TIRE INDUSTRY ASSOCIATION (TIA)

TIRE-DERIVED AGGREGATE (TDA) – STATEMENT OF WORK

Focus Areas: Roads, Retaining Structures, and Stormwater Management

Introduction

The Tire Industry Association (TIA) is leading efforts to promote the innovative reuse of end-of-life tires in civil engineering applications through Tire-Derived Aggregate (TDA). TDA is produced from shredded scrap tires and serves as a lightweight, free-draining, and durable aggregate alternative for numerous geotechnical and infrastructure uses. Its unique properties make it highly suitable for applications requiring drainage, load reduction, and environmental resilience.

All TDA applications described in this document use material that meets the ASTM D6270-B standard, ensuring consistent performance across road construction, structural backfill, and stormwater systems.

This document outlines TIA's initiative to advance and promote the use of TDA in three primary application categories:

1. Roads – Subgrade stabilization, frost protection, and drainage

2. Walls and Bridge Structures – Lightweight backfill for bridge abutments and retaining walls

3. Water Management Systems – Stormwater detention, infiltration, and runoff contaminant removal

1. Roads – Subgrade Stabilization and Frost Prevention

Challenge:

Poor subgrade conditions in road construction often result from organic soils with high moisture retention. In colder climates, freeze-thaw cycles cause frost heaving due to ice lens formation. This movement disturbs the driving surface, leading to potholes, uneven pavement, and high maintenance costs.

In warmer climates, particularly during hot summer months, moisture can also contribute to pavement failures. As surface temperatures rise, trapped moisture

within subgrade cracks heats up and expands. This thermal and moisture-induced pressure can lead to buckling or “blow-ups”—sudden surface failures at weak points such as joints and cracks. These issues have been observed not only on highways but also on bike trails and walking paths.

TDA Advantages:

TDA addresses these temperature- and moisture-related challenges through its hydrophobic and free-draining properties. It prevents moisture from being drawn to the surface by capillary action, reducing the formation of frost lenses in cold climates and helping to eliminate heat-driven expansion stress in warmer ones.

Key Benefits:

- Enhances subgrade drainage, minimizing moisture accumulation
- Prevents frost heave and pothole formation
- Reduces risk of pavement buckling in hot climates
- Functions as lightweight fill, reducing stress on weak soils
- Provides a cost-effective and sustainable alternative to traditional aggregates
- Extends pavement lifespan and reduces maintenance costs

Applications Include:

- Drainage layers for highways and access roads
- Subgrade support during spring thaw and summer heat
- Embankment stabilization
- Lightweight fill over compressible soils
- Bike trails and pedestrian paths

2. Walls and Bridge Abutments – Lightweight Backfill

Challenge:

Conventional soils used as backfill behind retaining walls and bridge abutments exert high lateral loads, particularly when saturated. Freeze-thaw cycles can further destabilize structures through moisture expansion and soil creep, often resulting in premature wall failure.

TDA Solution:

TDA, in compliance with ASTM D6270-B, is an ideal lightweight backfill material that reduces lateral static pressure—more than 50% less than traditional soil—and promotes rapid drainage. These characteristics help mitigate structural stress and prolong service life.

Key Benefits:

- Reduces lateral earth pressure on retaining walls and bridge abutments
- Promotes effective drainage, minimizing hydrostatic buildup
- Resists movement during freeze-thaw cycles due to hydrophobic properties
- Provides thermal insulation to protect structural components
- Improves seismic performance due to its flexibility and interlocking behavior

Ideal for Use In:

- Bridge abutments
- Wing walls
- Foundation walls and basement backfills
- Residential and commercial retaining walls

The reduced load and increased drainage capacity provided by TDA enhance the longevity and safety of vertical structures, especially in areas prone to wet conditions or seismic activity.

3. Water Management – Stormwater Detention and Pollutant Capture

Challenge:

Urban runoff from rain events carries a high load of pollutants during the “first flush.” Traditional stormwater systems often lack the capacity to capture, retain, and filter this initial surge, resulting in flooding, erosion, and contamination of natural waterways.

TDA Solution:

TDA, also compliant with ASTM D6270-B, serves as a cost-effective, high-capacity medium for underground stormwater detention and infiltration systems. With the ability to store approximately 14 cubic feet of water per cubic yard, it also

filters contaminants such as oil, heavy metals, and tire wear particles from roadway runoff.

Key Benefits:

- High water storage capacity for stormwater detention/infiltration
- Filters pollutants from the first flush of runoff
- Lightweight, durable, and environmentally inert
- Can be installed beneath parking lots or green spaces
- Reduces flooding risk and improves water quality

Use Cases Include:

- Infiltration galleries beneath urban infrastructure
- Bio-retention and green infrastructure systems
- Drain tile systems surrounding highways or parking areas
- Runoff treatment zones near roadways and industrial sites

TDA not only aids in water quantity control but also supports water quality goals by serving as a filtration medium for pollutants commonly found in urban runoff.

Conclusion

Tire-Derived Aggregate is a proven, sustainable, and performance-enhancing material for infrastructure projects. All TDA described herein meets ASTM D6270-B standards, providing reliable and consistent performance in roadbeds, retaining structures, and stormwater systems.

TIA's commitment to advancing TDA usage is driven by its potential to solve real-world engineering problems while providing an environmentally responsible outlet for recycled tires. TDA's use in roads, walls, and water systems presents a compelling case for its broader adoption in public and private sector projects.

TIA will continue working with engineers, public agencies, and industry stakeholders to document performance, support education, and encourage widespread implementation of this valuable resource.