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# Eliminating Construction Waste As a Pathway to Project Success

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## Learning Objectives

- Learn how to measure and benchmark the waste impacts of the construction sector.
- Discover the connections between improved material productivity and conventional positive project outcomes.
- Learn how to connect Construction Cloud workflows to lean preconstruction and site execution.
- Discover lean and sustainable Construction as a pathway to competitive advantage.

## Description

Material waste in construction commonly adds up to as much as 30% of procured material and 10% or more of project budget, offering a clear opportunity for optimization. Wasted materials also represent a sizable "forgotten" portion of a building's embodied carbon, infrequently measured or accounted for. This session will start from the premise that material utilization cannot be truly improved in isolation, exploring how the pursuit of more sustainable construction is fundamentally interlinked with other measurable outcomes like quality, schedule, cost, and safety—each worthy of optimization in its own right. Drawing on case studies and backed by Construction Cloud workflows, the presenters will show how the pursuit of more sustainable construction correlates with project success. They will argue that lean construction, which aims to root out waste in all its forms, offers a pathway to triple bottom-line success, combining positive outcomes for people, the planet, and profit.

## Speaker(s)

Michael Floyd: AEC Sustainability Strategy Manager at Autodesk.  
Environmental technologist working to bring better sustainability solutions to life through Autodesk's products. 14 years experience in design & sustainability.

Uchenna T.E. Okoye, PE: Senior Business Consultant at Autodesk.  
15 years experience as a building design structural engineer and general contracting project manager, working primarily on integrated project delivery healthcare and residential projects.

John Wiegand: Principal Business Consultant at Autodesk. John has worked in and on the business of construction for 34 years, and has been a strong Lean advocate. He has spent the last 6 years at Autodesk supporting customer outcomes in the AEC space.

## Sustainability & Lean for Construction

Construction consumes around half of all global raw material extraction and creates over a third of all global waste. At the same time, we know that as much as 30% of material brought onto the jobsite leaves again as waste. Buildings alone account for almost 40% of global industrial and process greenhouse gas emissions.

As the global population shifts and urbanizes over the next thirty years, the construction industry will need to build an average of 13,000 buildings every day in urban areas. Today, the global construction industry is building an average of 11,098 buildings per day. It's projected that we will need to build an average of 14,704 buildings per day in urban areas in 2050. That's an increase of 30% or 3,600 more buildings than we are building today.

Reconciling growth with environmental impact will require industry to dramatically improve material and carbon productivity over the coming years, utilizing lower carbon materials and reducing construction waste.

### Benchmarking Waste

Various approaches existing to benchmark construction waste performance:

#### Waste weight per built area, per building type

In 2017, StopWaste assessed [low, median, and high levels of construction and demolition waste](#) (lbs. per sq. ft) typical of various building types in Alameda County, CA. [LINK](#)

#### Wastage percentage rates for common materials

In 2008, The Waste and Resources Action Programme, aka "WRAP", a UK Charity, released its [Net Waste Tool](#) which sets baseline and good practice percentages of wastage per common material type. [LINK](#)

#### Waste weight per built area (LEED)

The USGBC has defined [a LEED credit worth 2 points](#) designed to reduce construction and demolition waste going to landfills and incineration. One option to achieve the credit requires generating no more than 2.5 pounds of construction waste per square foot (12.2 kg per square meter) of the building's floor area. [LINK](#)

These benchmarks provide useful references to gauge waste performance against measures that are either fixed relative to built square footage or procured material quantities. But it is important to recognize that such fixed values do not necessarily support replication of the good behavior behind any successful waste reduction program, nor do they suffice to focus the industry on continuous improvement towards better material productivity.

## Reducing Waste Through Transformative Best Practices

Construction is a complex undertaking and waste from defects is often part of life. Addressing the root causes of waste in construction requires a holistic approach to reduce such issues. Lean as an approach and a practice is a way to manage that complexity through cultural transformation, and through improved alignment between stakeholders.



### DEFECTS

Waste from a product or service failure to meet customer expectations



### OVERPRODUCTION

Waste from making more product than customers demand



### WAITING

Waste from time spent waiting for the next process step to occur



### UNUSED TALENT

Wastes due to underutilization of people's talents, skills, and knowledge



### TRANSPORTATION

Wasted time, resources, and costs when unnecessarily moving products and materials



### INVENTORY

Wastes resulting from excess products and materials that aren't processed



### MOTION

Wasted time and effort related to unnecessary movements by people



### EXTRA-PROCESSING

Wastes related to more work or higher quality than is required

The 8 Wastes of Lean; source: <http://theleanway.net/The-8-Wastes-of-Lean>

Lean for Construction improves project performance by increasing predictability, which turn leads to many universally desirable project outcomes: quality, schedule, cost, safety. Lean also reduces waste in all its forms, not just material waste, but also wasted movement, time, and sweat equity, etc. In this way, Lean is a meaningful pathway to triple-bottom-line success: people, planet, and profit.



To learn about trends in Lean adoption in the US, France, and the UK, see the eBook "[Handling Lean Construction from Beginning to End with Autodesk](#)". This report includes insights from a study conducted in partnership with Dodge Data & Analytics, drawing on survey responses from 425 construction professionals in the United States, France, and the United Kingdom.

[LINK](#)