



INTEGRATED ENGINEERING



DEVELOPING YOUR ASSETS

Through years of hands-on and in-the-field experience in engineering design and material selection, Lake Superior Consulting (LSC) enables our clients to safely and efficiently develop their critical assets. Our customized, complete end-to-end engineering solutions meet your specific developmental and logistical challenges. Using the highest standards of thoroughness and integrity, we diminish error margins so assets are reliable upon start-up and function as intended for their design life.

INTEGRATED EXPERIENCE

LSC's Integrated Engineering team supports complex projects requiring multiple disciplines, with cross-functional resources to ensure no detail is overlooked. From Mechanical to Civil/Structural and Electrical/Controls, LSC provides comprehensive turn-key designs that focus on design efficiencies that positively impact your bottom line. We work extensively in the following markets, and are on the move to become the leading provider in others.

ENERGY INFRASTRUCTURE:

- Oil and gas
- Power/utility

INDUSTRIAL:

- Mining
- Manufacturing
- Pulp and paper

MUNICIPAL/COMMERCIAL:

- Distribution piping
- Wastewater
- Commercial buildings

PROJECT DEVELOPMENT

The initial architecture of a project creates the foundation for successful completion. LSC's forward-looking approach combined with our industry knowledge, innovative solutions, and client interaction provides assurance to our clients that their project will be done right.

- Feasibility and economic studies
- Routing
- Site selection
- Survey
- Modeling

CORE COMPETENCIES

- Compressors/pumps
- Distribution and transmission pipelines
- Metering/interconnects
- Power distribution and transmission
- Power piping
- Process piping
- Storage tanks and pressure vessels

DETAILED ENGINEERING

The detailed design of a project is critical to the safe and reliable operation of your asset. Our qualified personnel are experienced in mechanical, civil, structural, and electrical design disciplines. We deliver comprehensive design packages, by incorporating design capabilities across multiple platforms including the latest in engineering and CAD software technologies and Geographical Information Systems (GIS).

- Arc flash studies
- Building design
- Crossing designs (road, railroad, waterbody/wetland)
- Material and equipment selection
- Fatigue analysis
- Fit-for-service analysis
- Grading plans
- Hydraulic analysis (steady state and transient)
- Geohazard identification and remediation
- Multi-discipline drawing packages
- Permitting support
- Stress analysis
- Storm water management
- Structural design
- Thermal relief

CONSTRUCTION MANAGEMENT

LSC's Construction Execution team coordinates and manages construction and facility operations for our clients, assuring quality is taken into consideration during and after execution of the work. When it comes to transitioning from designing and planning to executing, we ensure all work adheres to project specifications and that installation is performed with the utmost integrity.

- Construction coordination and management
- Constructability reviews
- Contract strategy
- Field supervision and engineering
- Civil services
- Maintenance and replacement
- Quality assurance and quality control
- Regulatory compliance
- Pressure testing

CIVIL SURVEY

Innovative data collection techniques deliver accurate information faster. We get the pulse on your asset using:

- Utility locates
- High-definition laser scanning
- Hydrographic surveys
- Line locating and centerline surveys
- Pre-construction staking and construction as-built
- Topographic and design surveys
- Boundary surveys
- As-built surveys
- Bathymetry

ADVANCING TECHNOLOGY AND TRANSFORMING DESIGN

LSC specializes in turning concepts into realities. Your operation deserves more than just the latest technology and design methods. We put technology into action for you and collaborate with your team throughout every step of the project. We use technology to support engineering, project execution and delivery.

CAPABILITIES:

- 3-D modeling for pipeline and facilities
- 3-D structural design using building information modeling
- 3-D surface modeling
- Finite element analysis
- Survey data processing
- Pipeline/facility data management for life of asset records
- GIS web viewer, mobile applications, and database integration
- Alignment sheet generation

You can count on us to deliver quality and excellence where you need it – with the professionalism and integrity you expect.





INTEGRITY MANAGEMENT



DISCOVER WHAT YOU CAN'T SEE

Beyond simply a process, elite Integrity Management programs must become ingrained at the heart of organizational culture. LSC approaches Integrity Management with vigor and determination – viewed as a welcome challenge rather than an insurmountable feat.

Lake Superior Consulting provides a lifelong look at your asset by inspecting, assessing, and evaluating integrity threats to develop a comprehensive Integrity Management Plan (IMP).

Our Integrity Management solutions protect, monitor, examine, and test to assure pipelines or facilities will perform at peak levels—no matter the life stage. We are your high-quality resource to assist in operating your asset safely and in compliance with the ever-changing regulatory requirements.

Ensuring asset integrity and longevity,
by protecting, maintaining, and monitoring assets.

INTEGRITY MANAGEMENT SOLUTIONS

Our Integrity Management team works to provide our clients with timely, accurate, and relevant information about their assets to enable the best possible integrity management decisions. Our customized Integrity Management plans give our clients the peace of mind that their assets are engineered and protected to a standard that ensures safety and exceeds regulatory requirements.

INTEGRITY SERVICES

- In-service pressure testing planning, design, and execution
- In-line inspection program execution and management
- Direct examination (NDE)
- Field direct examination
- Written Integrity Management program development and support
- Regulatory inspection for IMP, O&M, OQ, public awareness, and damage prevention services
- Flow modeling and capacity analysis
- Installation and restoration-to-service planning

CORROSION CONTROL SERVICES

- Cathodic protection system maintenance
- Stray DC interference testing, mitigation, and bond inspection
- AC corrosion modeling and mitigation
- Annual test point survey
- Close-interval survey
- Direct assessment (ECDA, ICDA, SCCDA)
- DCVG, ACVG, and current attenuation surveys
- Soil resistivity and terrain survey
- Pipeline depth-of-cover survey
- Ground bed design, installation, and inspection
- Protective coating solutions, inspection, and failure analysis
- Atmospheric corrosion inspection
- Exposed piping assessments
- Data efficacy review and acceptance
- Database implementation and management, including GIS formats

PROJECT MANAGEMENT

- Specification writing
- Procurement
- Inspection during fabrication
- Records review

CERTIFIED TECHNICIANS

- ASNT-VT, MT, UT (including SWUT and PAUT)
- AWS-CWI
- AMPP (formally NACE)

MECHANICAL INTEGRITY

ENGINEERING SOLUTIONS

- Vendor evaluations and fabrication support
- Welding technology and technical support
- Nondestructive engineering and testing
- Metallurgical and corrosion studies
- Plant equipment inspection
- Training programs

FITNESS FOR SERVICE (API 579-1/ASME FFS-1)

- Fracture analysis
- Fatigue analysis
- Elevated temperature evaluation
- Failure evaluation
- General and localized corrosion
- Blisters and HIC/SOHIC damage
- Weld misalignment and shell distortions
- Fire damage

PRESSURE VESSEL, PIPING, AND TANK SERVICES

- API 510, 570, and 653
- AWS certified welding inspector (CWI) Visual
- Testing (Borescope)
- Inspection data management system services
- Non-destructive examination (NDE) services
- STI SP001

