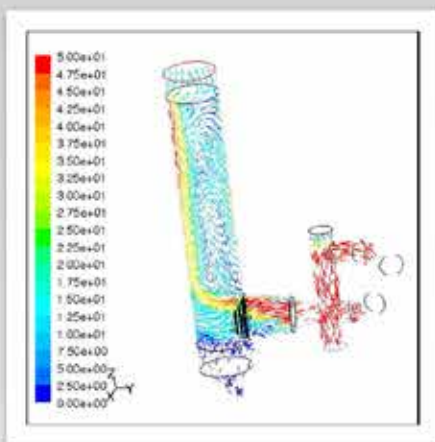
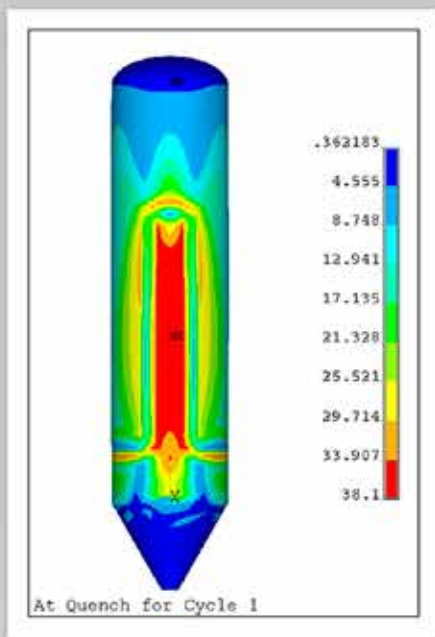
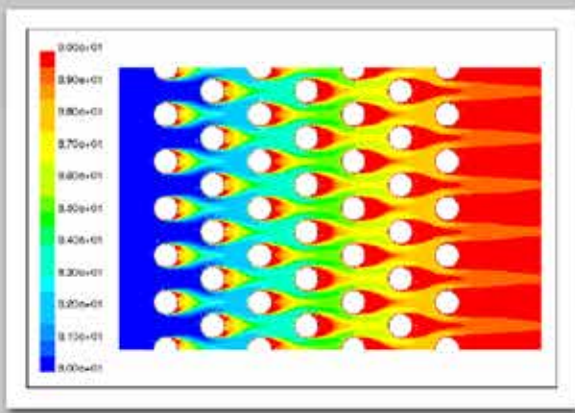
- Auto-Refrigeration/Brittle Fracture Assessments
- High Temperature Hydrogen Attack (HTHA)
- Engineering Analysis & Design
- Fitness-For-Service Evaluations
- Pressure Vessel Engineering (ASME BPVC Stamp Holder for Div. 1, 2, and 3 Vessels; R-Stamps and Re-Rates)
- Fracture Mechanics
- Fire Damage Assessments
- Field Instrumentation, Monitoring, and Testing
- Failure Analysis
- Materials Engineering, Corrosion Analysis, and Damage Mechanisms
- Creep Assessment and Testing
- Structural and Foundation Assessment & Design
- Heat Transfer Analysis
- Computational Fluid Dynamics
- Process Engineering
- Vibration Monitoring and Remediation
- Acoustic Emission Testing
- Turnaround Support
- Integrity Operating Windows (IOW) and Corrosion Circuit Reviews

## Critical Equipment Assessments

Our experience is unsurpassed in the assessment of critical plant equipment. The primary objective of these assessments is to measure and monitor what is actually occurring – including stresses, gradients, fatigue, and vibration. We then use this information to develop the most appropriate solution.

- FCCU Equipment
- Coke Drums
- Cat Reformers
- Fired Heaters / Steam Methane Reformers
- High Temperature Piping
- Pressure Vessels and Piping
- Structures
- Hydrotreaters and Hydrocrackers





Our company mission is to provide timely, professional engineering solutions and advice that improve your operations and solve your problems. Within our Plant Services group, we are a world-wide organization and our goal is to use analysis, field monitoring, testing, and design to improve your plant and process equipment.

# Tools of Our Trade

Stress Engineering Services works with you to understand your situation. For each engineering problem, critical inputs are needed to create accurate engineering models so that the result is as close to reality and as useful as possible. At times, measuring and monitoring a process in the field can provide surprising or discerning inputs to the model and insights to the process. This improves the accuracy of the solution and everyone's understanding of the underlying physics and root of the problem. Then we can utilize a number of powerful, effective, and state-of-the-art (aka, best available engineering) solutions and tools to help solve your problems.

- [Acoustic Emission Testing](#) - search for active damage or continuously monitor known damage
- [Finite Element Analyses](#) - structural, dynamic, thermal, fracture mechanics, etc.
- [API 579-1 Level 1, 2, and 3 Fitness-For-Service Assessments](#)
- [Fire Damage Mapping and Interpretation and Recommendations](#)
- [High Temperature Assessments](#) - using analysis, modeling, testing, and comparisons with known failures
- [Pipe Stress Walkdowns, Piping Hanger Evaluations, Spring Hanger Testing / Verification / Analysis](#)
- [Vibration Monitoring, Fluid-Induced Vibration \(FIV\), Vortex-Induced Vibration \(VIV\), Modal Interpretation, Fatigue Predictions and Remedies](#)
- [Fracture Mechanics Assessments](#) - for critical crack sizes, crack growth predictions, fracture mechanics testing (K, CTOD, J), linear elastic and elastic plastic fracture mechanics (LEFM and EPFM)
- [Residual Stress Measurement, Metallurgical Replication, and similar field work](#)
- [Turnaround Support](#) - includes our experienced engineers on-site and direct contact with our deep roster of Subject Matter Experts (SMEs)
- [Fluid Dynamics, Computational Fluid Dynamics \(CFD\), Pulsation and other process-structure analyses](#)
- [Failure Analysis / Materials Engineering](#) - including field work, scoop sampling and analysis, post-mortem analysis, and root cause analysis (RCA) through our staff of 40 metallurgists and techs, mobile metallurgy lab, and expansive metallurgy labs.
- [Health Monitoring](#) - provide real-time feedback for critical equipment or damage accumulation to enable continued, safe operations.
- [Process Hazards Analysis \(PHAs\)](#)
- [Testing Services](#) - our advanced labs enable us to do everything from strip samples to full-scale mock-ups with pressure, temperature, load, fatigue, in environment – virtually anything you need to test as part of a validation effort.
- [Field Installation of Equipment](#) (including strain gages, thermocouples, accelerometers, etc.)

# Process Engineering - “REV It Up”

Our staff has significant experience in delivering **Reliability**, **Efficiency**, and **Velocity** improvements. We have vital strengths in fitness-for-service evaluations, equipment inspection, acoustic emission testing, and field measurements. We are continually involved in pressure vessel analysis, piping and pipeline evaluations, corrosion and metallurgy analysis, welding and repair technology, and vibration analysis. We actively participate in technical committees and cutting-edge studies of plant operation and industry issues such as low temperature auto-refrigeration / brittle fracture, creep and high temperature materials performance, high temperature hydrogen attack, etc. We have also developed significant skills in process development and optimization, process simulation, process flow modeling including flow/thermal analysis, process control, and process safety. These chemical engineering skills enable us to tackle much broader and deeper plant problems.

## Reliable EPC Services

At Stress Engineering Services, we want to be your complete engineering service provider. Our Plant Services group and the associated groups within our company give you excellent expertise at your fingertips. Our Engineering, Procurement, and Construction (EPC) division, called Stress Engineering and Construction (SE&C), brings an unmatched level of technical expertise to EPC projects for refining, petrochemical, chemical, and midstream gas processing plants.

From concept to front-end engineering and to commissioning and start up, SE&C is the integrated solutions provider who brings technical expertise and a commitment to excellence to every project. SE&C draws on its extensive resources to offer a full range of services across all phases of your project, from fitness for service, process simulation, metallurgy, finite element analysis, computational fluid dynamics, fire damage assessment, and construction.

## Engineering Problem Solving

Many of our clients' most difficult challenges are not unique to just them. Stress Engineering Services is uniquely positioned to view the common problems across the industry. At times, joining companies together is the best approach, enabling combined resources, experiences, and research. Stress Engineering Services often directs Joint Industry Projects (JIPs) that examine material behavior, new technology, or new theories to help advance the science in our industry. In the end, the main drive for these undertakings is normally improved performance, reliability, and safety – often the financial justification is strengthened by sharing the investment among multiple companies. When our SMEs across multiple fields combine with the skill sets of our clients, it makes for a very powerful team!



## We Combine Experienced Plant Subject Matter Experts with Applied Science and Engineering to Deliver Multidisciplinary “Practical” Solutions!

Our Plant Services Practice is focused on helping clients. We are an extension of our client's engineering staff, working together with them on their design and analysis problems. Through our experience, commitment, and service, we're confident we can take on any problem. We have the know-how and drive to find solutions through skill, determination, and the best engineering knowledge and methods.

We are known for helping with a broad range of problems to be our clients' **Complete Engineering Service Provider**. We assist on a wide variety of specialty services, including taking on your most difficult technical problems.

We look forward to helping you solve your engineering problems, no matter how daunting or complex they may be. At Stress Engineering Services, you always get the right people, the right answers, and our commitment to service.

EXPERIENCE • COMMITMENT • SERVICE

Stress Engineering Services successfully completes over 3,000 projects per year for more than 1,000 clients worldwide. Our engineers have an average of 20 years of industry experience, with many of them having earned advanced degrees in their respective fields.





**Stress Engineering Services** is a leader in providing proven engineering services and solutions for a broad range of industries worldwide. Always at technology's leading edge, we set the standard in technical excellence by delivering the right answers - on time.

This commitment to excellence is the cornerstone of our business. It stems from our belief that there's more to providing quality service than just producing results. It's about having the most advanced technology and equipment along with a team of highly qualified engineering experts with years of applied industry experience and a wide array of engineering disciplinary skills. More importantly, it's about listening to the client's needs to effectively assess their problem, and unite the right skills and resources to solve their problem in the time they need it.

Since 1972, we have been servicing the needs of clients who require special, in-depth technical knowledge in the areas of materials engineering, metallurgy, testing, fitness-for-service, risk and feasibility assessments, floating production systems, riser design and analysis, pipeline engineering, mechanical design, fluid and fracture mechanics, process technology, product design and development, subsea engineering, data acquisition, instrumentation, and more.



HOUSTON  
CINCINNATI  
NEW ORLEANS  
WALLER  
CALGARY  
SINGAPORE

HOUSTON  
281.955.2900

CINCINNATI  
513.336.6701

WALLER FACILITY  
281.671.2550

NEW ORLEANS  
504.889.8440

CALGARY  
403.256.2527

SINGAPORE  
+65.6898.0511



[www.stress.com](http://www.stress.com)