

# Precast Concrete Box Culverts, Bridge Beams and Concrete Pipe

North Dakota County Roads  
Conference

Grand Forks, ND

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## Ray Pierson, P.E.

- BS Civil Engineering - SDSU
- 15 years Precast Experience
- 15 years Engineering Design Experience

## Dale Schwindt, P.E.

- BS Civil Engineering –
- 13 1/2 years Precast Experience
- 35 years Engineering Design Experience



## About Rinker

Rinker Materials personnel are active in numerous national and local associations offering their knowledge and expertise in the development of product specifications, innovative design methodology, and manufacturing processes.

With over 70 facilities that serve more than 35 states and eastern Canadian provinces, Rinker Materials is well-positioned to be your local resource. Rinker Materials facilities produce a full range of products, including concrete pipe, precast box culverts, bridge solutions, precast, along with various specialty products, making Rinker your one source for infrastructure solutions.





# Nationwide Dilemma





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Aging Infrastructure!



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Scenario to consider

- 100 bridges in a county
- With an estimated structure life of 100 years, how often would you need to replace a bridge????



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**1 PER YEAR!**



# Bridge Replacement Options

- New Bridge
- Box Culvert
- Multiple Concrete Pipe



# Bridge Replacement Options

## ➤ New Bridge





# Bridge Replacement Options

- **New Bridge with Prestressed Concrete I-Beams**
  - ❖ Spans Range up to 156'-0" to Date
  - ❖ Prestressed I-Beams 36" – 81" Height





# Bridge Replacement Options

- New Bridge with Prestressed Concrete Box Beams
- Length Ranges From 40' to 100'
- Heights Range from 21" to 45" @ 3" Increments





## Bridge Replacement Options

- ❖ Menoken, ND plant now produces I-Beams, Box Beams and Adjacent Box Beams only.
- ❖ Prestressed I-Beams are the MN Shape per NDDOT – This may change to the new, more efficient shape as they are now using in Minnesota and other states.
- ❖ Release strengths are now 6,500 psi and final strengths are up to 12,000 psi with current mix design.



# Bridge Replacement with Box Culvert

## *Precast Box Culvert Advantages*

1. Shortest Construction Time
2. Produced in Controlled Environment
3. Variability
4. Fewer Laborers

# Precast Box Culvert



Minimum Cover

Flared Wing Walls

# Precast Box Culvert

Deep Fills



## Precast Box Culvert Options

DBL 14'x12' w/ Baffle Walls



## Precast Box Culvert Options

DBL 12'x12' – Double Run



# Multiple Single Lines

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# Skewed Ends



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# Wing Walls



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# Wildlife Crossings

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# Bridge Replacement with Multiple Concrete Pipe Lines

1. Alternative to Box Culvert Placement
2. Sizes 84" and smaller can be drycast (multiple pieces made per day)
3. Arch pipe is also an option

# Multiple Round Pipe



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# Multiple Round Pipe



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# Multiple Arch Pipe



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## Other Products Available in ND

- ❖ Round & Arch Pipe (12" to 120" Round)
- ❖ Increasers & Reducers
- ❖ Bends (Long & Short)
- ❖ Cattle Passes (4'x6' & 5'x7')
- ❖ Manholes (48" to 120")
- ❖ Inlets & Catch Basins
- ❖ Concrete Erosion Control Mats
- ❖ Median Barriers
- ❖ Box Culverts (Singles & Doubles)
- ❖ Storm Shelters



# Questions?

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