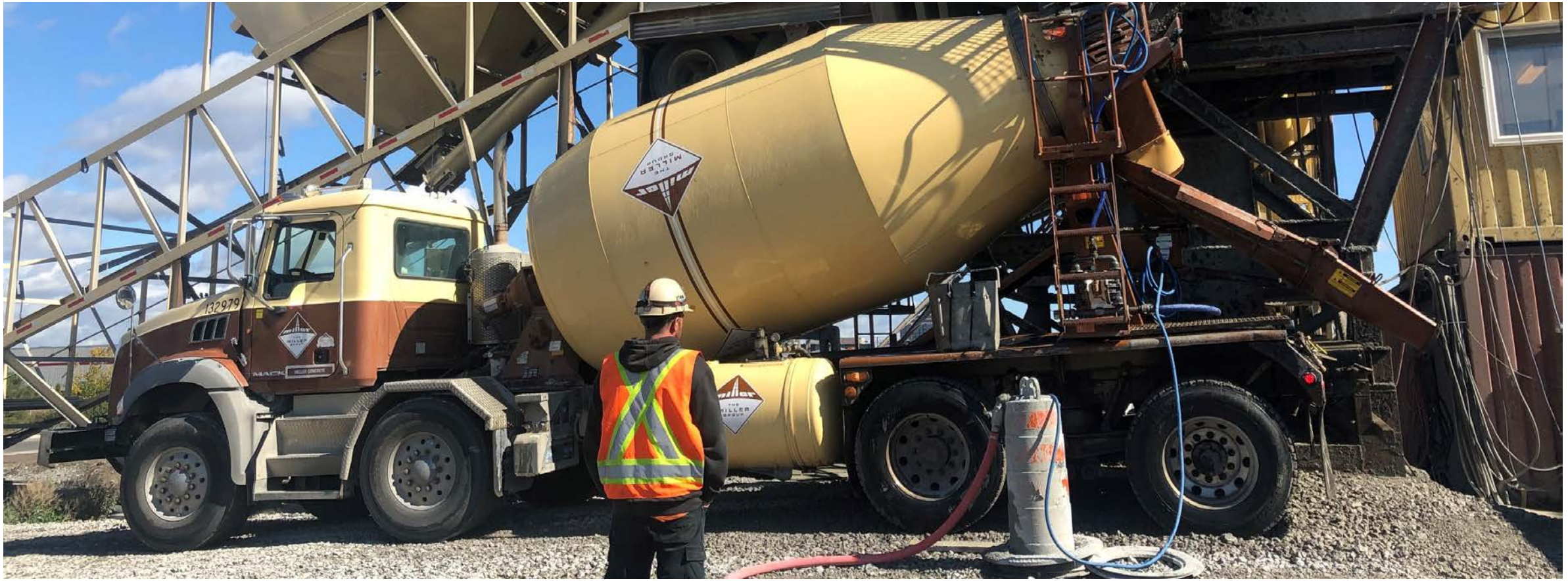
Provincial Concrete Pavements - Contractor Perspective
February 24, 2021



CONCRETE ONTARIO | Ready Mixed Concrete Association of Ontario

Cement Association of Canada

Photo credit: Emma Paulson, Miller

CONCRETE | Build for life™

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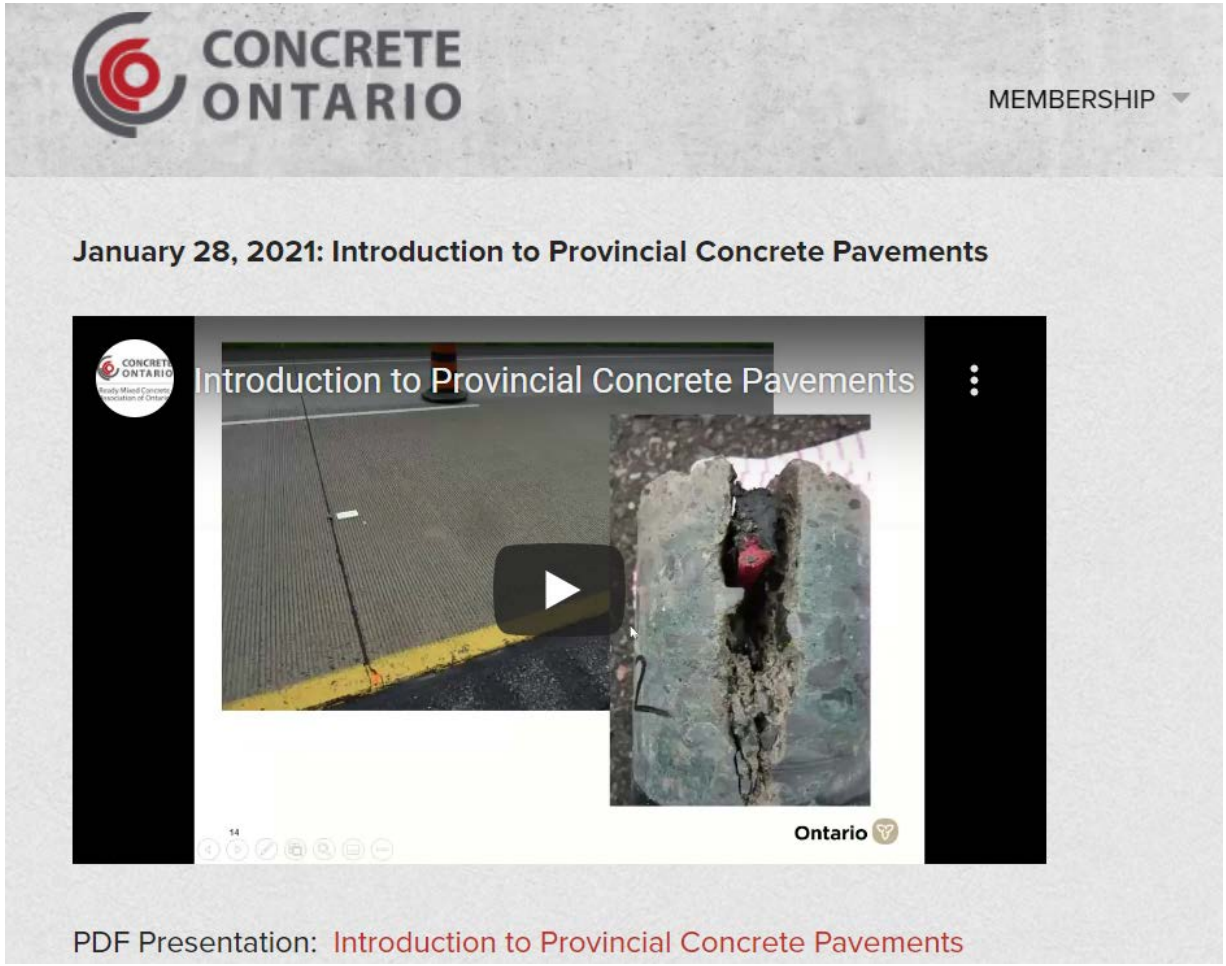
Housekeeping

- Approximately a 45 minute webinar with Q & A at the end
- All participants are muted
- Questions? Use the GoToWebinar ‘Questions’ Pane
- Webinar will be recorded and posted on the Concrete Ontario website along with a PDF copy of the presentation.
- https://www.rmcao.org/publications/webinar-presentations/

Concrete Paving - Webinar Series

- All previous webinars are available on the Concrete Ontario website:

www.rmcao.org/publications/webinar-presentations/



Presenters

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PROVINCIAL CONCRETE PAVEMENTS

FEBRUARY 24, 2021

Portable Concrete Batch Plant on Highway 401

THE MILLER GROUP
A COLAS COMPANY

BRENNAN
A COLAS COMPANY

COLAS
WE OPEN THE WAY

INTRODUCTION

OVERVIEW OF MILLER PAVING AND YOUR PRESENTERS

LUCAS VANDERPLUYM, P.Eng

- 10 years of experience supplying concrete paving projects

SAMI DAAS

- 5 years experience managing concrete paving projects

MILLER PAVING LIMITED

- subsidiary of Colas and parent company of Miller Concrete and Brennan Paving

MEETING AGENDA

1. PRODUCTION - SPECIFICATIONS AND MATERIALS
2. PRODUCTION - PLANT SET-UP
3. PRODUCTION - DAILY OPERATIONS
4. PLACEMENT - PAVING EQUIPMENT
5. PLACEMENT - PAVING QUALITY
6. PLACEMENT - CURRENT CHALLENGES

Placement of Concrete on Highway 417

PRODUCTION AND SUPPLY

SPECIFICATIONS AND MATERIALS

RAW MATERIALS

- Aggregates
- Cements and Supplementaries
- Admixtures

PERFORMANCE REQUIREMENTS

- Permeability
- Strength
- Air
- Consistency and Placeability

SAMPLING AND TESTING

- Raw Materials
- Plastic Concrete
- Hardened Concrete

PRODUCTION AND SUPPLY

SETTING UP A PORTABLE PLANT

SITE REQUIREMENTS

- 3 acres
- flat and level
- environmental restrictions

ACCESS REQUIREMENTS

- 1 way traffic flow
- cement, aggregate, water, and concrete

WASH-OUT SITE

- need space to wash trucks each load

STOCKPILE AREA

- high-production means big piles
- solid base

EQUIPMENT REQUIREMENTS

- wet/dry, hydro/generator, water supply
- additional cement storage

PRODUCTION AND SUPPLY

DAY TO DAY OPERATION

APPLICATION

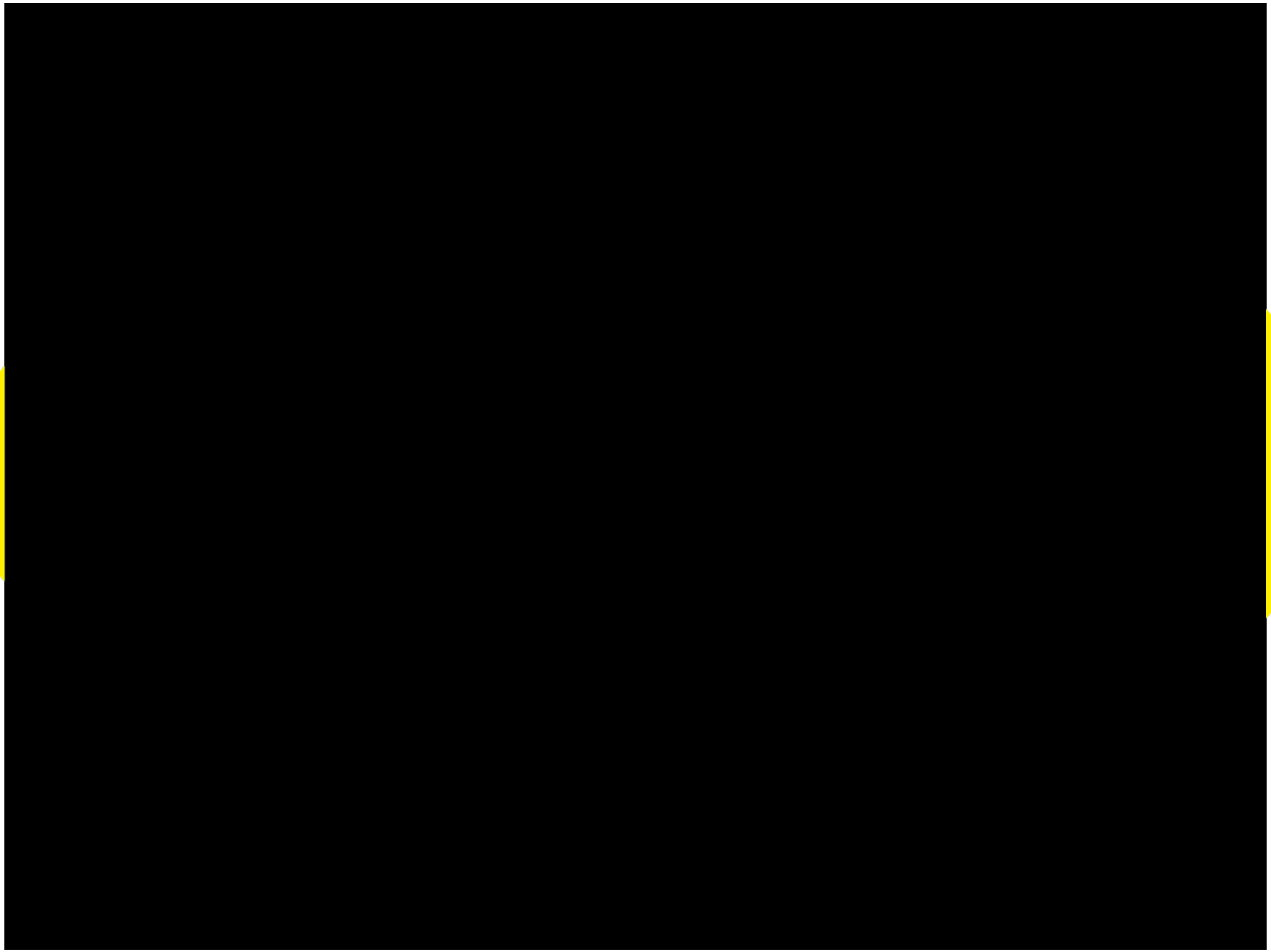
- hand work and patches
- single lane machine
- two lane machine

POTENTIAL BOTTLENECKS

- cement: 1 tanker blows 20-30T/hr
- aggregate: loader size and number
- haul trucks: load size/round trip
- operator: focus and fatigue
- production cycle time: 2 min/load

MOISTURE CONTROL

- consistent moisture control is critical
- water content and slump control



PRODUCTION AND SUPPLY

CONSISTENTLY BETTER RESULTS

TEST Criteria	No. Tests	Average	Standard Deviation	Coefficient of Variance	% With-In Limits
Compressive Strength (MPa)	100	**52.9**	4.6	8.6%	100%
Rapid Chloride Permeability (coulombs)	100	**1303**	238	18%	100%
Hardened Air Spacing Factor (mm)	100	**0.151**	0.025	17%	100%
Hardened Air Content (%)	100	**5.1**	1.4	28%	98%

PLACEMENT AND FINISHING

EQUIPMENT

2-LANE CONCRETE PAVER WITH INTEGRATED DOWEL BAR INSERTER (IDBI)

PROS:

- Capable of placing large volumes of concrete in a day
- Integrated DBI reduces the cost of placing Load Transfer Devices
- Excellent concrete consolidation
- Improved ride quality

CONS:

- High setup cost
- Takes a long time to adjust paver width (could take up to 2 weeks with the DBI)

PLACEMENT AND FINISHING

EQUIPMENT

SINGLE LANE CONCRETE PAVER

PROS:

- Higher productivity when compared with hand-placed concrete
- Easy to transport, setup, and change paving width
- Excellent concrete consolidation
- Great improvement in ride quality compared to hand-placed concrete

CONS:

- Places less volume per day than the 2-lane paver
- Requires Load Transfer Devices to be placed ahead of paving

PLACEMENT AND FINISHING

PRODUCTIVITY

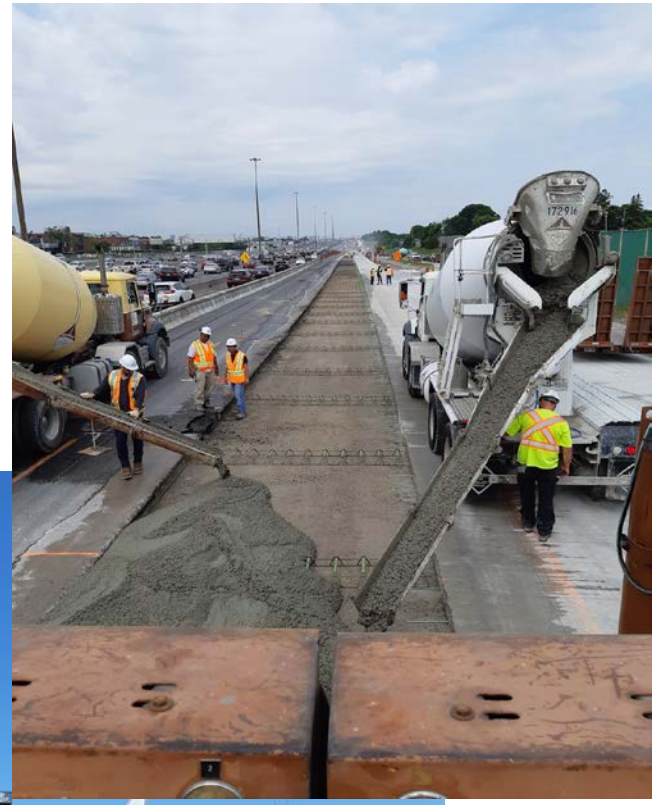
SHORT CONSTRUCTION SEASON NEEDS HIGH PRODUCTION

SINGLE LANE PAVER:

- Can place 300m to 450m in a 12 hour shift
- Concrete truck ease of access is a contributing factor to productivity

2-LANE PAVER:

- Can place 700m to 800m of a 2-lane highway in a 12 hour shift
- Requires a mobile concrete plant on site to ensure adequate concrete supply for the project



PLACEMENT AND FINISHING

QUALITY

RIDE QUALITY

Gomaco 2-lane paver achieved an IRI of 0.93 m/km after grinding approximately 30% of the 12km highway.

Contributing factors to Ride Quality:

- **Road Profile (Horizontal and Vertical curves)**
- **Concrete slump consistency**
- **String line accuracy**
- **How well the paver tracks the stringline**

PLACEMENT AND FINISHING

QUALITY

EDGE SLUMP:

- Achieved a mixiumum of 3mm edge slump when paving 350mm thick concrete
- Consistency in plastic concrete slump is key

THICKNESS:

- Thickness is controlled by following a stringline to guide the paver height
- Grading needs to follow stringline height as well

PLACEMENT AND FINISHING

QUALITY

CONSOLIDATION

- **Paving equipment consistently delivered excellent consolidation at HWY 417 in Ottawa**

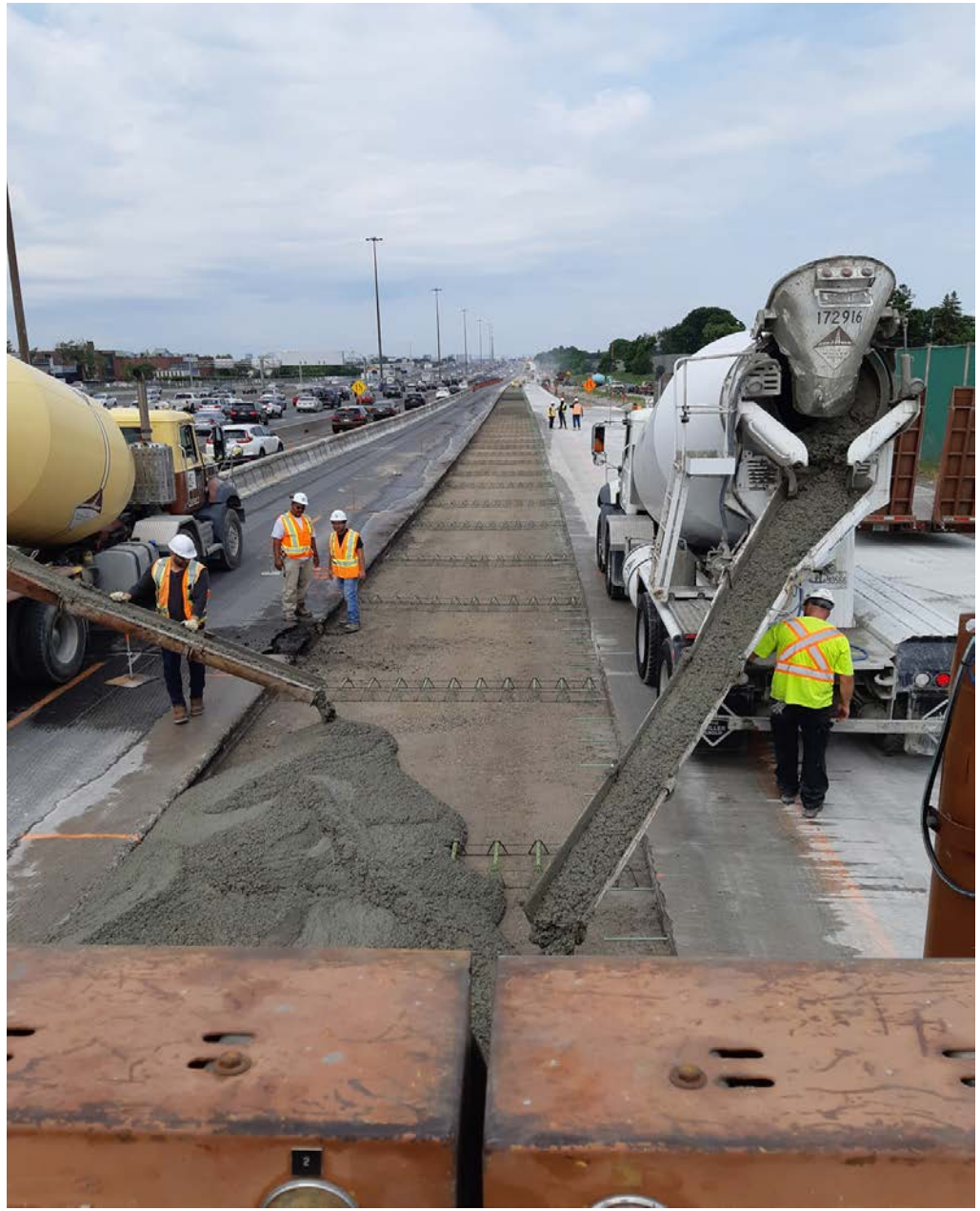
- **Approximately 500 cores were taken over 24 lane kilometers without observing consolidatio issues**

PLACEMENT AND FINISHING

CURRENT CHALLENGES

WEEKEND HIGHWAY REPAIRS

- **Large volume of High-Early strength concrete placed in potentially hot temperatures**
- **Operation may be suspended until more favourable weather arrives (operational risk)**
- **Minimal margin for error, restricted operating window makes every step of the process critical**



PLACEMENT AND FINISHING

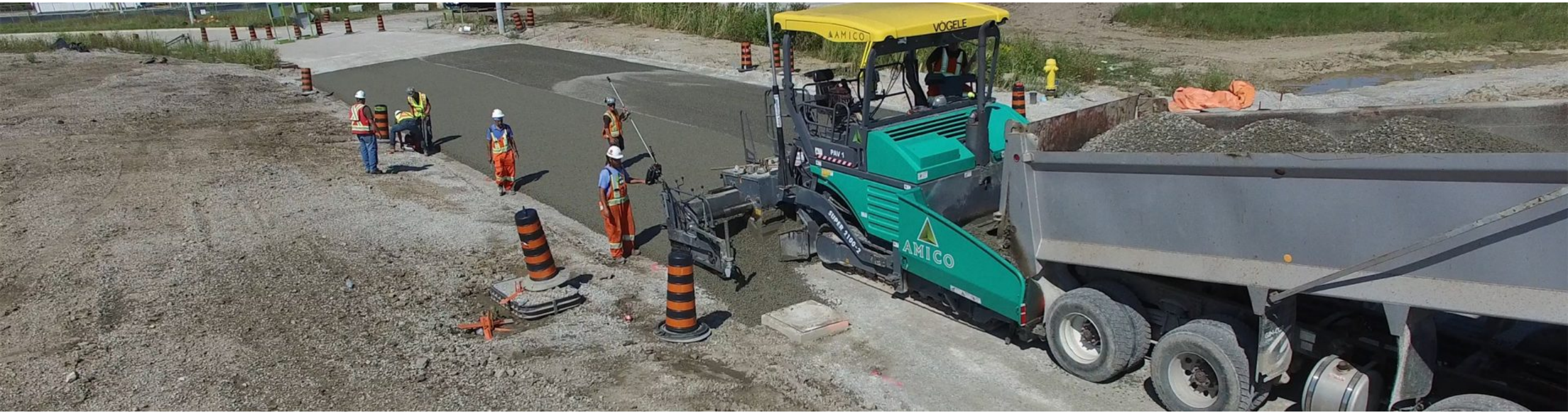
CURRENT CHALLENGES

JOINT SEALING

- New MTO specification calls for a maximum 6mm wide joint
- Narrower joint is slower to seal. One (1) joint sealing crew can seal approximately 700 m per day compared to 2,000 m using the old configuration
- Diamond grinding needs to take place before sealing. New Ride Quality specifications normally require more diamond grinding
- The new specifications prolong the time needed to complete the same area of pavement in comparison with the old specifications

Questions?

Next Webinar



- **April 22** – Open Graded Drainage Layer (OGDL) Overview
- AMICO

Thank you!


спасибо
谢谢
GRACIAS
THANK YOU
ありがとうございました
MERCI
DANKE
धन्यवाद
شُكراً
OBRIGADO