

Innovative Mining Infrastructure



S U P P O R T I N G Y O U R S U C C E S S

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THE AIL GROUP OF COMPANIES

Outline

Introduction of AIL

Innovative Mining Infrastructure

Application Examples

- Example #1 – Haul Road Crossings
- Example #2 – Portal Entrances
- Example #3 – Crusher Retaining Walls

Benefits for Northern Work

Questions

15 mins

5 mins

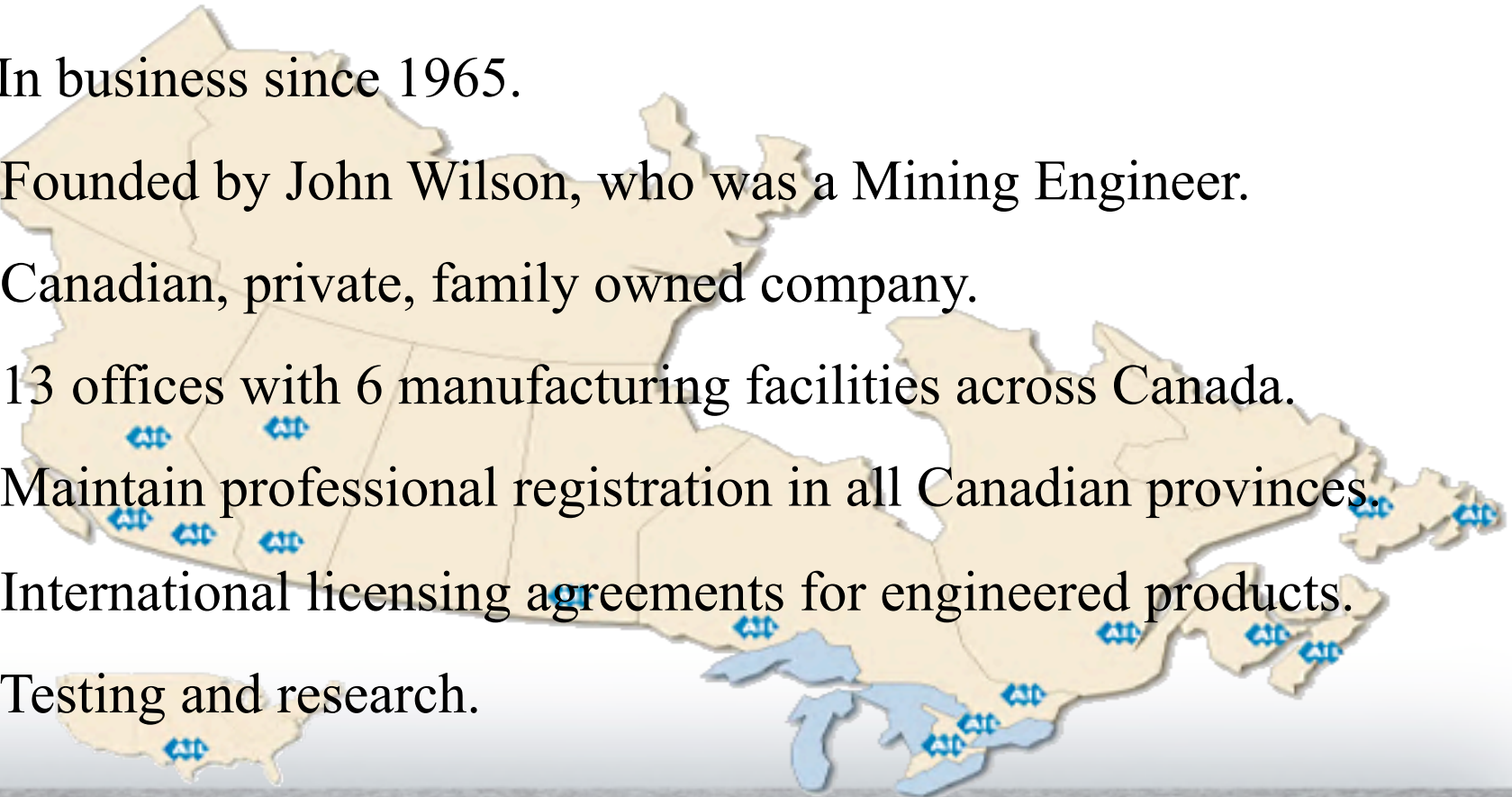
OUTLINE



THE AIL GROUP OF COMPANIES

Introduction of AIL

- In business since 1965.
- Founded by John Wilson, who was a Mining Engineer.
- Canadian, private, family owned company.
- 13 offices with 6 manufacturing facilities across Canada.
- Maintain professional registration in all Canadian provinces.
- International licensing agreements for engineered products.
- Testing and research.



INTRODUCTION



THE AIL GROUP OF COMPANIES

Introduction of AIL (con't)

- Manufacturer of corrugated steel structures & MSE Walls for mining infrastructure projects.
- Full service in-house engineering and drafting department.
- Technical sales team.
- Experienced on site supervision assistance (with cold weather experience).
- Custom designed products for each specific project.



Innovative Mining Infrastructure



Innovative Mining Infrastructure

- Begins with a fresh approach to solving unique challenges
- Major aspects to consider are:
 - ✓ Design Solutions
 - ✓ Transportation
 - ✓ Installation
 - ✓ Maintenance



INNOVATIVE MINING INFRASTRUCTURE



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- Design aspect:

- Good supplier with in-house engineering capacity
- Key personnel work from start to finish of project
- Custom solutions to maximize efficiency of design
- Design to specific DSL (temp applications to 100 yr)

- Transportation aspect:

- Nestable/stackable components to maximize weight to volume ratio
- Load configurations adaptable for trucks, sea cans, and various planes

- **Installation aspect:**

- Modular & expandable – minimize cost at early stages and expand upon full operation
- Local labour force for assembly
- Ideal for assembly in all weather conditions from the arctic of Canada to the outback of Australia
- Custom solutions with standard components

- **Maintenance aspect:**

- Virtually maintenance free during life span of the mine
- Methods for repairing components if damaged



Application Examples



Haul Road Crossings

Application Example #1

Nammuldi - Australia



Portal Entrances

Application Example #2

Galore Creek – Northern BC



Crusher Retaining Walls

Application Example #3

Lac des Iles – Northern Ontario



Haul Road Crossings

Application Example #1

“Overview and Use”



- Span over streams, rivers, roads or rail lines
- Range from 1.5 m span to 27 m span
- Various live and dead load combinations
- Environmentally friendly installations

HAUL ROAD CROSSINGS



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Haul Road Crossings

Application Example #1

Nammuldi - Australia



Challenges:

- Build grade separations over a rail line and two roads without traffic interruption
- Efficient construction schedule of entire project

• Solution:

- Modular construction using man-lift not scaffolding
- Construction 7, 7, 18 and 38 days = 70 days total

HAUL ROAD CROSSINGS (con't)



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Haul Road Crossings

Application Example #1

Nammuldi - Australia



Rail Crossing

13.6 m

span

9.8 m

rise

82.4 m

length

DSL = 50 yr

Road Crossing

11.4 m

7.2 m

80.8 m

Live Load = 390 t haul truck

HAUL ROAD CROSSINGS (con't)



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Portal Entrances

Application Example #2

“Overview and Use”



- Provide ramp access through overburden to rock face
- Vehicle access, ventilation, support for utilities
- Little or no concrete required
- All season and stage construction
- Reduce winter maintenance at portal entrance

PORTAL ENTRANCES



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Portal Entrances

Application Example #2

“Design Considerations”



- Custom geometry based on clearance box (span, rise, length)
- Efficient design (live, dead, snow & wind loading)
- Hanger system for utilities
- Reverse bevel end for improved ramp protection
- Foundation options (concrete, steel, full invert)

PORTAL ENTRANCES (con't)



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Portal Entrances

Application Example #2

Galore Creek – British Columbia



Challenges:

- Remote site without road access or runways for planes
- Requirement for very little concrete to be used
- High fill and avalanche protection for the ramp

PORTAL ENTRANCES (con't)



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Portal Entrances

Application Example #2

Galore Creek – British Columbia

- **Solution:**

- Modular components that could be air lifted using helicopters
- Full invert 9.1 m (30 ft) dia round pipe eliminating a concrete foundation
- Reinforcing ribs provided required design capacity allowing sufficient cover to absorb avalanche impacts



PORTAL ENTRANCES (con't)



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Crusher Retaining Walls

Application Example #3

“Overview and Use”



- Access to top of crusher systems to take advantage of gravity
- Welded wire mesh mats (4 ft wide x 2 ft tall x req'd length)
- Simple components providing versatility in solutions
- Easily adaptable to changing site conditions with proper technical support

CRUSHER RETAINING WALLS



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Crusher Retaining Walls

Application Example #3

“Design Considerations”

- Walls can be built with vertical face up to 120 ft (36.5 m)
- Live load range from light trucks to 400 t haul trucks
- Stage construction in conjunction with crusher tower
- Removes lateral loads from crusher tower
- Local aggregate from mine can be used

CRUSHER RETAINING WALLS (con't)



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Crusher Retaining Walls

Application Example #3

Lac des Iles - Ontario



- 86 ft (26 m) tall x 300 ft (91 m) long with stepped wing walls
- Support 200 t rock trucks dumping at the top
- Inside and outside corners to wrap around crusher tower
- Economized design by supplying black steel for 15 yr DSL
- Allowed for winter construction

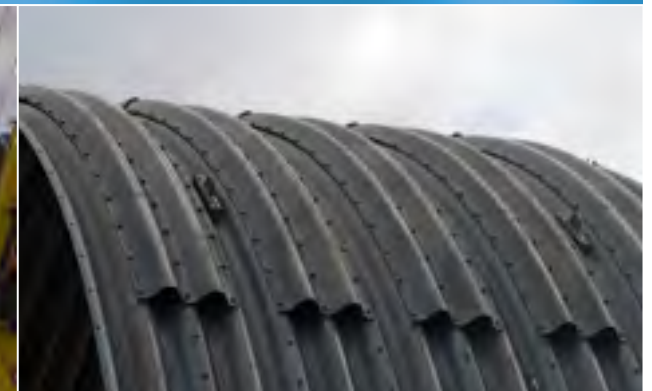
CRUSHER RETAINING WALLS (con't)



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Benefits for Northern Work



Benefits for Northern Work

- Significant advancements with corrugated steel and MSE structures have been made in recent years
- Little or no concrete required
- Ideal for winter (cold weather) installations
- Modular construction that is expandable
- Nesting for economic shipping
- Design assistance from budget through to final installation
- On-site training for use of local labour force

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SUMMARY



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Questions and Discussion

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