



- Metallurgical consulting and testing
- Metals characterization
- Failure analysis
- Forensic investigations
- Weld engineering
- Corrosion assessment
- Heat treating evaluations
- Fire damage assessment
- Litigation support
- Mechanical testing
- Fatigue and fracture analysis
- Engineering criticality assessment
- Fitness for service
- Nonlinear finite element analysis
- Third-party analysis
- Peer review

Most metallurgical failures can be traced back to either inadequate design or materials quality. Understanding materials behavior—from welding and brazing to corrosion and other forms of degradation—and a component’s response to complex loading is paramount to determining why a part or component failed and to preventing failures in new designs. Clients rely on the extensive experience of our metallurgical and applied mechanics engineers to provide engineering solutions related to design optimization and evaluation of in-service failures.

Our metallurgical and applied mechanics engineers leverage extensive knowledge of materials behavior and failure modes in conjunction with recognized industry analysis techniques to understand structural response to complex mechanical and thermal loading and to evaluate in-service damage mechanisms. We possess decades of experience in the evaluation of all types of materials, parts, and components and can provide cost-effective solutions for challenging designs, existing infrastructure, and mitigation of unexpected failures.

Our state-of-the-art Janney Technical Center laboratories are equipped to handle a wide variety of materials characterization and testing, including composition and microstructure. Among other advanced testing equipment, our scanning electron microscope is an invaluable tool in the investigation and analysis of part and component failures. But our capabilities are not confined to the laboratory. We routinely employ a diverse array of nondestructive evaluation capabilities in the field, including ultrasonic testing, magnetic particle testing, thermography, and field metallography and replication.



Metallurgy and Applied Mechanics

REPRESENTATIVE PROJECTS

- Apple Blossom Wind Farm - Bad Axe, MI: Forensic investigation
- A. Stucki Company - Moon Township, PA: AAR 2016 knuckle failure analysis
- Concrete Reinforcing Steel Institute: Development of durability model
- Condominium - Chicago, IL: Stainless steel pool liner corrosion investigation
- CountryMark Refining - Mount Vernon, IN: Inspection plan support, fitness for service assessments, failure analysis, and on-site metallurgical turnaround support
- Energy Plant - Columbus, NE: Investigation of structure and pressure vessel collapse
- Inter-Fluve - Hood River, OR: Investigation of failures of threaded log connectors
- Odfjell Terminals - Houston, TX: Assessment of chloride tank weld corrosion
- Pharmaceutical Plant - Chicago, IL: Post-incident investigation of dryer for fire damage
- Polyethylene Plant - Port Allen, LA: New ASTM A53 pipe assessment
- Port of Houston - Houston, TX: Corrosion assessment program development
- SCI Phoenix Prison - Schwenksville, PA: Corrosion analysis of stainless steel bathroom fixtures
- Sinclair Wyoming Refining Company - Sinclair, WY: On-site turnaround support

