# TTCC/National Concrete Consortium

# STRINGLESS PAVING APPLICATIONS



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#### How Does One Deal With Traffic and Stringlines?

# **Colorado- Night Time Paving**

- Concrete overlay on asphalt 2-lane state highways
- Using pilot car during and following construction
- 24-hours a day pilot car
- 285,000 S.Y. (10.25 miles) – 80,000 S.Y. milling





#### Paving with Outside & Inside Stringlines 1<sup>st</sup> Pass

Concrete Overlay
Pilot Car
Clearance-6 ft <u>+</u>
Paved shoulder takes load entire lane closure
Cannot pull in trucks

#### Paving with Outside Edge Stringline & Ski Combination- 1<sup>st</sup> Pass

•Ski or rolling stringline

•7-10 yrs ago good option

Allows truck pull in

•Pull out prevents long loading on paved shoulder

•Issue is smoothness and sometimes matching grades

#### Paving with Outside Stringline Only & Slope Control 1<sup>t</sup> Pass

•Today modern equipment allows for outside stringline and machine reactive cross slope adjustment (sensors) improves smoothness

•Allows truck pull in

•Pull out around paver prevents long loading on paved shoulder

#### Outside Edge Stringline Only 2<sup>nd</sup> Pass



### News Technology- STRINGLESS PAVING

- Computer model replacement of stringline guidance
- Often referred to as "3D" paving
- It is an "engineered" overlay construction process





# WHY SHOULD DESIGNERS & CONTRACTORS CONSIDER THIS METHOD OF PAVER CONTROL?

- Can be single or multiple lane paving
- Reduce staking time & manpower costs
- Improve safety & mobility in work area
- Improve speed of construction
- Improve control of overlay placement



### **AGENCY GOALS (Before Construction)**

- Improved profile & cross slopes
- Concrete yield
- Surface ride quality
- Overlay depth (Minimum/average/ maximum)





# WHAT MAKES STRINGLESS PAVING WORK?

- Sensor selection based on agency goals reflective in specifications
- Pavement location & elevation control
- Paver guidance system innovation
- Beware of the investment required

Tech Cente



# **EXISTING SURFACE MAPPING**

- Establish x,y,z control
- Identify points of interest across the slab
- Utilize existing mobile technology to map
   \* GPS, LIDAR, Total Stations, GSI
- Consider the 25 foot intervals or shorter
- 5 to 10 MPH speeds depending on system







#### Surface Mapping with GPS

### **Stringless Paving Survey Grid**



total station.

### **Proposed Improvement model**







#### TOOLS NEEDED FOR STRINGLESS PAVING

- 4 robotic total stations
- 4-6 prisms and tripod poles
- 2 prisms and mounts for slipform paver
- Control panel and 4 corner controls on slipform paver (sensors)
- Touch screen and one thumb drive on paver



• 4 radio communication systems

## **Stringless Paving**



# **Stringless Paving**



## Measuring "Attitude"



### **3D Stringless Control System**

- Computer, Software & Radios
- Slope Sensors
- Prisms or GPS & Masts





# **SLIPFORM PAVER INTERACTION**

- Sensor selection by the contractor
- Training of staff prior to & during construction is critical
- Model review prior to construction
- Consider additional backup control equipment
- System evaluated is independent of slipform manufacturer
- Control system is dependent on slipform age & control system



## **THANK YOU!**

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