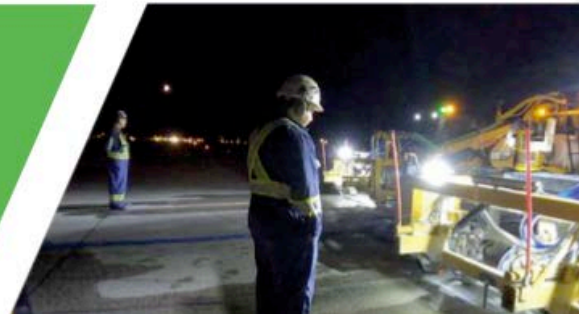
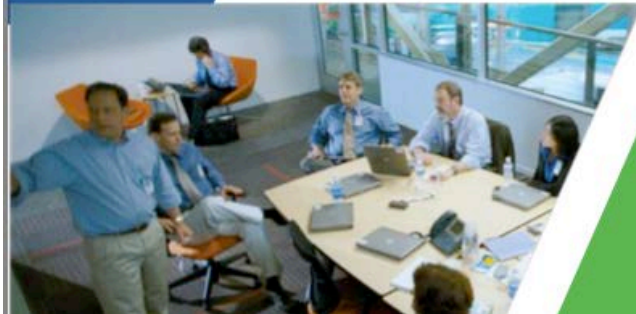
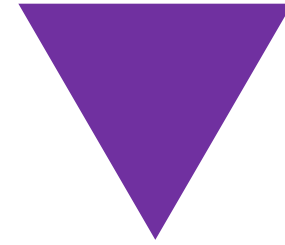




2024 SPRING CONVENTION



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CNC Precision Slot Cutting & Dowel Retrofit

@Vancouver International Airport(YVR)



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➤ Project Background & Context





The Specific Problem - Loss of Load Transfer

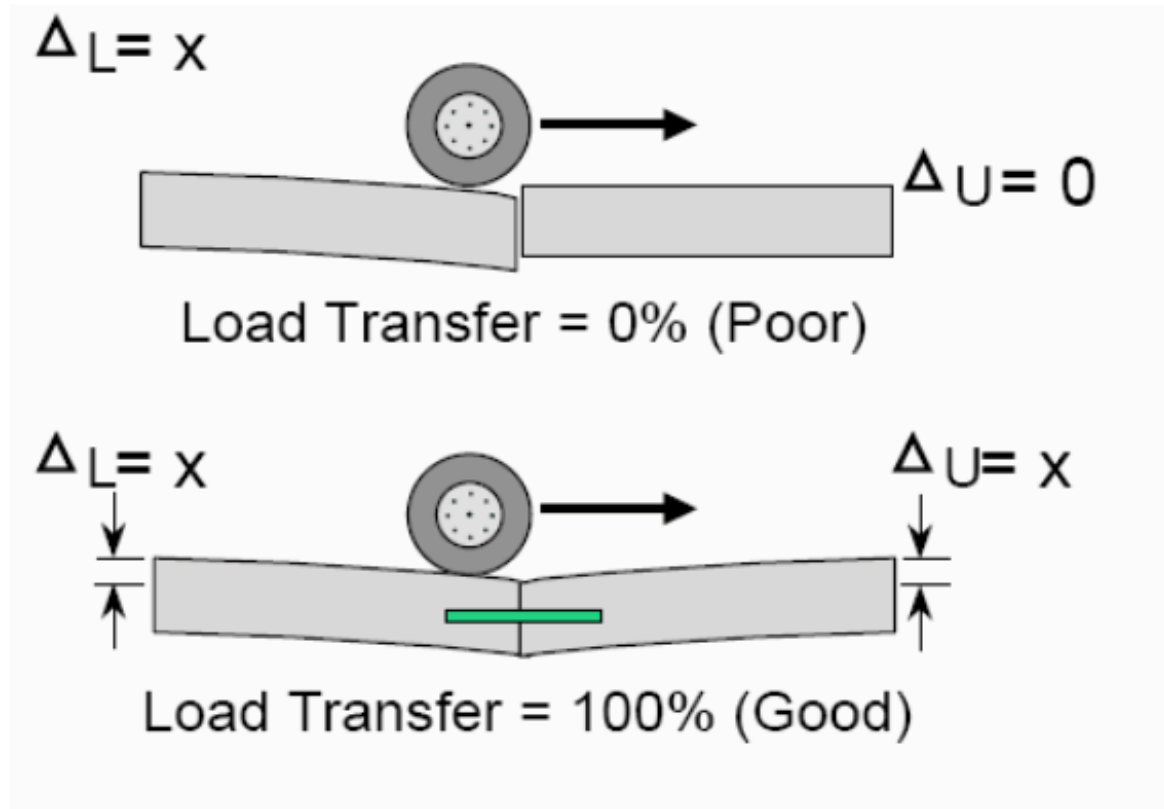
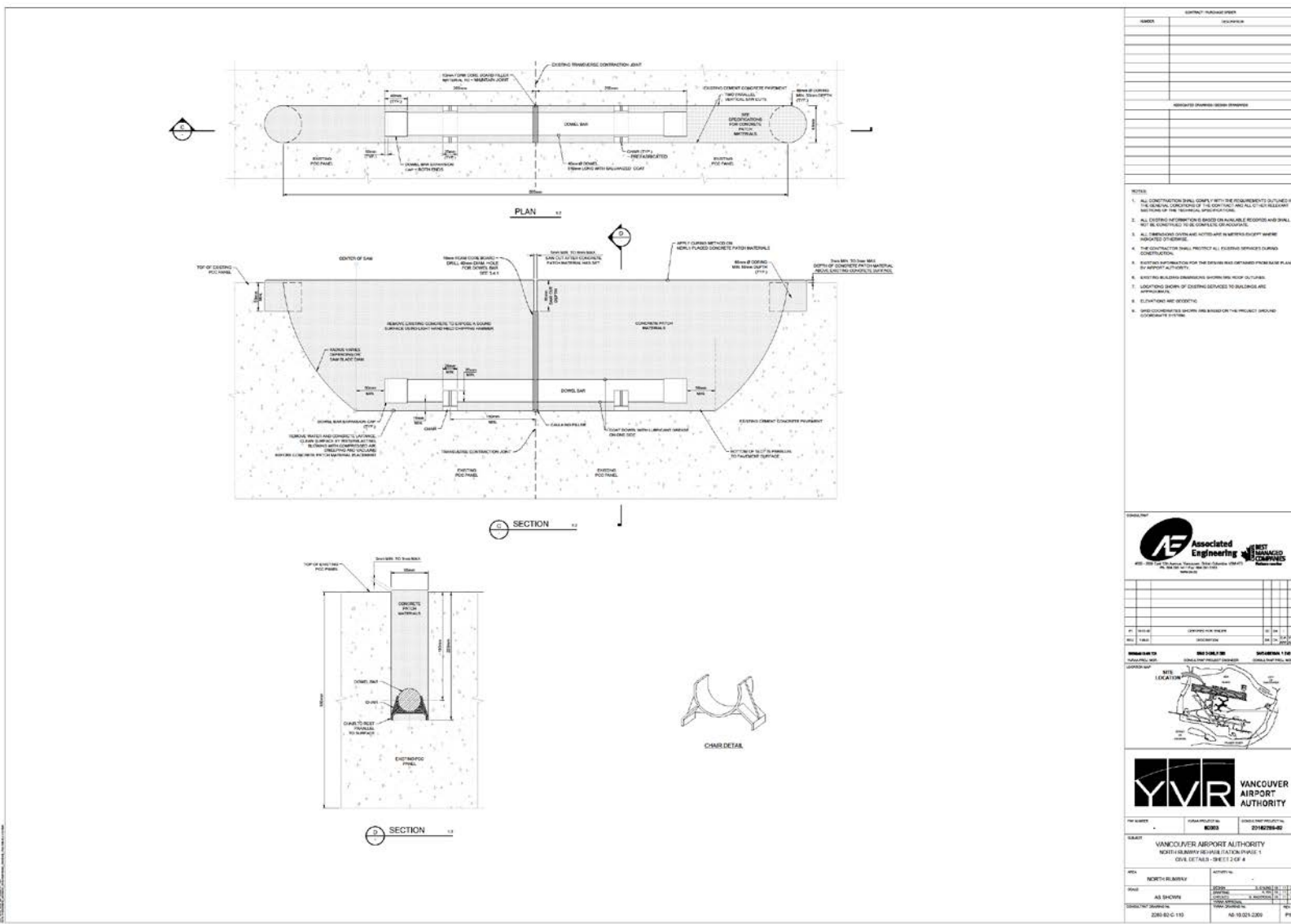


Figure 1. Improving load transfer with dowel bar retrofit (MTAG 2008)



DBR DESIGN



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Backfill Material Selection

Polyester Polymer Concrete

Advantages of PPC

Excellent flowability, low viscosity

A more uniform material

Strong and durable bond

Higher toughness, more flexibility and resistance to fracture

Rapid setting and high strength within short period of time

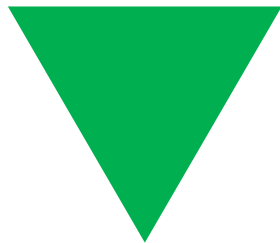
Fast mixing operation

More forgiving to variability in workmanship

Higher compressive, tensile, flexural and bond strength

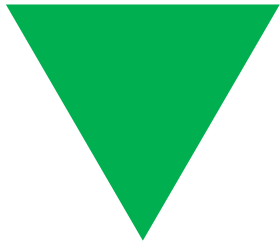
No risk of cracking due to shrinkage and/or thermal stresses

High abrasion resistance

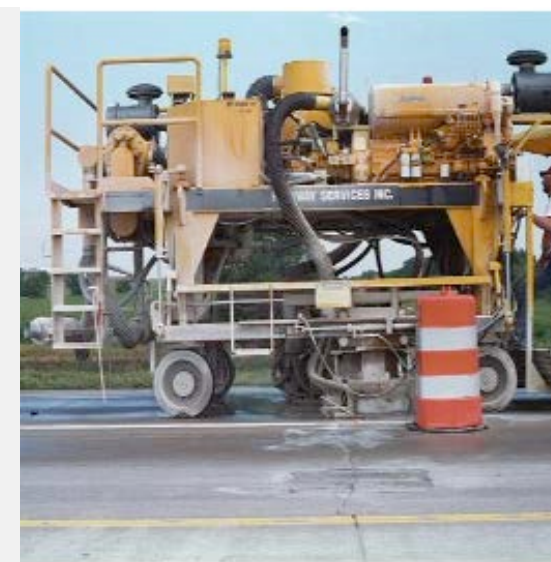




The Logistics Problem

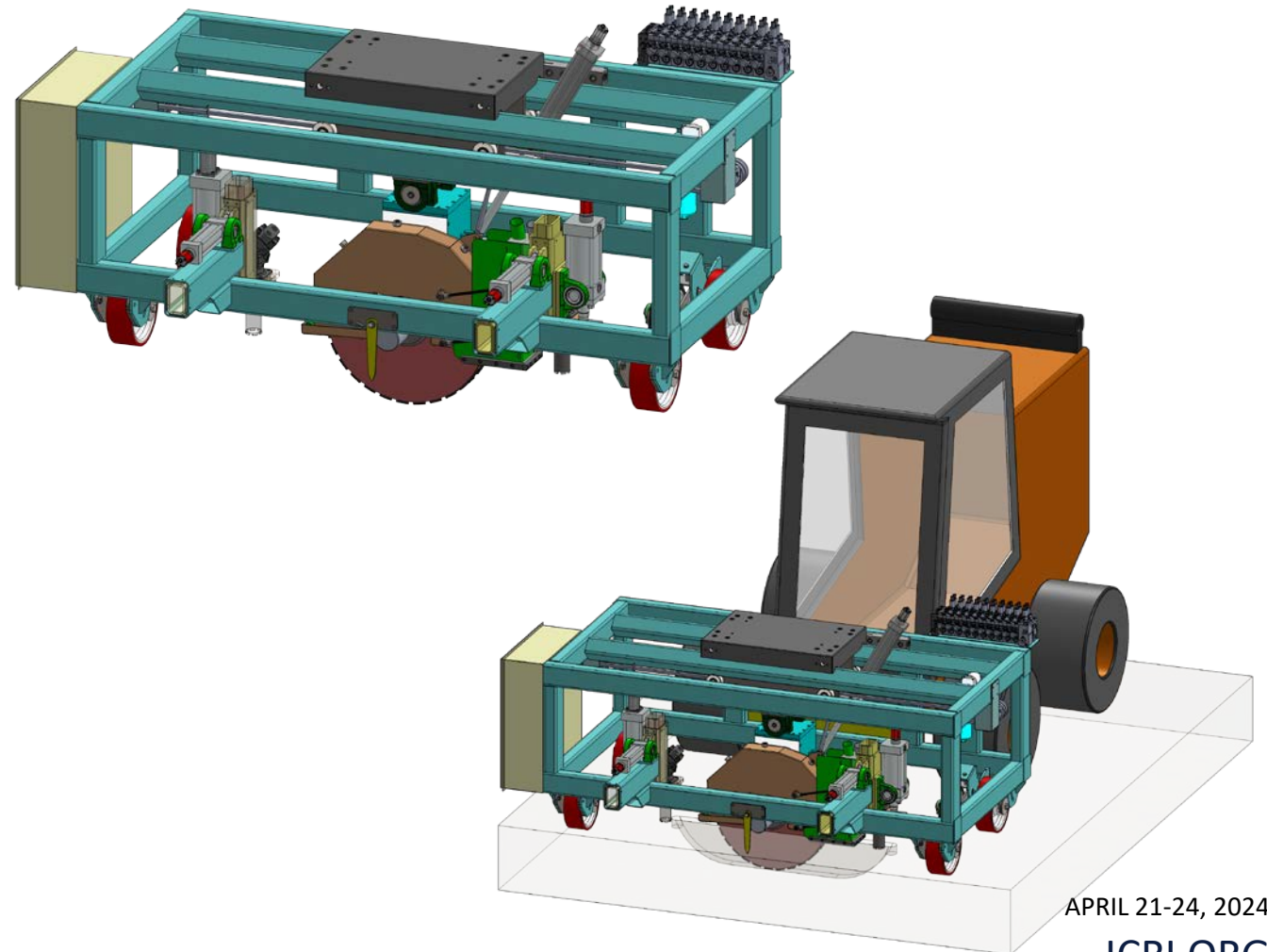
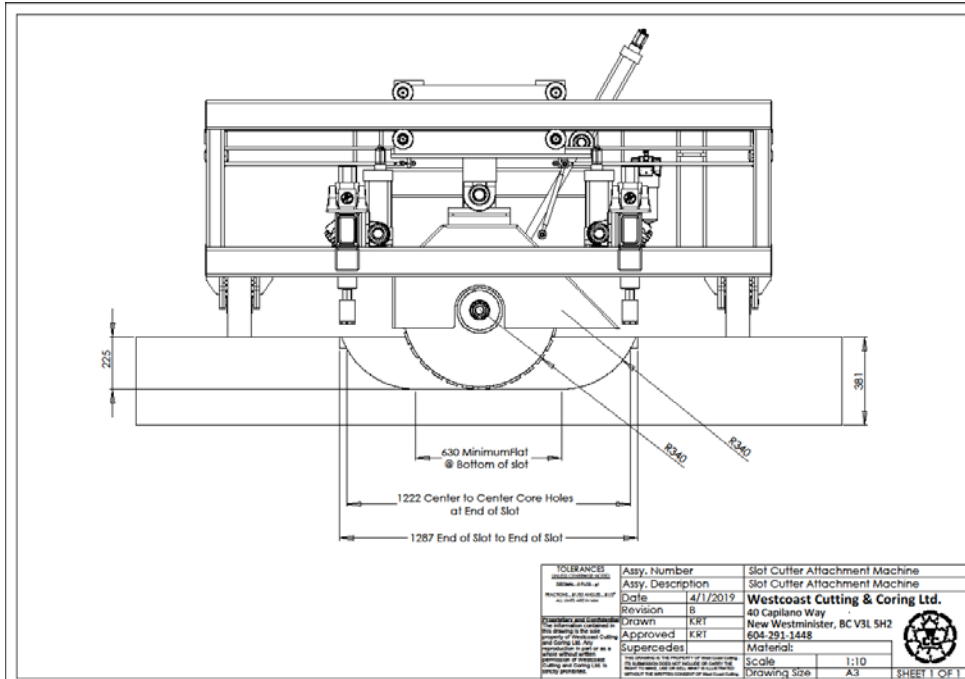


➤ Challenges of Conventional Concrete Cutting Equipment





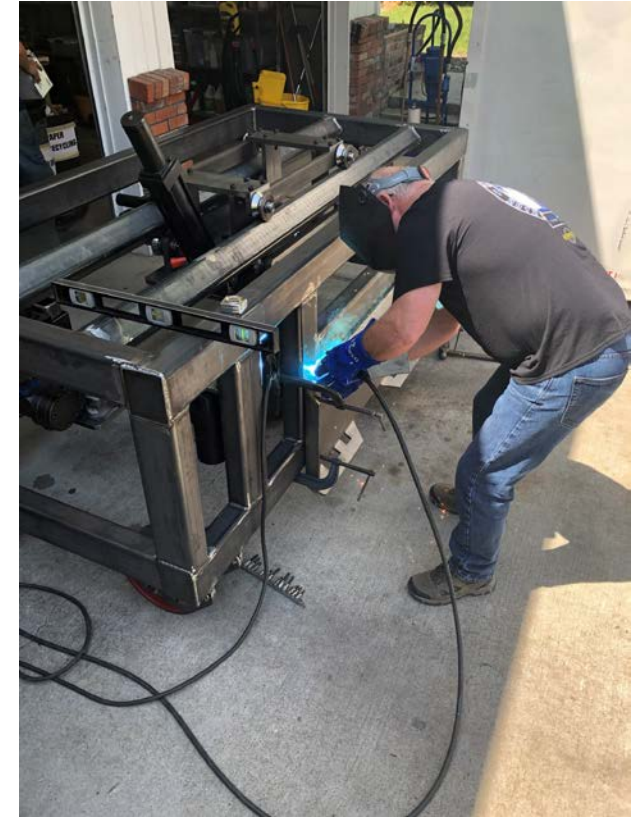
Custom Designed Equipment



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➤ Heavy Steel Frame Fabrication





Plumbing the Hydraulics

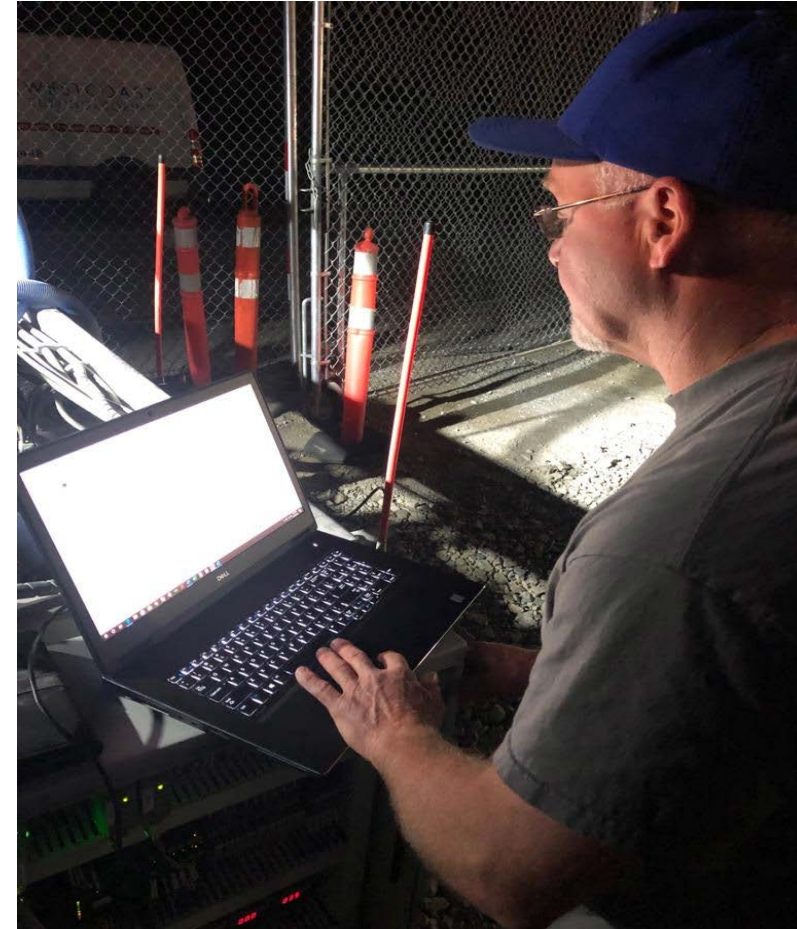
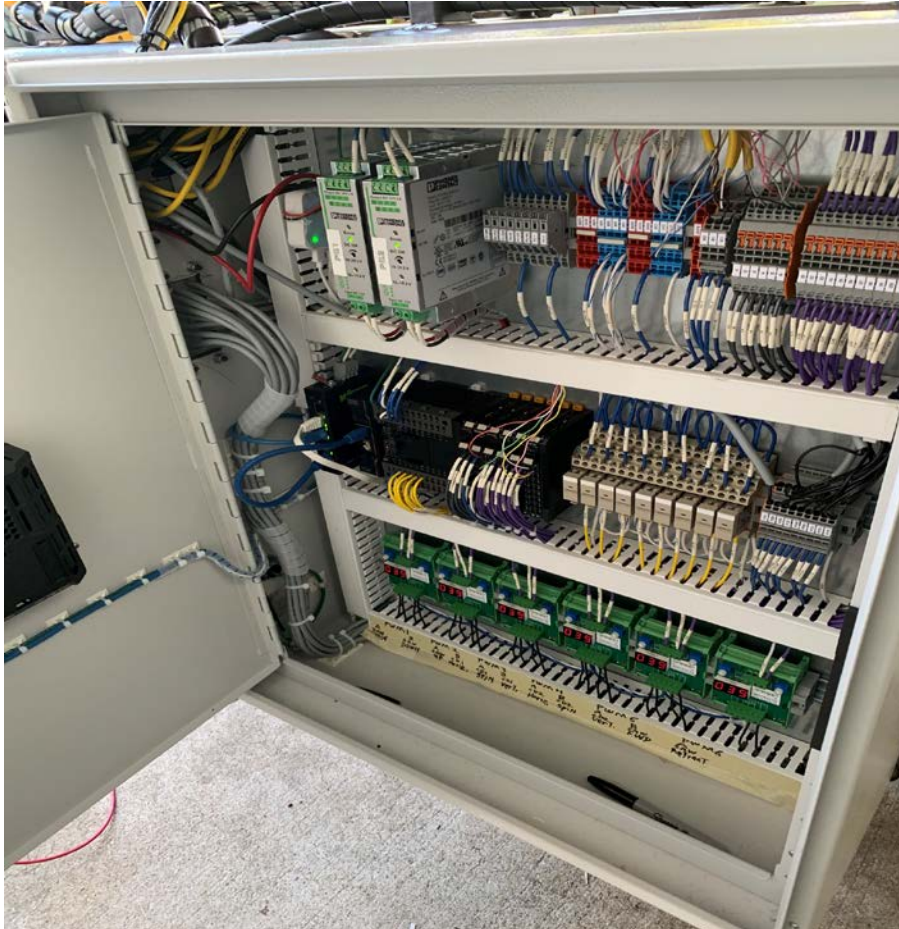


➤ Skidsteer & Slot Cutter Radio Controlled



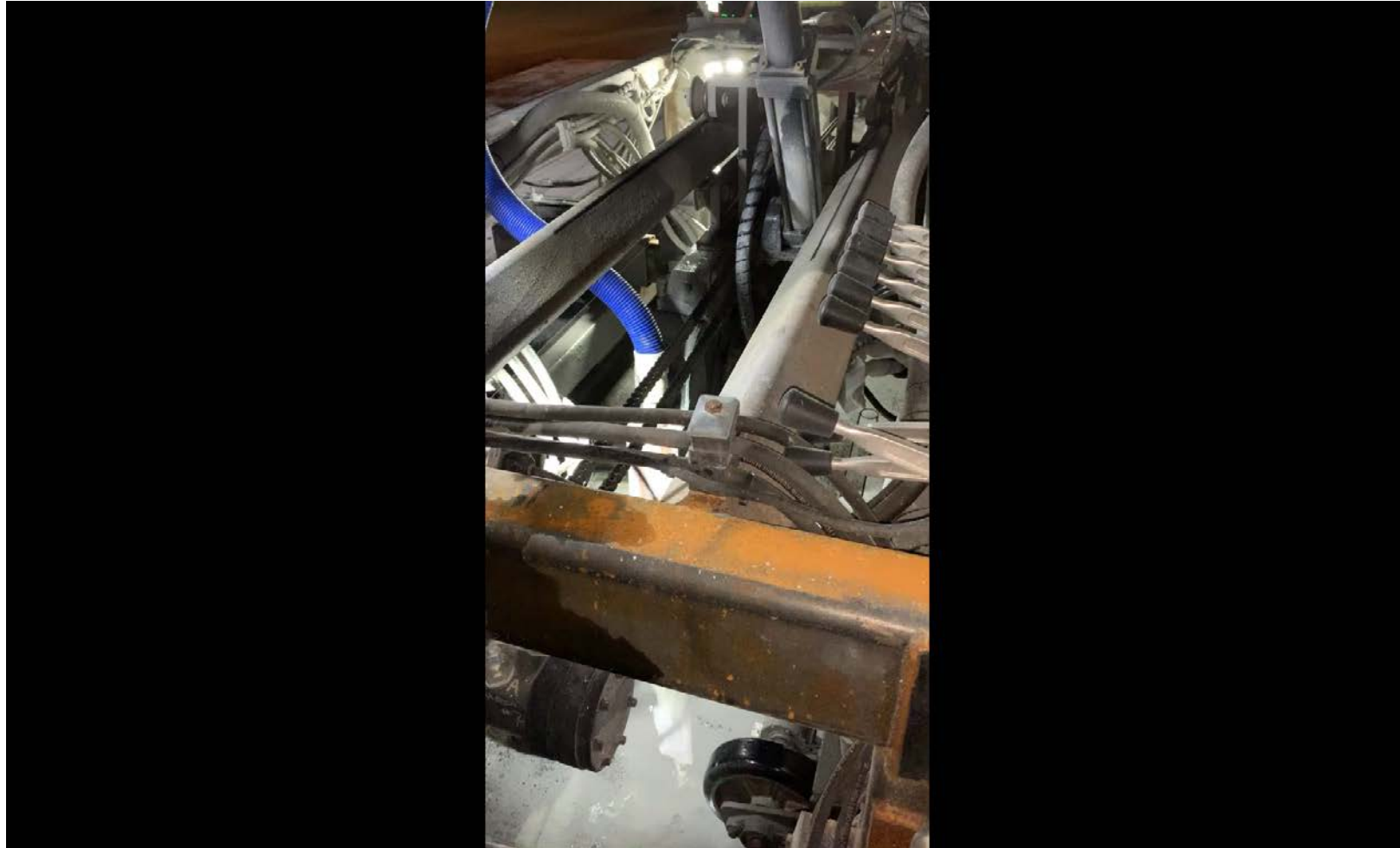


The Brain-Programmable Logic Controller-PLC

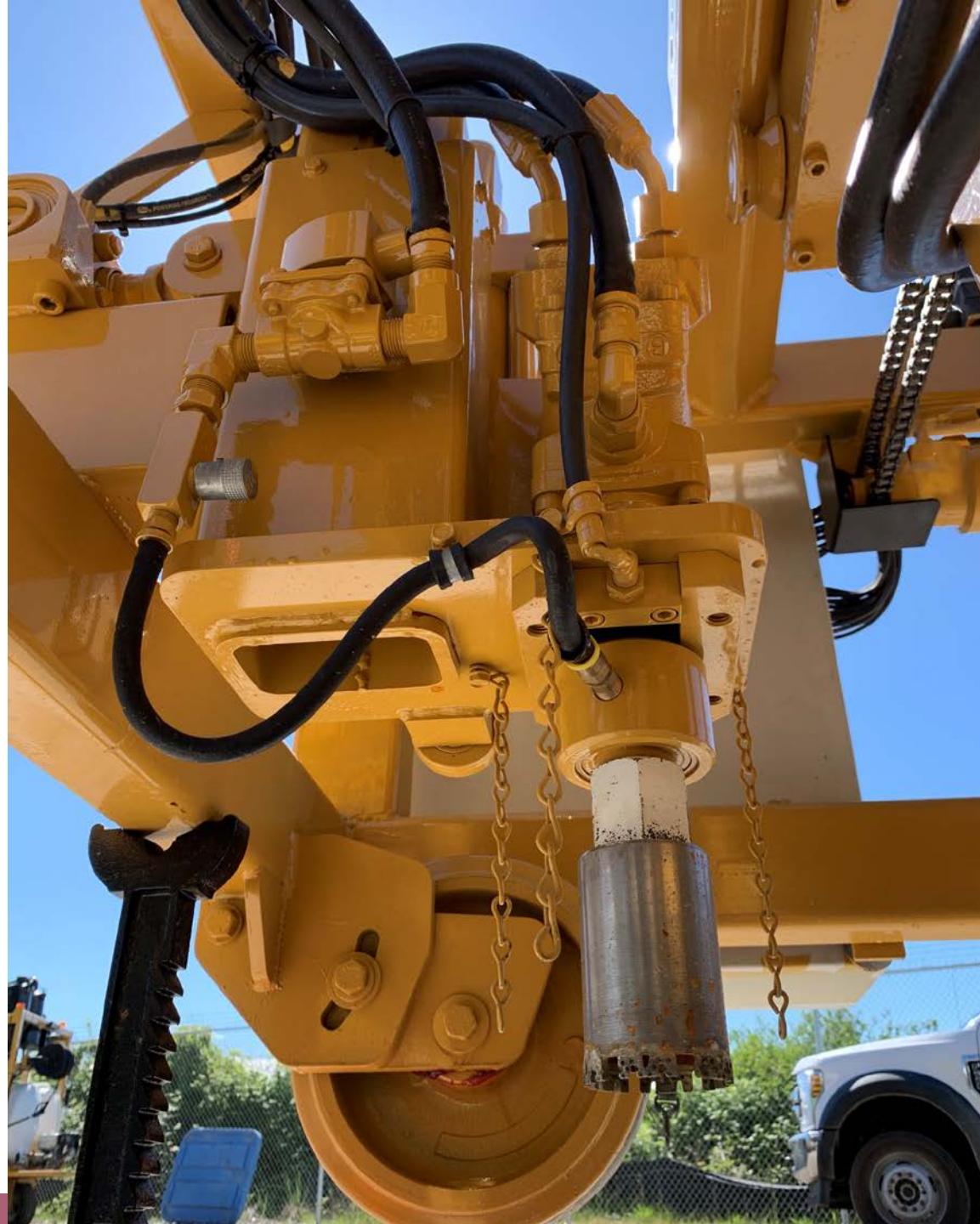




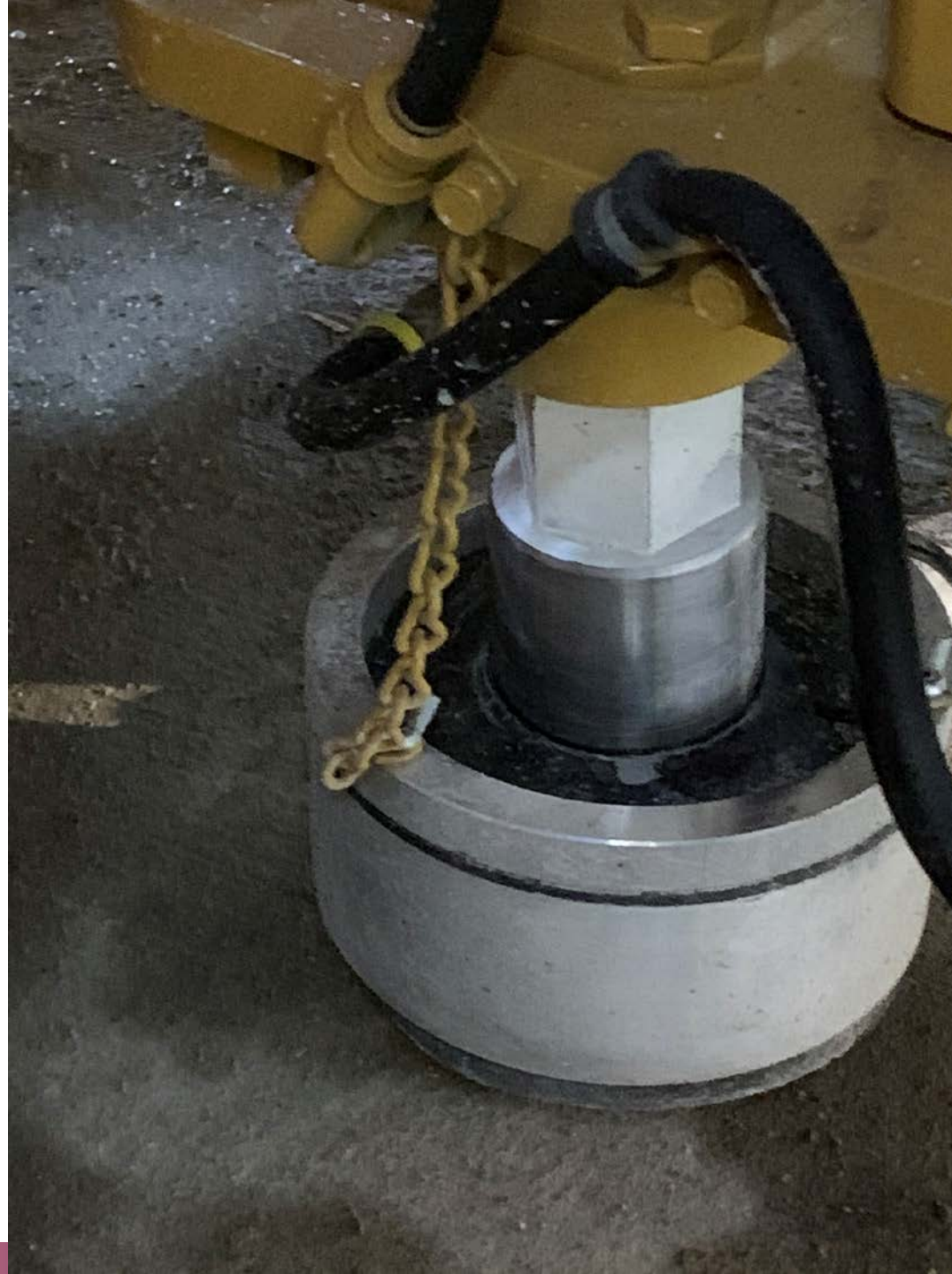
Like a Player Piano



Automated Hydraulic Core Drill



Core Drill & Vacuum Boot

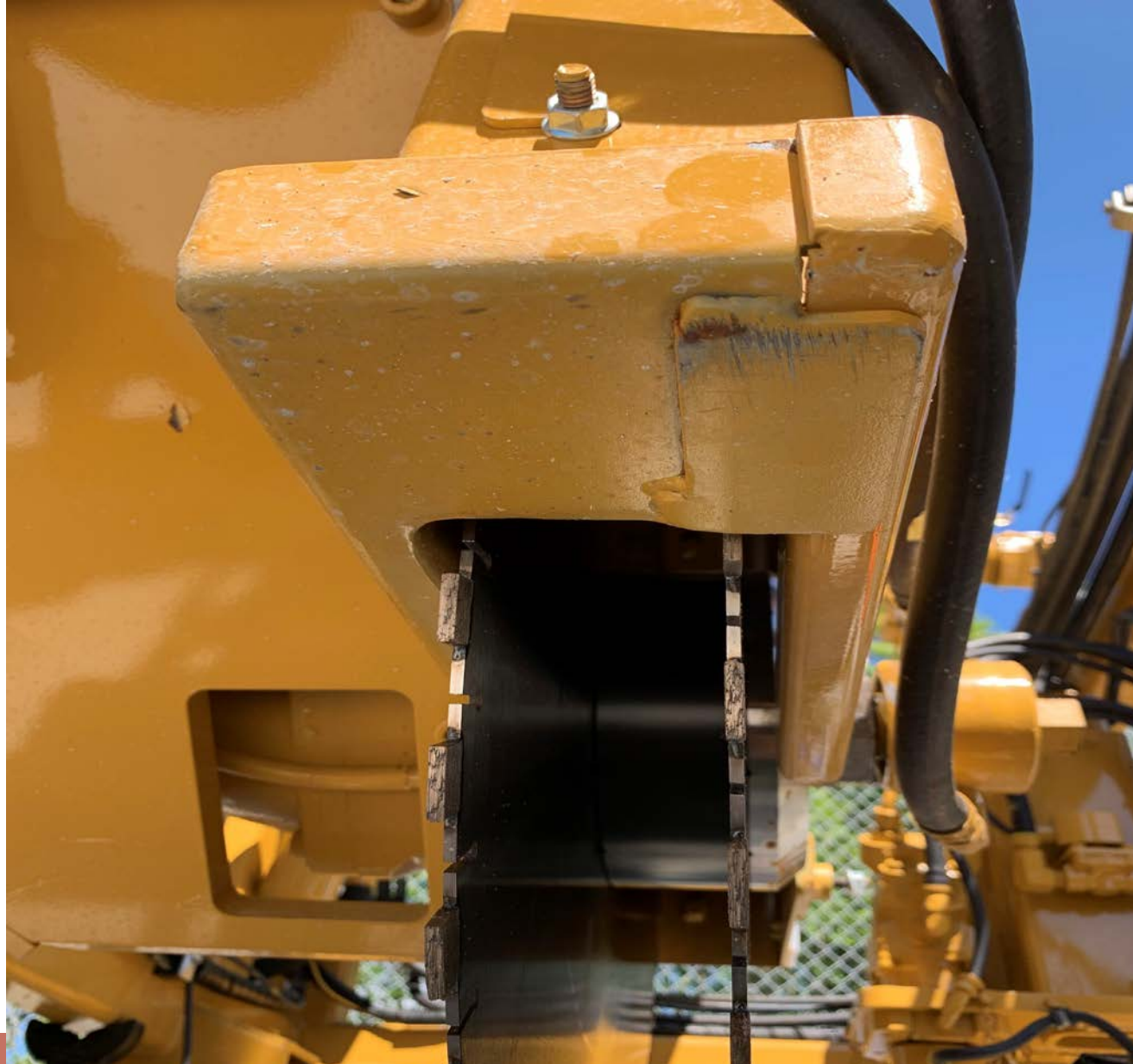




Through the hub watering, dual 26" blades, 2.55" spacing



➤ Dual blade cutting head with vacuum guard



➤ Testing First Saw



3 saws producing slots before self contained vacuum trailers came online



Vacuum Trailer Base with 4-Wheel Castors & Solid Hitch





Slurry Management System



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Navigating the Yard



➤ Mobilizing to the Runway



Mobilizing to east end of runway. Runway distance is 3.3km. Total distance from yard to east end of runway was 5km.



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➤ The North Runway-YVR



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Operations: Remote Control Units



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➤ Full Cutting Cycle, Rearview



➤ Operator Cleans Slab while Sawing in Progress





CNC Precision



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➤ Excavating Slots in Preparation for Dowels



➤ Excavating Slots in Preparation for Dowels



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➤ Debris from Slots





Chipped and Ready for Final Cleaning





Cleaned and Ready for Dowels Bars and PPC



➤ Installing dowels and PPC in prepared slots



Final cleanup and inspection of runway at end of shift



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**Completed slots at end of shift,
runway ready for air traffic**



Sunrise and ready for Airplanes to Land



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[ICRI.ORG](https://www.icri.org)

Project Team



Associated is an employee-owned, Canadian consulting engineering company with a history dating back over 75 years. One of Canada's most comprehensive consulting engineering companies, Associated provides inspection, design and construction services in the airports, roads, highways, bridges, structures, water resources, wastewater, water, solid waste, and site engineering fields. We pride ourselves on achieving solutions that are constructible, aesthetically pleasing, and environmentally sustainable. We are well-known in the industry for our engineering innovations.



Flatiron was founded in Boulder, Colorado, in 1947, and named for the unique rock formations there, Flatiron now operates across the U.S. and Canada. Flatiron is a subsidiary of German-based HOCHTIEF, one of the world's largest international construction service providers. Flatiron builds roads, bridges, rail, airports, dams, industrial, water and underground projects from common to complex, large-scale jobs. Delivering successful projects under a variety of contracting methods, Flatiron has unparalleled design-build and public-private partnership experience and expertise.



CanWest Concrete Cutting & Coring is one of the largest concrete cutting companies in Western Canada. CanWest has a quality reputation for specializing in runway rehabilitation and airport projects for over 30 years. Our experienced project management team has the expertise to run large commercial and industrial projects. We have created customer loyalty through creative problem-solving, innovation, and world-class quality assurance standards.



West Coast Cutting & Coring Group Ltd. has been in business since 1976 and is headquartered in New Westminster, B.C., Canada, with branch offices in Prince George, Vancouver Island, and Edmonton, Alta. WCC Group has become an industry leader, having successfully completed major projects across Canada, the United States, and Asia. WCC Group offers a full range of concrete sawing and drilling services and specializes in providing custom solutions that bring value to their clients.

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Questions?

Optional—Project Video

Project Video: <https://airportrunwayrehab.com/wp-content/uploads/2023/09/YVR-North-Runway-Project.mp4>

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