



# *Infrastructure Base Course Solutions*

*Presented by:*

Century Road



# What is Mechanical Concrete?

Mechanical Concrete® is a patented technology that utilizes end-of-life vehicle tires to create an aggregate confinement array (a.k.a. geocell) with tire-derived cylinders. When placed on a prepared subgrade and filled with aggregate, it creates a durable base course that is low-cost, low-maintenance, and water-permeable.



# Mechanical Concrete History

## 2008

- Mechanical Concrete was developed and patented by Sam Bonasso, PE, who was the former Administrator of the Research and Special Programs Administration of the US Department of Transportation.
- The technology was approved for use by the WV DOT

## 2008-2021

- Sam and his team completed and documented numerous successful projects throughout the USA in a variety of infrastructure applications

## 2022

- Century Road Solutions (CRS) of Houston, TX purchased the patent

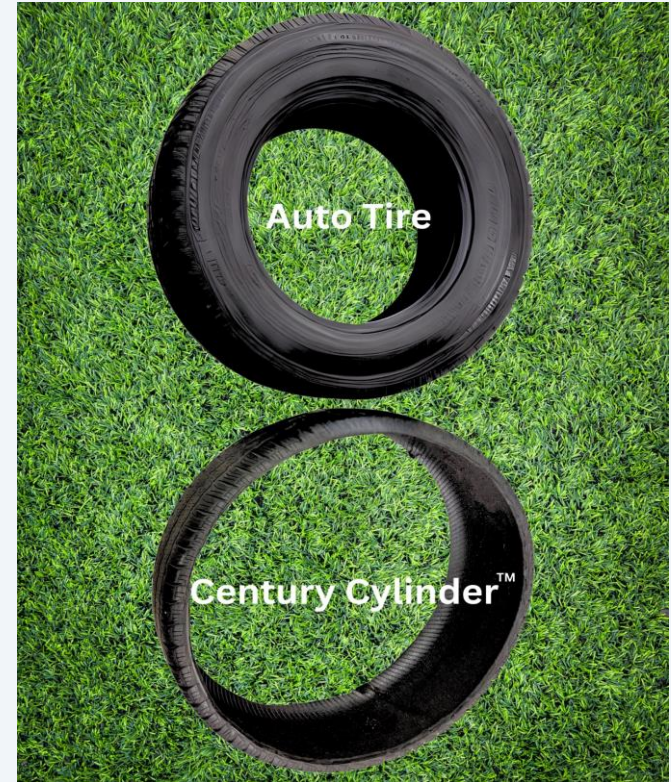
## 2023-Present

- CRS provides alignment with a growing waste tire supply chain in North America, establishing path forward for Mechanical Concrete's widespread adoption
- CRS Continues to complete and document successful projects in the USA in multiple scenarios.



# Tire Derived Cylinder (TDC) Facts

- Mechanical Concrete applications use the Tread Ring of a scrap tire to create a tire-derived cylinder (aka **Century Cylinder™ or TDC**)
- A TDC is a patented product
- TDCs do not hold water or gases like a whole tire
- High tensile strength of TDCs enable them to serve as a stable and durable geocell for decades when utilized in Mechanical Concrete's process
- Qualifies for "Beneficial Use Determination" in many states



# TDC Processing Requirements & Byproduct

## Tire Size & Quality

- Passenger car tires only
- 9" (23 cm) or less in width
- no exposed wire

## Processing Machinery

- A dual blade tire sidewall removal machine
- \$4,550 usd for the SR1-1 made by EECO (pictured)

## Procedure & Production rate

- Removal of both sidewalls
- 4 cylinders per minute (240 per hour)

## Byproduct

- 2 sidewalls per tire
- adequate for agricultural tarp weights and traffic barrel supports
- ready for crumb processing



# TDC Usage Statistics

- Approximately 14,200 tires per mile at 12 ft lane width.
- Approximately 10,000 tires per acre



# Applications and Efficiency

## Versatile Uses

- Gravel & dirt road upgrades
- Shoulder repair & improvements
- Heavy equipment yards & trucking terminals
- Driveways & parking lots
- New base course establishment of any kind
- Road profile elevation
- Utility road cuts or emergency repairs
- Erosion prevention & stormwater mitigation
- Walking trails and bike paths (1/2 height TDC)
- Bridge abutments & culvert outflow protection
- Foundations & retaining walls
- Railway ballast reinforcing
- Pavement base failure corrections
- Military & aviation applications
- Any load bearing surface

## Construction Efficiency

- Supports traffic immediately after construction
- No weather restrictions for rainfall
- Low labor skill requirements
- Can be built from both ends simultaneously
- Works with any conventional road building aggregate types
- Waste-free construction & no water required



# Additional Advantages

## Environmentally Safe

- Safe for use near or under water
- Mitigates stormwater runoff volumes in gravel road applications

## Environmentally Beneficial

- Less excavation is required for construction resulting in less fuel burn and reduced carbon emissions
- No water required during construction
- Compatible with recycled aggregate or any locally sourced aggregate

## Weather Resilient

- No structural deterioration from freeze-thaw cycles or moderate flooding events

## Favorable Public Perception

- Demonstrates good stewardship to the public by re-using end-of-life tires in civil infrastructure projects with positive results



# Value as a Stormwater Mitigation Tool

## Applications and Benefits:

**Porous Pavement Systems:** confines aggregates to create permeable surfaces that store stormwater while supporting heavy vehicle loads.

**Reduced Infrastructure Footprint:** By managing water at the source, aggregate confinement systems reduce the necessity for large, costly retention ponds and pipe systems

**Bioretention & Filtration:** Aggregate layers provide storage and filtration, removing pollutants, suspended solids, and metals.

**Versatility:** Suitable for diverse applications, including roads, shoulders, parking lots, road medians, and sports fields

**Modularity:** No single point of failure within geocell array; design can be easily modified during construction for drainage and natural landscape features

# Mechanical Concrete Construction

1.



Site Preparation

2.



Cylinder Placement

3.



Cylinder Attachment

4.



Cylinders Filled With Aggregate



Lateral movement of aggregate

# Use Case Example

# Use Case Example

Lateral movement of aggregate

# Use Case Example

Lateral movement of aggregate

# Project Example



Highway shoulder stabilization & drainage solution

# Project Example



Rural road base course with 2" of wearing course surface aggregate

# Project Example



Haul road from coal mine to a barge terminal access

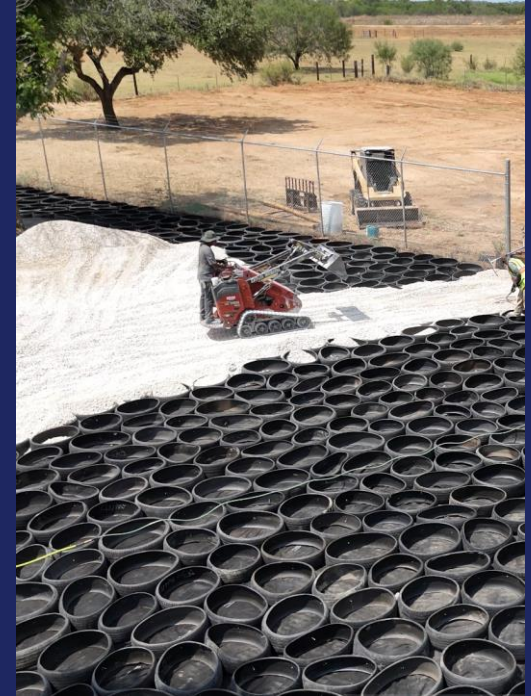
# Project Examples



Utility access road



Urban road pavement section



Industrial terminal

# Project Focus: Meriwether County, GA

## Project Details

Location: Luthersville, GA

Installation date: May 2025

### Scope:

- 12" profile elevation on roadbed in flood prone area
- 880' x 18' unimproved gravel county road section
- 9" Mechanical concrete base course
- Recycled concrete aggregate with fines used for fill
- 3" ABC stone wearing course
- Section contains concrete bridge and multiple culverts
- 3,520 tire cylinders used

### Highlights:

- Goal was to prevent expensive recurring maintenance due to the road section washing out
- Performance during stormwater events is verified
- Unskilled labor used for cylinder installation
- County Commissioner Jennifer Snelson said ***"It's perfect...like riding on concrete. Normally the road would be completely washed away after 3" of rain"***



# Project Focus: Guadalupe County, TX

## Project Details

**Location:** Seguin, TX

**Installation date:** 2014

### Scope:

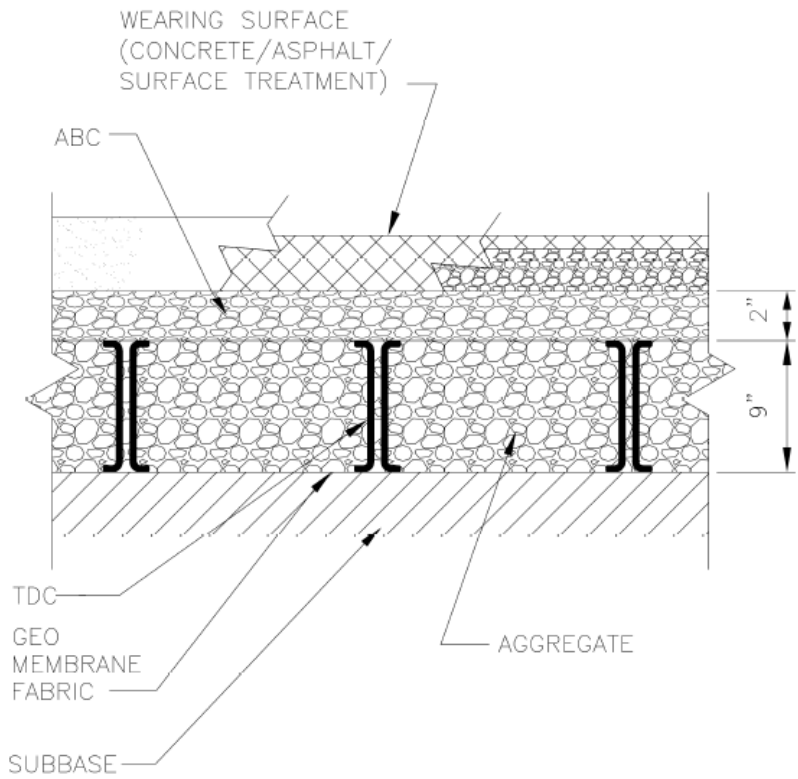
- Resurfacing of a 1000' x 20' asphalt county road section
- 8" Mechanical Concrete® base course
- Onsite milled RAP used for fill
- 4" chip seal wearing surface
- 4,440 tire cylinders used

### Highlights:

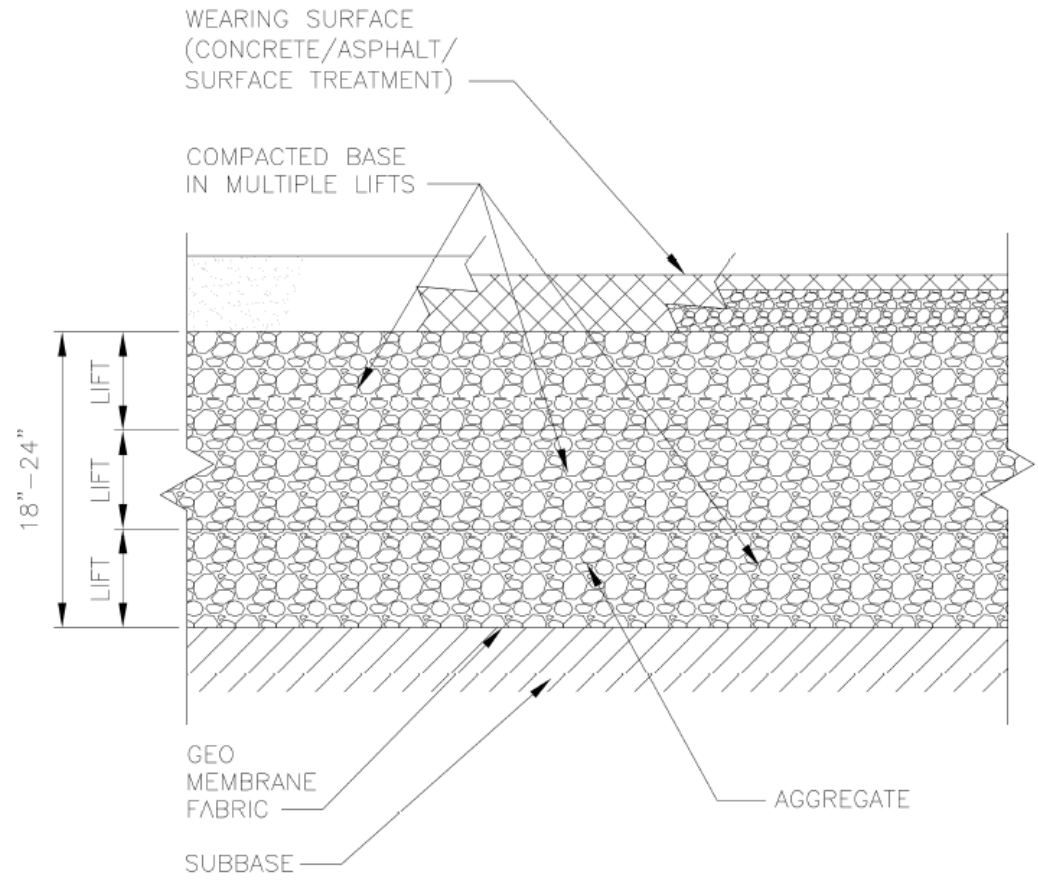
- 10 years of use with no surface treatments or maintenance while TXDOT has re-topped two adjoining sections during the same period.
- Construction of Mechanical Concrete base course was able to continue during heavy rain events without delay
- Guadalupe County Road Supervisor, Mark Green, confirmed in 2024 that the Mechanical concrete portion of the road is ***"...better than all connecting sections"***



Pictured in 2024 (10 years post construction)



MECHANICAL CONCRETE METHODOLOGY  
HEAVY ROADWAY SECTION



TRADITIONAL METHODOLOGY  
HEAVY ROADWAY SECTION

# Century Road Solutions' Role

## Partnerships with Tire Recycling Businesses

- Procure adequate waste tire stockpile source
- Enact quality control measures for processed TDCs
- Coordinate delivery and material staging of TDCs at project sites

## Supportive presence in public forums and customer conversations to deliver product knowledge

- Participate in planning discussions to determine qualified use and project scope
- Address environmental questions and concerns
- Assist road building contractors' budgeting/operational questions

## Establishment of positive working relationships with agency and private stakeholders

- Provide on site presence at first-time installations
- Create opportunities for local economies and associated local businesses



# Quotes and Testimonials:

*“Less asphalt is required [when using Mechanical Concrete]. The use of the asphalt is principally for surface improvement and only a minor contributor to overall strength. The implications of this are significant in that other types of lower cost surface treatment may be used for rural and urban roadways with Mechanical Concrete bases.”*

– Sam Bonasso, former Acting Administrator of the Research and Special Programs Administration at the U.S. Department of Transportation

*“I visited the project site following a rain event of nearly 10 inches, and the road held up perfectly. Residents in the area also expressed their satisfaction with the improvement.”*

– Jennifer Snelson, District 2 Commissioner, Meriwether County, GA

*“The key to this system is the simplicity of the system. It just works!”*

– Jeff LaBenz-Hough, former Associate Vice President, HDR Engineering

# Call to Action!



## Who should you tell about Mechanical Concrete?

- **County and Municipal Road Departments, Planners, and Public Works Engineers**
- **State DOT Materials Departments**
- **State Tire Recycling Officials and Grant Program Managers**
- **Rail Logistics and Trucking industry**
- **Economic Development Groups, AEC & Site Selection Professionals**
- **Public Utilities managing large amounts of pavement infrastructure and ROWs**
- **Private Landowners (anyone that needs a reliable and affordable base course for their next project!)**

# End of Presentation

[www.mechanicalconcrete.com](http://www.mechanicalconcrete.com)

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