

# **Innovative Use of Recycled Materials in Infrastructure Projects**

**Prof. Hany El Naggar**  
Dalhousie University, Canada

## **Abstract**

There is a critical global need to adopt sustainable materials and practices in construction projects. The recycling and repurposing of tires in North America and across the globe have seen a significant increase, driven by the goal of mitigating the environmental impact of discarded tires. This has led to a notable surge in the application of tire-derived aggregates (TDA) in civil engineering, marking unprecedented growth in this area. TDA offers a cost-effective alternative to traditional backfill, being approximately 70% to 80% more affordable. Additionally, it boasts superior geotechnical characteristics, maintains structural integrity, and is 60% lighter than commonly used backfill materials. This lecture introduces an innovative use of TDA as a backfill around corrugated steel pipes, aimed at enhancing their functionality. The practicality of this novel system is investigated through extensive laboratory experiments and validated numerically with three-dimensional finite element models.