



NON-FERROUS



Hatch's Material Services Group provides materials selection services, FEA analyses and welding expertise

CONTACTS

Ted Barrette, P.Eng.
Supervising Mechanical Engineer
+1 905 469 3403 ext 7334
ebarrette@hatch.ca

Victor Taylor
Senior Welding Technologist
+1 905 469 3403 ext. 7312
vtaylor@hatch.ca

Geir Moe, P.Eng.
Senior Materials Engineer
+1 905 469 3403 ext. 7355
gmoe@hatch.ca

Shankar Peruma
Senior Finite Element Analyst
+1 905 469 3403 ext. 7304
speruma@hatch.ca

MATERIAL SERVICES GROUP

As part of Hatch's world-class Autoclave Technology Group (ATG) based in Oakville, Ontario, Canada, the Materials Services Group is involved in some of the most severe, high-pressure, corrosive and erosive environments in industry today. Supported by ATG's long history of EPCM project experience and collection of industry professionals, the Materials Services Group is capable of handling the most demanding projects.

MISSION STATEMENT

The Material Services Group's mission is to ensure the reliability of critical equipment, utilizing the application of materials engineering, finite element analysis (FEA) design / validation and quality management of the welding and fabrication processes.

MATERIAL SUPPORT FROM CONCEPT TO CONSTRUCTION

Hatch has a team of professionals in material technology, including:

- Materials engineering
- Finite element stress analysis and design
- Welding technology and inspection.

The Material Services Group brings the requisite experience and knowledge base necessary to support your material application and fabrication-management needs.

SERVICES

- Materials selection
- Failure analysis
- Finite element stress analysis and design
- Welding application technology
- Welding inspection and fabrication management
- QA/QC documentation creation, review, approval and control
- Training programs for all services.
- Painting and Coating Inspection Services



MATERIAL SERVICES GROUP CONTINUED**Materials Engineering**

Material selection is critical in avoiding premature failure of equipment and optimizing process performance. Selection of a suitable material not only takes into account obvious factors such as corrosion resistance and mechanical properties, but also other issues such as material availability, economics, safety, and environmental standards.

Following material selection, the preparation of suitable specifications defining material requirements as well as fabrication and welding requirements is vital to ensure reliability of the new equipment. Intimate working knowledge with the codes and standards for the design and manufacture of equipment allows us to develop suitable specifications and review supplier documentation to ensure compliance with the end user's requirements.

*Corrosion test coupon analysis**Pitting corrosion**Stress corrosion cracking analysis***MATERIAL SELECTION**

- Metals
 - Carbon Steel
 - Austenitic and super-austenitic stainless steels
 - Duplex and super-duplex stainless steels
 - Nickel Alloys
 - Titanium Alloys
- Non-metals
 - Rubber linings
- Materials evaluation and ranking studies, including the development and management of corrosion test programs
- Preparation of material and equipment fabrication specifications
- Corrosion and high-temperature applications in such industries as: pulp and paper, chemical process, steel plants, energy, desalination, etc.
- Aqueous corrosion and hot corrosion mechanisms and prevention
- The application and use of all conventional cladding techniques.
- Certified personnel to NACE Level 1 for painting and coating inspection.

LABORATORY SERVICES

- Conduct failure investigation, metallurgical analysis and characterization, microscopy and electron microscopy, mechanical testing and corrosion testing.

PLANT \ EQUIPMENT INSPECTION AND CONDITION ASSESSMENT

- Inspection and condition assessment services can be carried out on equipment, such as Gas Cleaning Systems, Sulphuric Acid Plants, Furnance Lining, Gas desulphurization equipment, etc.

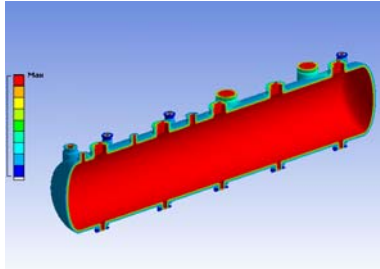
MATERIAL SERVICES GROUP CONTINUED

Finite Element Analysis

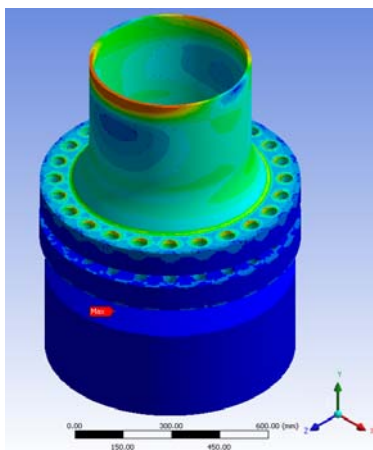
To complement your resources or to fulfill a need for special expertise, we offer finite element analysis consulting to help you solve analysis and design challenges in various disciplines. Our goal is to act as a seamless extension of your company's engineering department. Hatch has acquired extensive experience in the mining, energy, oil & gas, transportation, structural, industrial and various manufacturing sectors.

EXPERIENCED FEA ANALYSTS

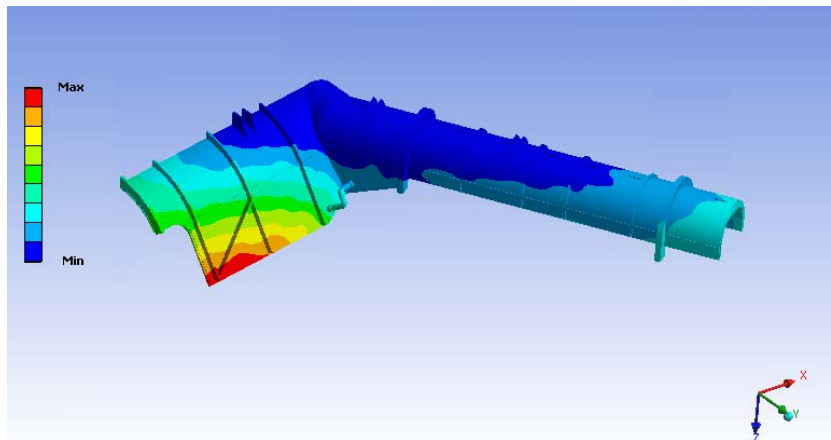
- Compliance to a specified Design Authority Requirements
- Design development of new designs
- Value engineering on an existing design
- Failure analysis of a component by analyzing various loading scenarios and examining the resulting stress pattern in the component to determine a probable failure mode
- Non-linear stress analysis (structural material plasticity, large deformation and frictional contact)
- Non-linear materials (plasticity, creep, hyper-elasticity)
- Non-linear contact (frictional contact)
- Fatigue, reliability, life protection
- Heat transfer (steady and transient thermal, non-linear material properties)
- Drop test (structural explicit analysis)
- Buckling frequency and harmonic response
- ANSYS® FEA training



FEA thermal analysis of a pressure vessel



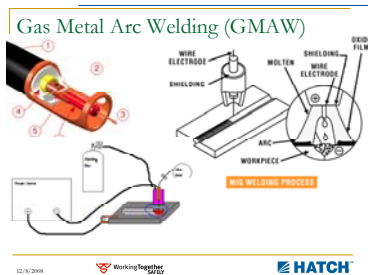
FEA stress analysis of a reactor nozzle



FEA stress analysis of a water-cooled launder



Inspection of large pressure vessel component



Training document

MATERIAL SERVICES GROUP CONTINUED

Welding Inspection

Visual welding inspectors are a key component in maintaining quality in the fabrication of critical equipment and structures by ensuring that the full scope of Hatch's requirements are monitored during the fabrication process, including dimensional control of fabrications, schedule management and reporting.

A firm understanding of the welding process and all related requirements is an essential component for the inspector in order to identify potential quality issues before they translate into lost time or revenue. The welding inspectors in Hatch's Material Services Group are welding technologists who are capable of bringing over 25 years of welding technical expertise to all areas of the fabrication process from design to construction.

HATCH'S WELDING CAPABILITIES

- Developing weld and inspection procedures
- Global on-site welding inspection and fabrication management
- Quality audits and prequalification of fabrication vendors
- Document Review and management during all fabrication phases
- Auditing and management of third party inspection organizations
- Technical training sessions in welding technology

EXPERIENCED PERSONNEL

The welding inspection staff are certified to:

- Canadian Welding Bureau (CWB) under CSA Standard W178.2 with the following product endorsements:
 - ASME IX and VIII-I – Pressure Vessels
 - ASME B31.3 – Process Piping
 - CSA W47.1 and W59 – Structural Steel
- National Board of Pressure Vessel Inspectors – “A” endorsement
- NACE CIP Level 1.