

## Member Communication Experience

# Turning Construction Waste Into Resources

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The U.S. construction industry continues to experience a steady growth trajectory, with its value expected to reach \$2.3 trillion by 2028, up from \$2 trillion in 2023. However, all that growth also comes with challenges – particularly in the realm of construction waste. In 2023, it is estimated that North America alone generated 600 million tons of construction and demolition (C&D) waste, a troubling figure for an industry facing increasing pressures to strengthen its sustainability efforts to decrease its carbon footprint.

While the industry is making progress, efforts remain slow and fragmented. The industry is simply too large and complex for small-scale initiatives to create lasting change. To make a real difference, the construction industry must shift toward a circular economy – treating waste as a resource rather than a burden.

By prioritizing reuse, recycling, and innovative material recovery, the industry can reduce its environmental footprint. At the same time, adopting circular practices can lead to a more sustainable, efficient, and profitable construction sector.

## THE GROWING ISSUE OF CONSTRUCTION WASTE

The rise in construction waste has reached a critical point, driven by rapid urban expansion of the last decades and a post-pandemic building surge. Major cities are seeing an influx of new developments, often at the expense of older structures that are demolished. At the same time, supply chain disruptions from global conflicts, tariffs, extreme weather, and ongoing



inflation have made it harder to source and acquire materials efficiently.

This cycle of inefficiency results in even more waste. Contractors often stockpile supplies when prices are favorable, leading to surplus materials that may go unused. At the same time, the urgency of meeting project deadlines means they frequently resort to last-minute deliveries, even if that means sending out partially filled trucks. In dense urban areas, where storage is expensive or impractical, it is often cheaper to discard excess materials than to return or store them. Additionally, projects may be rushed or mismanaged due to understaffing, increasing the likelihood of waste. As a result, up to 30% of materials delivered to construction sites end up as waste.

If construction waste keeps piling up, the environmental consequences will only get worse. An estimated 35% of all C&D debris ends up in landfills, contributing to soil contamination, groundwater pollution, and methane emissions that accelerate climate change. Replacing discarded materials also takes a heavy toll — mining sand, gravel, and crushed stone erodes soil, destroys habitats, and drains natural resources. As demand for these materials rises, so does the strain on the environment, making it increasingly essential to adopt more sustainable practices.

## **A CIRCULAR ECONOMY: TURNING WASTE INTO A RESOURCE**

A circular economy offers a promising answer to the challenges of construction waste. In contrast to the traditional linear economy, raw materials are extracted, processed, used, and then later discarded as waste. A circular economy focuses on minimizing waste and maximizing the value of materials through reuse, recycling, and repurposing. In construction, this means turning demolition debris into new building materials or repurposing existing structures for new uses, reducing landfill waste.

A growing number of cities are already demonstrating the potential of circular construction. In Berlin and Paris, for example, regulatory shifts toward renovation and retrofitting over new construction have created opportunities to reclaim materials from old buildings. Instead of demolishing structures — which often creates mixed debris that is hard to repurpose — companies are carefully dismantling them piece by piece. This method allows valuable materials like steel, concrete, and wood to be salvaged, processed, and repurposed for new projects or recycled for creating second-life materials: a more sustainable approach that reduces waste and lowers demand for virgin resources.

In addition, construction companies and materials manufacturers are increasingly integrating circular practices into their operations. Some companies have established dedicated recycling yards near demolition and construction sites, where industry waste is received, sorted, and processed into reusable materials. Ultimately, embracing circular practices in construction offers both environmental and economic benefits. Environmentally, it reduces waste in landfills, lowers pollution, and conserves natural resources.

Economically, it lowers construction costs by reducing the need for new materials, cuts transportation expenses through local recycling, and improves supply chain efficiency. However, adopting materials made from waste remains a challenge, as the cost-benefit balance in these cases is not yet significant. Nonetheless, there are still areas for improvement and challenges to address, such as increasing market demand, which would require stronger regulatory pressure and sanctions. This shift toward a circular economy will be essential for building a future in which both the environment and the economy can thrive together.

## **THE ROLE OF TECHNOLOGY**

While the concept of a circular economy in construction is promising, it can be challenging to implement on a large scale. One of the main hurdles is the need for more efficient and cost-effective waste sorting and recycling processes. However, advancements in technology are providing new approaches to these challenges, making it easier to integrate circular practices into the industry.

Robotic arms are one example of how technology is improving waste sorting. These machines can quickly and accurately separate materials like concrete, wood, and metal, reducing labor costs and the time required for manual sorting. Additionally, software-as-a-service (SaaS) companies are developing digital platforms that streamline waste tracking by logging the origin, movement, and final use of recycled materials. These platforms create a digital record of the recycling process, making it easier for companies to verify compliance with sustainability goals and regulatory requirements. By increasing transparency and accountability, these platforms help build trust in waste management efforts and encourage broader industry adoption of circular practices.

Smart sensors are another technological innovation that improves waste management and construction efficiency. Ultrasonic sensors can track container fill levels in real time, allowing logistics teams to optimize collection routes, reduce unnecessary trips, and minimize fuel use. Meanwhile, weight sensors embedded in construction equipment can monitor material loads, helping to prevent overuse and reduce excess waste. Additionally, smart sensors integrated into buildings can assess structural integrity, extending the lifespan of materials and reducing the need for premature demolition. Another key

advancement is the use of imaging systems with cameras and detection technology to analyze different waste layers, identifying whether the material is clean or contaminated. This enhances recycling and disposal processes by enabling more accurate waste classification.

## THE FINANCIAL CASE FOR CIRCULAR CONSTRUCTION

The economic viability of recycling and circular practices is a critical consideration for the industry. While some technologies may require significant up-front investment, the long-term financial and environmental benefits can far outweigh the costs. Recycling construction waste can reduce the need for new materials, leading to cost savings for construction companies. Moreover, using recycled materials in construction projects can result in lower overall environmental impact, which can enhance a company's reputation and attract clients who prioritize sustainability.

The financial incentives for adopting circular practices extend beyond cost savings. Many national and local governments offer carbon credits and other financial incentives to companies that engage in sustainable practices. These incentives can help offset the initial costs of implementing recycling technologies and encourage industrywide adoption. Furthermore, consortiums and collaborations within the industry are emerging to help share the financial burden of waste management and recycling efforts. By working together, companies can pool resources and expertise to create more efficient and effective recycling systems.

Over the next decade, the construction industry is expected to expand its use of recycled materials as market acceptance grows and recycling technologies become more cost-effective. Companies that invest early in circular strategies will gain a competitive advantage in a market where sustainability is an increasing priority. 



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### About the Article

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