

Measuring Productivity vs. Production

Understand the critical distinction between production vs. productivity in construction and how focusing on efficiency/value transfer can boost profits and project success.

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may or may not accurately represent construction put in place.

- Production tracking is a simplistic method of dealing with a complicated environment.

If you're measuring productivity, there's slightly more to it than that, such as how much of the work planned is completed. It's important to focus on the effort expended. This can be answered by reviewing these questions:

- How much of the layout is complete?
- How much of the material is purchased?
- How much prefabrication work is completed, but not yet installed?
- How much of the material handling is completed?
- How much of the testing is completed?

- Are we certain there are no rework or repairs required?

- How close are we to completing our performance obligation from the customer's perspective?

Your contract defines what the customer expects upon completion. Your work is complete when the performance obligation is fulfilled from the customer's perspective. Your customer doesn't pay for activities that don't transfer value to the completion of the project. These are the items that you pay for from your profits if your team isn't able to be their most productive.

GETTING YOUR TEAM TO BE THEIR MOST PRODUCTIVE

Keep them working on transferring value. You help them be their most productive

You are running several jobs. Some of them make the profit expected, sometimes they don't make the profit you expected, and other times they make much more than you planned. Assuming there's not something unique in the scope of work/estimate, can you explain why? It may be in the way you measure productivity.

Think about what your customer pays you for — they pay for you to complete your performance obligations. Doing it as productively as possible is what will increase your profits.

PRODUCTION VS. PRODUCTIVITY

What is production? It's the measure of construction put in place. Yes, but how?

What is productivity? It's how well the construction was put in place. Yes, but how?

Think of it this way. On Floor 2, Section A in the medium-sized committee room, you plan to install boxes and run wire, conduit, and MC cable for the lights. You've installed half of the boxes and run half of the wire, conduit, and half of the MC cable. How "complete" are you?

If you're measuring production, you'd likely say 50%. Why?

- Production tracking typically looks for linear calculations. This typically calculates percent complete based on the burn rate of units installed, or perhaps slightly different based on costs to date.

- Calculations are a typical cost-based accounting perspective, which

**Application of ASTM E2691
Standard Practice
for Job
Productivity
Measurement**

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**ASTM
INTERNATIONAL
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The International standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

ASTM INTERNATIONAL
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**Standard Practice for
Job Productivity Measurement¹**

This standard is issued under the fixed designation E2691; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last approval. A superscript letter (a) indicates an editorial change since the last revision or approval.

INTRODUCTION

Job Productivity Measurement (JPM) measures both construction productivity differential on an ongoing and periodic basis and average productivity over the life of the construction project. JPM calculates the ratio of output per unit of input; how much work—Construction Put In Place (CPIP)—was produced by how many labor hours. Additionally, JPM is an early warning signal for construction performance. It measures ongoing productivity changes, trends, and anomalies resulting from changes on a construction jobsite, which enables contractors, project managers, supervisors, and foremen to react and improve productivity as the construction project unfolds.

1. Scope

1.1 Based on the UNIFORMAT II format for organizing building data, established in Classification E1557, and depending on the level where measurement is applied (industry, total job, or building element), JPM measures construction productivity at three levels: task, project, and industry (shown in Fig. 1). By comparing labor hours used against CPIP, JPM allows for unified measurement of established building elements (according to the UNIFORMAT II format). This practice establishes a process for measuring construction job productivity by comparing labor usage to CPIP.

1.2 JPM measures labor productivity of the installation processes on a construction job.²

1.3 CPIP is measured with input from the labor performing the installation, utilizing elements of statistical process control (SPC) and industrial engineering.

1.4 JPM takes into account the difficulty of installation at any given point on a job.

1.5 JPM evaluates relative productivity changes using trend monitoring.

1.6 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the

Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards:*³
E631 Terminology of Building Constructions
E833 Terminology of Building Economics
E1557 Classification for Building Elements and Related Sitework—UNIFORMAT II
E1946 Practice for Measuring Cost Risk of Buildings and Building Systems and Other Constructed Projects
E2166 Practice for Organizing and Managing Building Data
E2587 Practices for Use of Control Charts in Statistical Process Control
2.2 *ASTM Manual:*⁴
MNL 65 Application of ASTM E2691 Standard Practice for Job Productivity Measurement

3. Terminology

3.1 *Definitions*—For definition of general terms related to building construction used in this practice, refer to Terminology E631; and for general terms related to building economics, refer to Terminology E833.

3.2 *Definitions of Terms Specific to This Standard:*
3.2.1 *baseline labor hour budget, n*—a budget of direct labor hours created at the onset of a new construction project

¹This practice is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.01 on Building Economics.
²Current edition approved April 1, 2020. Published April 2020. Originally approved in 2007. Last previous edition approved in 2016 as E2691-16. DOI: 10.1520/E2691-20.
³JPM is based on the application of Job Productivity Assurance and Control (JPAC), which has been used in industry for more than fifteen years, resulting in 20 to 30% improvement in productivity for contractors using it.
⁴For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.
⁵Available from ASTM International Headquarters. Order MNL-65-EB.

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Fig. 1. Under ASTM E2691, job-site productivity is measured at the system level by relating value delivered to total labor hours, accounting for both direct work and supporting activities across multiple labor codes.

by managing the work environment. Note that neither productivity measurements nor production tracking has any weight on whether your teams are busy and/or working hard.

So what can you work with them to do? Review what's not transferring value at all and what's necessary, but still not transferring value. Work on items to enable your team to be more productive, like:

- Remove their waiting time
- Remove/reduce their walking time
- Reduce/eliminate rework and repairs
- Support and plan for limited material handling
- Reduce need for material movement (including handling/transferring waste)
- Reduce time spent working around other trades
- Reduce limitations in access to areas

You do this by making a work plan and then measuring productivity periodically and continuously. Keep thinking: Is it correct, necessary, and complete from a customer perspective?

HOW TO MEASURE (AND BE ABLE TO ADDRESS AND IMPROVE) PRODUCTIVITY

The standard for job productivity measurement in construction is ASTM E2691, and it is built taking all of the above into account (Fig. 1). It prescribes a measure of system productivity by comparing the transfer of value to all the hours spent in total or in a few labor codes (the standard allows for six to 15).

The work needed to complete the project (the performance obligations) to the customer's expectation is planned and then measured by the observed percent completion of that work. Productivity differential conveys whether that work is taking more or less than planned, and forecasts that rate through the project's completion.

Productivity trends are monitored weekly on most jobs, although some jobs require more frequent measurement. They are monitored for:

- Special causes of variation (abnormal ups and downs from the expected rate) require explanation. They're not special because we think they're special; they are indicators that the system is not predictable, and the cause for that instability needs to be understood to see if it is going to continue or not.
- Common causes of variation (the constant noise and minor ups and downs in productivity) should also be studied — but with a different tool for categorizing them. Otherwise, you'll be spending a lot of time chasing your tail trying to fix the day-to-day impacts to productivity that are completely normal. This can cause tampering and actually make things worse (see Fig. 2 on page 26).

This monitoring and root cause analysis happens through a weekly job review meeting (see "Making Job Review Meetings More Effective," which appeared in the *EC&M* August 2025 print issue), where the data is at hand, and the project team is reviewing it to explain the conditions.

The key is that the input for the entire process of productivity measurement must include input from the field. While the estimate and agreed-upon contract dictate the size of the check-book and accounting represents what was spent, the field and productivity measurement are the explanation in the middle. The correct measurement and process to monitor, explain, and maintain stability are all important.

WHY PRODUCTIVITY VS. PRODUCTION MATTERS

You have a contract for a performance obligation to be completed from the customer's perspective. Your profits are determined by how productively you deliver that performance obligation. Remember: Linear calculations to calculate production make it difficult to know where your projects will end up as planned — more profitable or less profitable. Knowledge is in managing

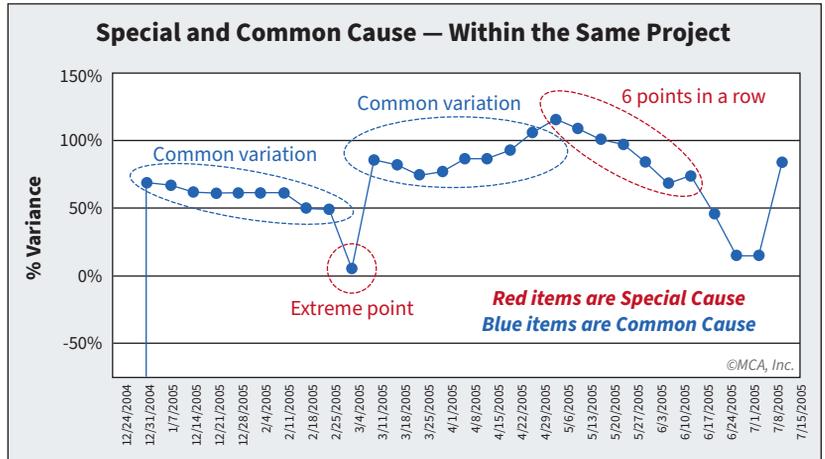


Fig. 2. Common and special cause variations can both occur on the same project.

the work environment and measuring and managing productivity. **EC&M**

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