



Minerals-Alloys Processing & Failure Investigations

## Metallurgical & Forensic Engineering

*Engineering meeting evidence, delivering irrefutable truth.*

# Company Profile

**Company Name:** AlloProx

**Tagline:** Engineering meeting evidence, delivering irrefutable truth.

**Business Type:** Metallurgical & Forensic Engineering Consulting

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## About Us

**AlloProx** is a specialized metallurgical and forensic engineering consultancy with deep technical roots in **metallurgical** engineering, materials science, structural analysis and failure investigation.

We investigate material and component failures, uncover root causes, and deliver independent, science-backed assessments for industries where performance, safety, and liability intersect.

With over 18 years of expertise in **metallurgical engineering**, **material characterization**, and **failure investigation**, AlloProx provides comprehensive services to sectors where asset integrity, reliability, and accountability are paramount — from **mining operations** to **metallurgical processes**, **manufacturing processes** to **aerospace components**, and from **structural** failures to **automotive recalls**.

Our team of PhD-qualified engineers, legal-aware experts, and multidisciplinary analysts combines laboratory precision with real-world insight to provide solutions and reports that are **technically rigorous**, **business-relevant** and **legally defensible**.



Minerals-Alloys Processing & Failure Investigations

## **Mission**

To deliver accurate, timely, and scientifically sound engineering solutions and forensic investigations that empower clients to make informed decisions, prevent future failures, and resolve disputes.

## **Vision**

To be the trusted partner for metallurgical engineering consultancy and forensic investigations across high-risk, high-value industries, ensuring integrity, safety, and accountability through engineering excellence.

## **Core Services**

### **1. Metallurgical Consulting**

- Mineral Process Design and Evaluation
- Hydrometallurgical Process Design and Evaluation
- Pyrometallurgical Process Design and Evaluation
- Alloy selection and failure prevention
- Process optimization: Enhancing the efficiency and productivity of smelting operations by optimizing process parameters and reducing energy consumption (mineral processing, hydro & pyrometallurgical process, casting, heat treatment, HIP, welding)
- Materials specification and compliance audits
- Corrosion mitigation strategies
- Plant Audits and Feasibility Studies: Conducting detailed audits and feasibility studies to assess the plant's performance and identify areas for improvement.

### **2. Failure Analysis & Root Cause Investigation**

- Mechanical failure of components (fractures, fatigue, wear)
- Metallurgical failure (corrosion, embrittlement, improper heat treatment)
- Process-related failures (welding defects, casting issues, additive manufacturing flaws)
- Structural and civil failures in buildings, bridges, and infrastructure

### **3. Materials Characterization**

- Microscopy: SEM, FIB-SEM, EBSD, TEM

- Spectroscopy: EDS, XRD, OES
- Mechanical Testing: Tensile, fatigue, hardness, impact
- Corrosion testing and evaluation
- Thermal and rheological analysis

#### **4. Expert Witness & Legal Support**

- Litigation support for law firms and insurance providers
- Expert witness testimony in arbitration, mediation, and court proceedings
- Technical documentation review and forensic reporting
- Failure case reconstruction and simulation

#### **5. Insurance & Risk Assessment**

- Post-loss investigation of insured assets and structures
- Technical support for subrogation claims
- Pre-loss risk audits and life expectancy evaluations

#### **7. Equipment Leasing**

- Lease of specialized mineral processing and metallurgical engineering equipment dedicated to crushing, milling, smelting, and characterization
- Flexible short-term and long-term leasing options
- Technical support and maintenance for leased equipment

#### **8. Technical Training of Staff and Support**

- Customized training programs in mineral processing, pyrometallurgy, hydrometallurgy, and materials testing and analysis
- On-site and remote training options
- Certification programs to enhance workforce technical capabilities
- Providing training and support to plant personnel to ensure the successful implementation and operation of new technologies and processes.

### **Industries We Serve**

#### **Mining**

- Crushing equipment selection
- Wear and fatigue failures in crushers, mills, and conveyors



- Corrosion and material degradation in harsh environments
- Forensic assessment of structural failures in shafts and headframes

### **Metallurgical Engineering**

- Evaluation of mineral processing flowsheet, including mineral variability, process efficiency, crushing, milling, and liquid-solid separation equipment
- In-depth analysis of the smelting process, refining, and processing equipment
- Evaluation of Lixiviation and Electrowinning Process,
- Process optimization and efficiency evaluation,
- Consulting on new alloy development and failure prevention

### **Construction**

- Structural collapse and deterioration investigations
- Material selection, suitability and compliance testing
- Evaluation of construction defects and failures in concrete and steel structures

### **Automotive**

- Component failure analysis (engine parts, chassis, transmission)
- Material evaluation for lightweighting and performance
- Support for recalls and warranty claim investigations

### **Aerospace**

- Investigation of component failure (rotating parts, fasteners, composites)
- High-temperature material analysis and service degradation
- Compliance assessments for critical safety components

### **Legal**

- Objective, science-based expert testimony
- Case support for contract disputes, negligence, product liability, and personal injury claims
- Customized forensic reports with visual and technical clarity

### **Insurance**

- Detailed failure assessments for loss investigations
- Damage evaluation in natural disasters, fires, or operational failures

- Preventative audits to minimize risk exposure

## Why Choose AlloProx?

- **Staff with 18+ Years of Expertise:** Industry-leading knowledge in metallurgy and forensic engineering
- **Advanced Analytical Capabilities:** Equipped with state-of-the-art network labs and diagnostic tools
- **Multidisciplinary Insight:** Bridging the gap between engineering, legal, and insurance perspectives
- **Independent and Confidential:** Objective evaluations, free of conflicts of interest
- **Responsive and Transparent:** Clear communication, quick turnaround, and accessible reporting

## Case Study Highlights

- **Metallurgical Equipment Failure:** Diagnosed fatigue cracking in mantle liners, saving the client millions in unplanned downtime.
- **Aerospace Component Analysis:** Identified root cause of turbine blade failure linked to service-induced creep deformation
- **Legal Dispute Resolution:** Provided expert testimony in a structure defect litigation, leading to a successful settlement
- **Automotive Recall Support:** Conducted metallurgical failure analysis on batch-manufactured suspension components.

## Let's Talk

Whether seeking answers after failure, requiring expert opinion in litigation, or looking to enhance material performance, AlloProx is your engineering partner in delivering clarity and solutions.

**Contact AlloProx today** to discuss your metallurgical engineering project or forensic investigation needs.

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