Overview of PSI Technologies Inc.
Saskatoon, Saskatchewan, Canada

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PSI Technologies Corporate Overview

- Founded around Nebraska-Kansas Border
- Incorporated in Saskatoon, SK, Canada in 1998 (18 years)
  - Consulting and construction company
  - Employees a staff of 100 including 10 engineers and 1 geologist
  - 1000+ major pieces of equipment
- 5 Primary PSI Divisions:
  - Engineering Services
  - Mining Services
  - Earthworks Construction
  - Aggregates/Trucking
  - Land Development

*PSI Technologies motto: dedicated to engineering the best solutions for its clients through best practice in science, technology and engineering.*
PSI TECHNOLOGIES CORPORATE COMMITMENT

• PSI Technologies is dedicated to excellence through innovation.
  – Foundation based on advances in materials science through the use of scientifically-sound and pragmatic mechanistic methods.

• Mission: to assist engineers in the design, analysis, construction, and management of diverse infrastructure.
  – Integration of technical innovation and environmental sustainability is a cornerstone of our company’s philosophy.
  – Dedicated to Research & Development.
  – Dedicated to Client specific needs.
Our Commitment to Safety

PSI Technologies is committed to creating, maintaining, and promoting a safe and healthy work environment for our workforce and our community. PSI has a comprehensive health and safety program that covers all safety concerns that might arise in our diverse work environment.

PSI actively pursues a goal of zero lost-time incidents. The proactive safety culture instilled into PSI’s workforce by management is the key to PSI’s impeccable safety record. PSI is an interdependent organization that demonstrates commitment and dedication to safety at all levels of our company.
PSI’s Corporate Commitment - Sustainability

- Wood Recycling
- Concrete Recycling
- Plastic Recycling
- Asphalt Recycling

Images showing the recycling process and a street with recycled materials.
PSI TECHNOLOGIES SERVICES

• Engineering Services
• Laboratory Testing
• 3D Numerical Modeling
• Structural Asset Management

• Aggregate Production
• Earthworks Construction
• Mine Services

PSI’s BUSINESS ADVANTAGE:
PSI Technologies offers vertically integrated cost effective full turnkey engineered infrastructure solutions, including materials design, structural design, equipment operation, project management, and quality assurance testing for civil and mining design and construction works.
ENGINEERING SERVICES

Road Coring & Sampling

Geotechnical Borehole Drilling & Logging

Materials Testing

Project Management
LABORATORY TESTING

Asphalt Concrete Testing

Soils & Aggregate Testing
LABORATORY TESTING

Mine Backfill Materials

HMAC Wheel Tracker

Portland Cement Concrete

Climatic Durability
3D MODELING—NONLINEAR MATERIAL PROPERTIES

a) Base

b) Salt - 15% Brine Immediate Test
a) Soil – Phase Angle (Frequency Dependency)

- Phase Angle vs. $I_1$ (kPa)
- Frequency: 10 Hz, 1 Hz, 0.1 Hz

b) Soil – Modulus (Frequency Dependency)

- Modulus vs. $I_1$ (kPa)
- $E$ (MPa) vs. $I_1$ (kPa)
- Frequency: 10 Hz, 1 Hz, 0.1 Hz

![Graphs showing soil properties](image-url)
3D MODELING
3D MODELING

PSIPave3D™
3D MODELING – SPECIFICATIONS & CLIMATE BY REGION
3D Modeling - Input Geometry & Truck Load

- Urban and Rural
- Multi-lanes

- Trucks list
- Nonuniform contact area

Flow Through Testing
3D MODELING – MATERIAL PROPERTIES

- **Linear and Nonlinear Elasticity**
- **Linear and Nonlinear Viscoplasticity**
- **Viscoplasticity and Elasto-Plasticity**
- **Fracture (Cohesive Zones)**
3D MODELING - INPUT GEOMETRY & TRUCK LOAD
3D MODELING - TIRE FOOTPRINT
3D MODELING - STRUCTURAL ANALYSIS
MODELING – Effect of Utilities
3D MODELING–FWD WITH FEM
3D MODELING – FORENSIC ANALYSIS

a) Target Optimum Fill, Wet In Situ
b) Dry Average In Situ Condition
c) Wet Average In Situ Condition
d) Subgrade Wet of Optimum
3D Analysis – Multiscale Modeling

Global Scale

Local Scale

Micro Scale

Patent #PCT/US2009/066071

International Journal of Pavement Engineering 2015:
Multi-scale computational model for design of flexible pavement – part I: expanding multi-scaling
Multi-scale computational model for design of flexible pavement – part II: contracting multi-scaling
Multi-scale computational model for design of flexible pavement – part III: two-way coupled multi-scaling
3D MODELING - COST MODULE
AGGREGATE PRODUCTION

Crushed Asphalt
Aggregate Delivery
Concrete Rubble
Plastic Recycling
Concrete Recycling
EARTHWORKS CONSTRUCTION

Foundation Excavation
EARTHWORKS CONSTRUCTION

- Trucking Services
- Basement Excavation
- Rail Infrastructure Services
- Culvert Replacement
MINE SERVICES

Tailings Processing
Mine Services

- Tailings Processing
- Backfilling
- Quality Control Testing
- Custom Underground Void Filling
MINE SERVICES
ALWAYS MAINTAIN BALANCE
FIGURE OUT WHAT'S IMPORTANT AND MOTIVATES
Thank You!

Please visit: www.psitechnologies.ca for more information