



A Guide to Measuring

# Construction Productivity

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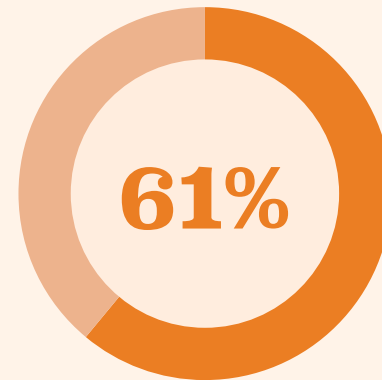


# **The state of construction productivity**

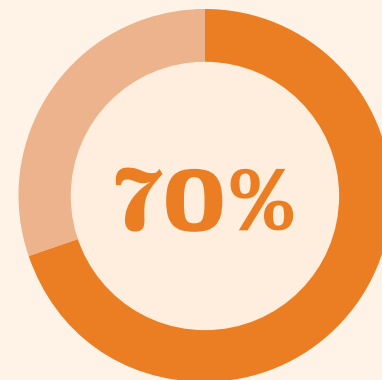
# The world spends \$10 trillion on construction-related goods and services every year.

But productivity is still lower than other sectors.

(2017 data from [Mckinsey Global Institute](#))



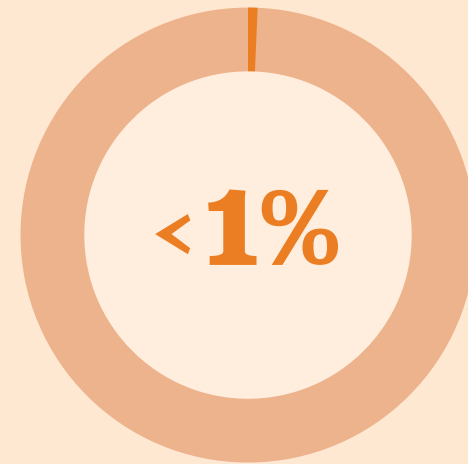
**of projects take longer to complete than scheduled**



**of construction projects go over budget**

# Why does construction productivity look so low?

It's hard to measure—and the industry doesn't typically invest in new tech to manage projects digitally.



**of revenue is used for R&D tech**

**How the industry  
measures  
productivity**

# Micro productivity vs. Macro productivity

In construction, there are two types of productivity: micro and macro.

## Micro productivity

The output of one company (or even one project), including:

Total profits

Resources used

Completion time

VS.

## Macro productivity

Looks at the industry overall from a large sample of projects, including:

Labor

Capital

Energy

Material

Service

Manpower

Quantities

Equipment

# Acceptable productivity metrics

Two metrics are widely accepted in construction, but don't tell the whole story: Labor Productivity Metric and Project Productivity Metric.



## Labor Productivity Metric

**Labor Productivity**

=

Quantities Installed

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Working Hours

**Doesn't consider**

Different types of jobs and  
job specialties



## Project Productivity Metric

**Project Productivity**

=

Cost for Construction


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Working Hours

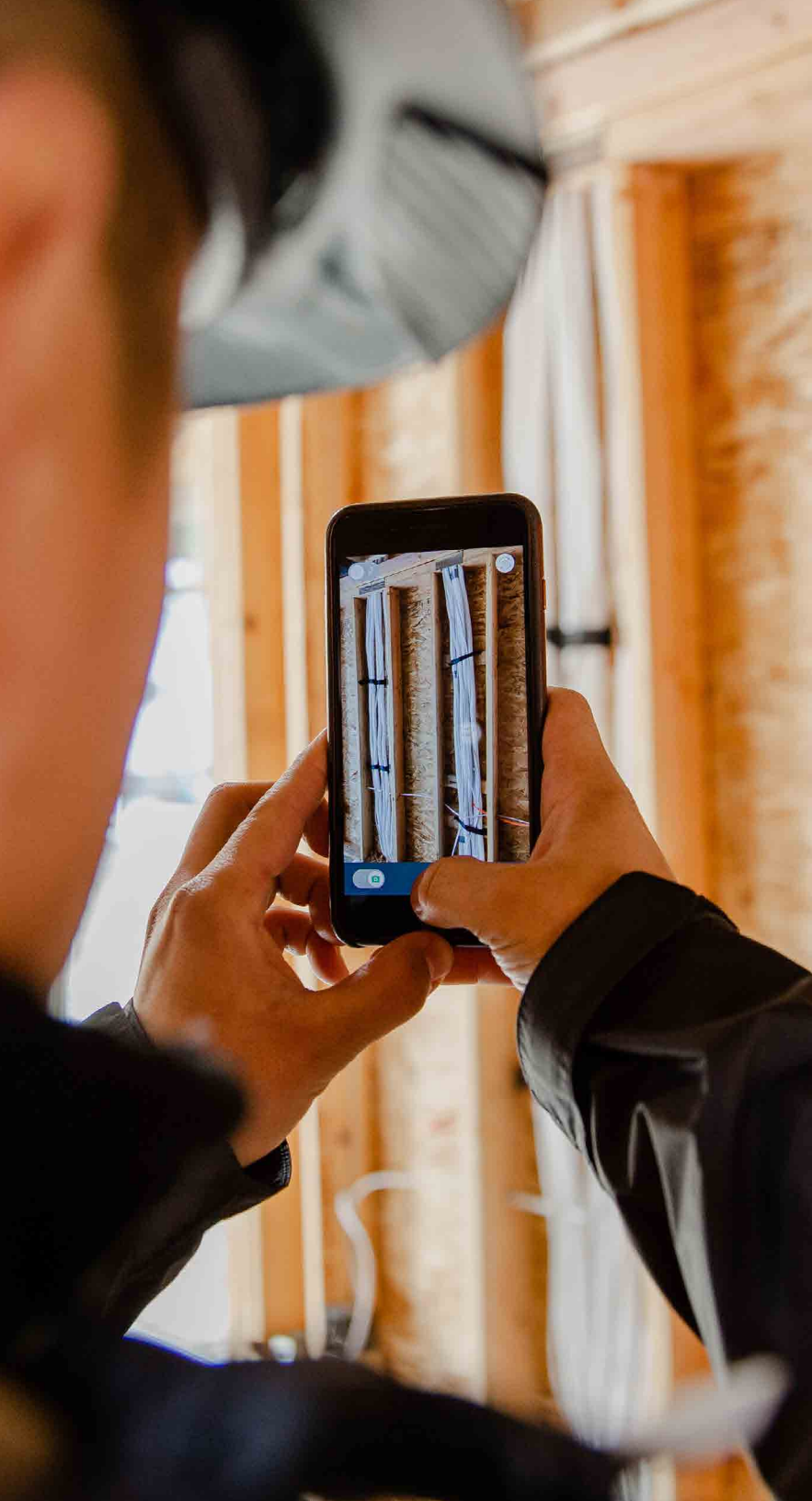
**Doesn't consider**

Where costs come from, how  
many hours they take up





# **The Total Productivity Metric**



# Total Productivity Metric (TPM)

This metric combines all the factors we discussed before, but also considers how different each task and job is.

It measures six types of input across four project phases.

## TPM inputs and definitions

- Labor input: manpower
- Owner cost: expenses that aren't labor, materials, or energy
- Material input: materials used in the actual structure
- Capital input: rental and equipment costs
- Energy input: energy put into a project
- Construction project indirect cost: parking, housing, temporary structures, and utilities

# How do you calculate TPM?

Phase 1.

## Planning and design

- Labor
- Owner Cost

Phase 2.

## Procurement

- Labor
- Owner Cost

Phase 3.

## Construction

- Labor
- Material
- Capital
- Energy
- Indirect Cost
- Owner Cost

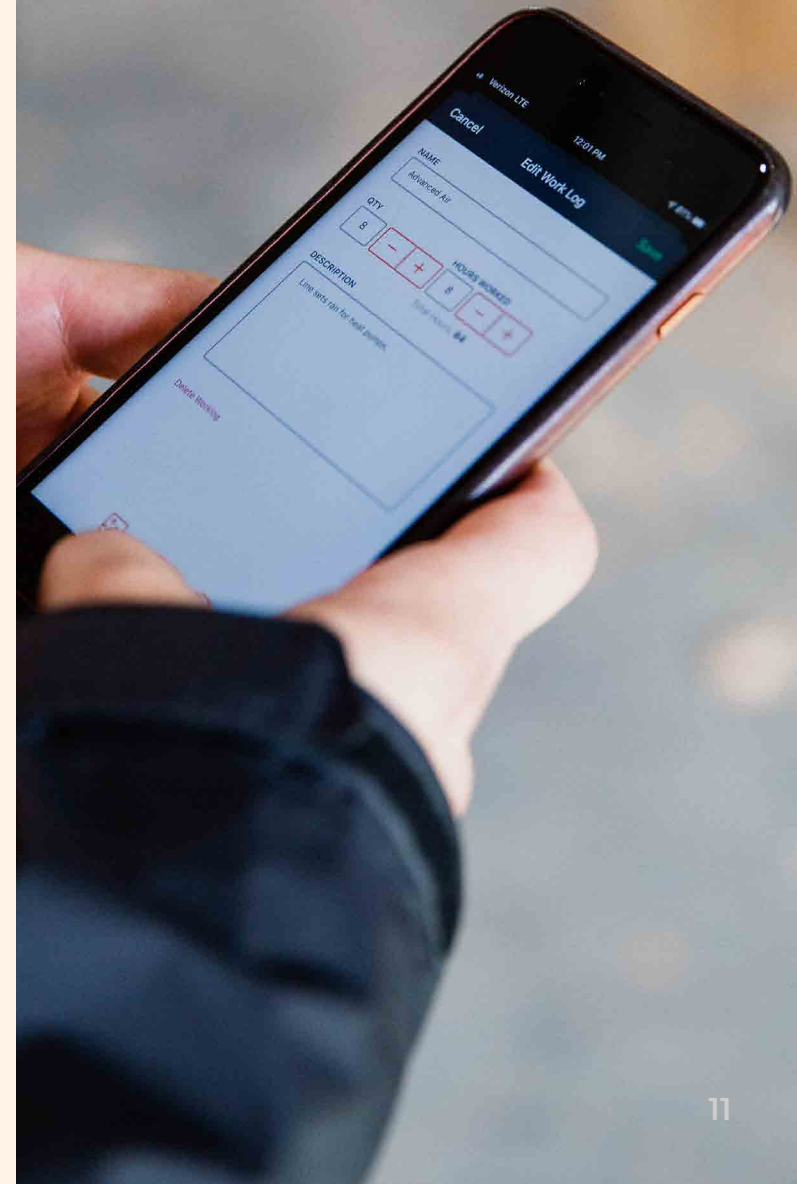
Phase 4.

## Commissioning and start-up

- Labor
- Energy
- Owner Cost

Divide by total output

**The Total Productivity Metric**



# Example

You have to build a 20-mile stretch of highway.

To calculate the Total Productivity Metric, add up all the input factors.

Then, divide that number by the end result output (in this case, 20 miles).

## 1. Calculate Input

\$80,000 Labor  
\$100,000 Owner Costs  
\$40,000 Materials  
\$60,000 Capital  
\$30,000 Energy  
+\$20,000 Indirect Costs  
**\$330,000 Total Input**

## 2. Divide by Output

**\$330,000 Total Input**  
-----  
20 Miles

## 3. Outcome

**\$16,500 per mile**



## The risk with TPM

TPM is accurate because it factors in many different inputs.

However, any missing or incorrect information can easily skew your results.

**BUT**

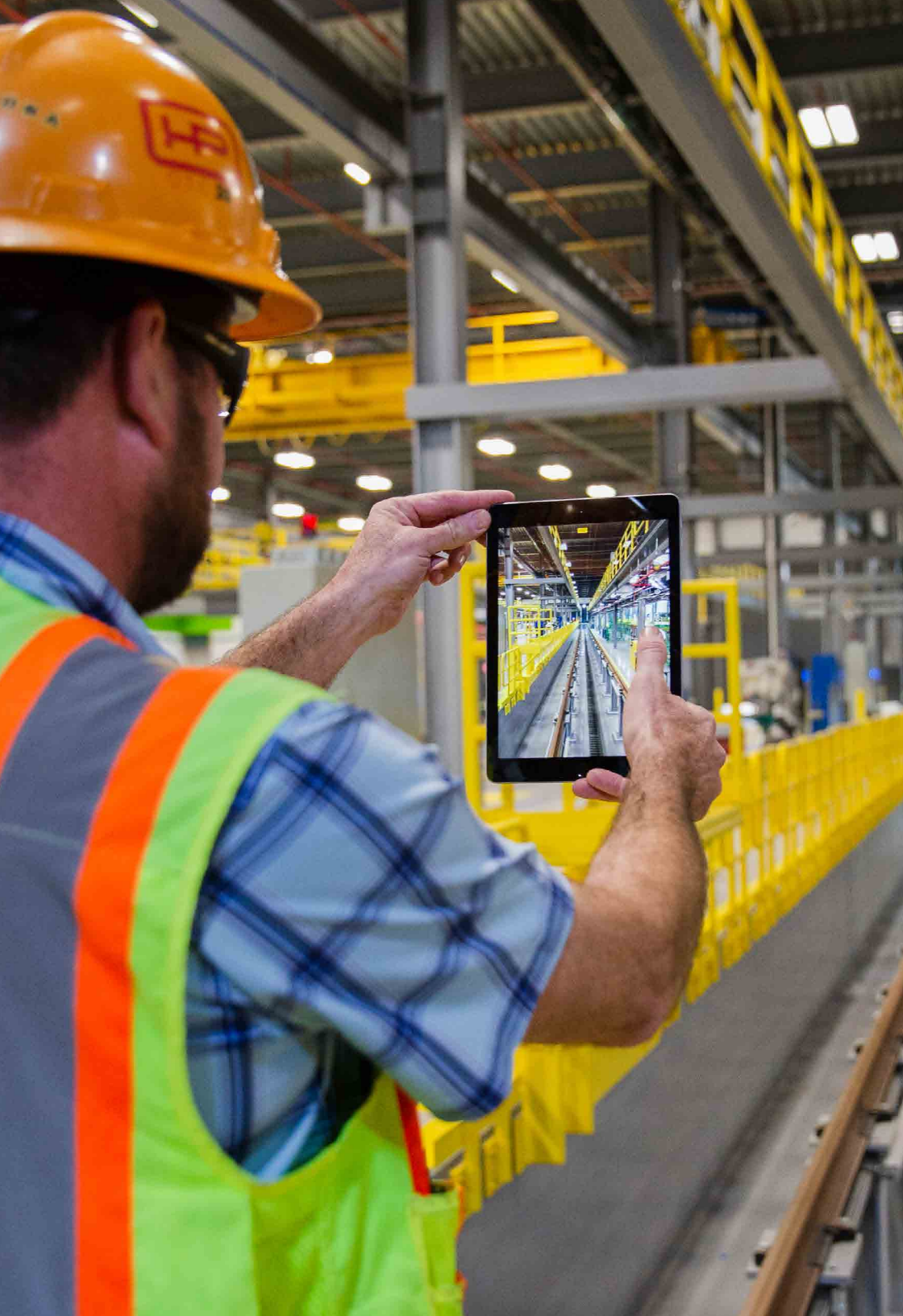


## One way to lower risk?

**Accurate field data collection**

(And swapping from pen and paper to software makes it easier to achieve.)

# 04 **Technology's role in productivity**



## Accurate data, better results

Field reporting is essential to calculating productivity. Keeping a clean log of jobsite updates can also prevent surprise delays or errors. Easier said than done—but easier done with technology.

# Why switch to software?



- 01.** Make reporting easy for your field crews
- 02.** Less manual entry (and human error)
- 03.** Track all your data (and progress) in one place—and share it to win bids
- 04.** Make data-driven decisions to do more efficient projects



# Stay on time, and within budget

When you have real-time jobsite data at your fingertips, you can make better decisions for your projects. And deliver them on time and within budget.

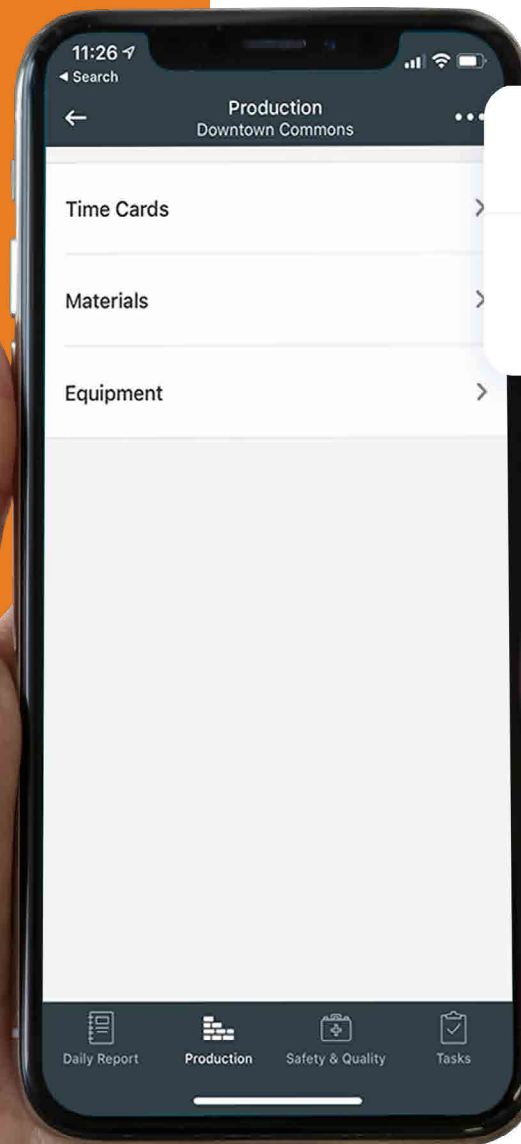
Better collaboration is only a few clicks away.




# Production tracking made easy

From material and equipment logs to time cards, there's a lot to track on the jobsite. And keeping tabs on resources used (or needed) is harder to do with loose papers.

Give your crews an easy-to-use tool in the field. With Raken's mobile app, they can quickly record quantities and usage. Plus, they can attach photos and videos for more visibility.



Jimmy Flores  Week Total: 16  
RT 16 OT 0 DT 0

Superintendent

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HOURS

New Material Log

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MATERIAL

---

QUANTITY

sf

---

COST CODE

