

**2-D Motor Grader Machine Grade Control—Into the Future**

30<sup>th</sup> Annual Regional Local Road Conference



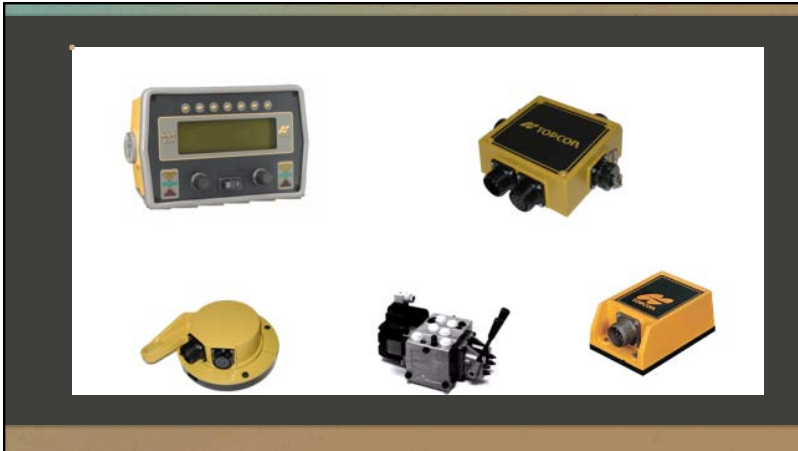
**Jason Pearson**  
Regional Sales Manager- Western North Dakota/Eastern Montana

**Benefits of 2-D Motor Grader Machine Grade Control?**

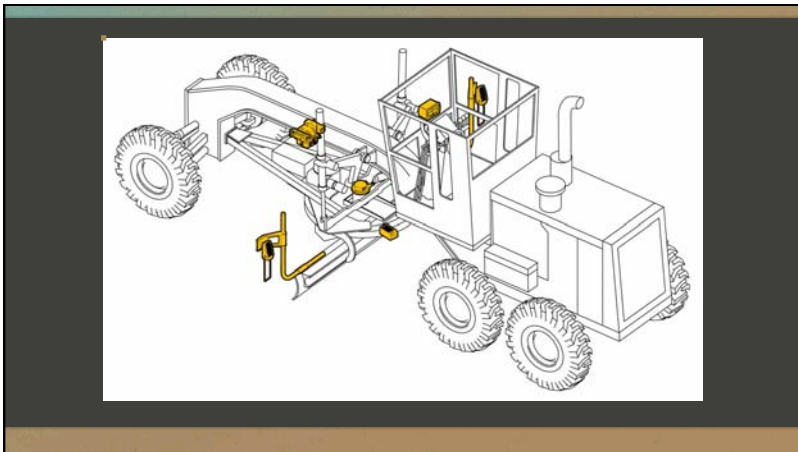
- Simple to run
- Easy setup (no survey control or 3D model)
- Upgradeable to 3DMC

**Benefits of 2-D Motor Grader Machine Grade Control?**

- Been around for a long time
- Save project costs, speed job completion and Improve quality of work



### Add Elevation



### Laying Gravel Off Curb And Gutter



### Finishing Subgrade Off Stringline



### Road Widening Off Existing Road



### John Deere GP Cross Slope



### John Deere GP Cross Slope

- John Deere first to integrate cross slope
- Standard on all GP-Series Graders
- All cross-slope controls, buttons and screens are integrated into existing components



### 3D Motorgrader Control

**GX-60**  
Control Box

**MC-R3**  
GPS Receiver & Radio

GPS Antenna

Radio Antenna

Slope Sensor

Rotation Sensor

Main Slope Sensor

Hydraulic Interface

**TOPCON**

**RDO**  
INTEGRATED CONTROLS

### 3D Motorgrader Control

**TOPCON**

**JOHN DEERE**

**RDO**  
EQUIPMENT CO.

**RDO**  
INTEGRATED CONTROLS

## Questions

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**RDO**  
INTEGRATED CONTROLS

# Butler **CAT**

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### Spink County Objectives

Quantify the benefits of using an automated blade control system in the governmental sector, on a non-paved county road

#### Potential benefits

- Accuracy to the targeted road specifications
- Fuel savings
- Material Savings
- Time Savings

Spink County uses an established road specification: Figure 1.0 below

- Road Width = 24ft
- Road Crown = 4.5%
- Road Cap Thickness = 2" minimum
- Compaction Rate = 25%

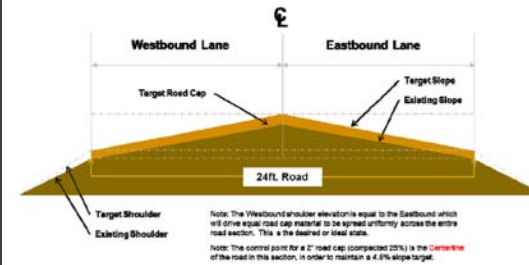
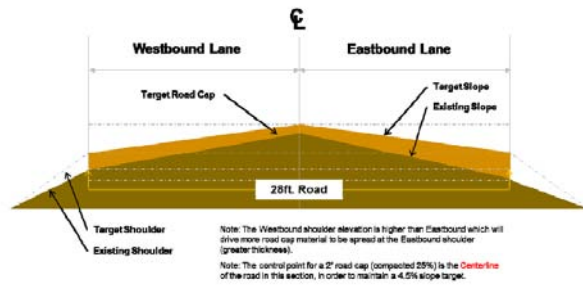


Figure 2.0 (below) shows one of the check points within the 2 mile controlled area. Notice the road width is 28' (not the desired 24') and the Westbound shoulder elevation is higher than the Eastbound. Using the Centerline of the road as the starting point for the minimum 2" road cap thickness and a 4.5% cross slope from centerline, we see a much thicker base course layer at the shoulders, especially the Eastbound shoulder:



### Accuracy Improvement

- Desired Cross Slope = 4.5
- W/O CGC Cross Slope = 2.0% to 4.2% range (average deviation from desired slope of 1.3% or 28% off target)
- With CGC Cross Slope = 4.2% to 4.5% range (average deviation from desired slope of 0.10% or **only 2%** off target)

### Fuel Savings

- Resulted from increased accuracy, fewer passes required to complete
    - \$1,464 or 422 gallons less over 8 months
    - \$10,980 or 3,165 gallons less projected over 5 years for a single machine or...
    - \$54,900 or 15,825 gallons less projected for other 5 fleet graders over 5 years
- Note: Avg. fuel price = \$3.47/gal

### Potential Material Savings

- Resulted from consistent road crown, cross slope and equal shoulder elevations.

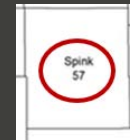
	Desired Target	Non-CGC Section	CGC Section
Road Width (avg)	24 ft	28 ft	27 ft
Cross Slope	4.5%	4.5%	4.5%
Road Cap	2 in	2 in	2 in
Required Material	978 cu. yds/mile	2,039 cu. yds/mile	1,208 cu. yds/mile
Cost Per Mile	\$13,141	\$27,408	\$16,240
Add'l Cost Per Mile	--	\$14,267	\$3,099
% More	--	108%	23%

### Questions?

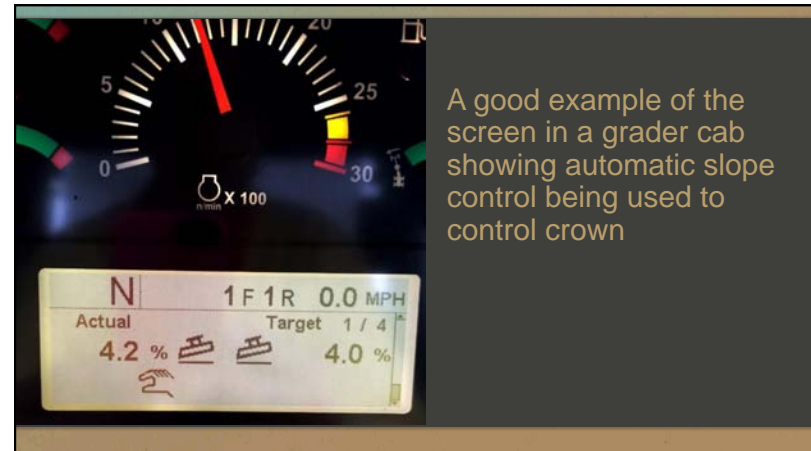
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### Spink County, SD

#### Benefits of Grade Control



Jeff Haessig  
 Spink County Highway  
 Superintendent



### Benefits of 2-D Motor Grader Machine Grade Control?

- Reduced fuel consumption by approximately 20%
- Safety
  - Reduced corrugation
  - Better cross section

### Benefits continued

#### Cutting Edge Efficiencies

- Wearing on the entire 16' of the moldboard
- Reduced cutting edge wear
- Reduction in crowning of the blade
- Reduces rural curb and gutter

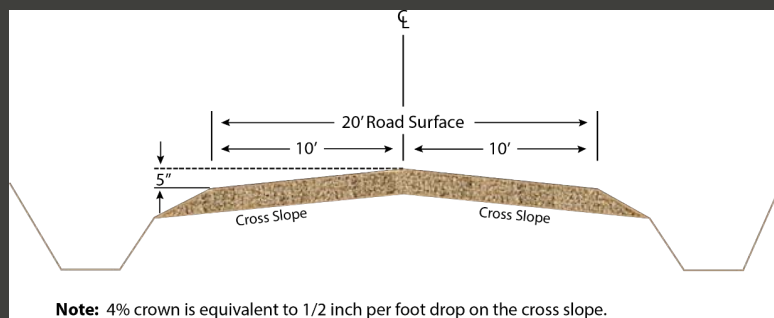
### Road Maintenance Improvements

- Reduction in blade maintenance cycles
- More uniform roadway
- Reduces cutting and filling each cycle
- Able to enhance finish blading
- Material savings by placing a uniform thickness

### Looking Into the Future

- Looking forward to advancement in technology
- Lack of experience in today's operators

### Example Illustration of Cross Section



### Questions?

Jeff Haessig  
Spink County Highway  
Superintendent