

What Makes a Good Plan? Using AI to Predict Project Outcomes Before They Start

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When it comes to health, financial, or educational goals, it's important to have a structured plan. Research shows that people who plan exercise routines and meals are more likely to reach their fitness goals.¹ Similarly, in academics, students who create a study plan are more likely to achieve better grades.²

But what about planning construction projects? MCA, Inc. has studied this question over the past three decades. In the early 2000s, analysis and jobsite observation showed that one hour spent planning can save 17 hours on installation.³ But what makes a good plan, and does a better plan lead to a better outcome?



This article summarizes MCA, Inc.'s findings and offers practical takeaways contractors can use to set up, manage, and course-correct plans that predict outcomes early.

FROM DATA TO AI-DRIVEN INSIGHTS

Using Agile Intelligence™ models, MCA, Inc. developed data-driven answers to two questions that can help guide, monitor, and predict project outcomes by the time a job reaches 10% complete:

- What makes a good plan?
- Does a better plan lead to a better outcome?

This approach combines decades of project data and field experience with AI.

Often at the start of a construction project, in the short window between project award and project start, the project manager (PM) rushes to put together a budget for labor and materials. Once installation has started, the budget often becomes a lonely spreadsheet that's left behind now that it has served its purpose. At most, it is reviewed when the PM or financial manager has a feeling that things are about to go sideways. That's when the blame game begins: Who is at fault — the estimator or the field and project teams?

The latest analysis tested a theory seen anecdotally across construction projects: A solid, structured plan for the work — not only at the beginning but updated and managed throughout — correlates with materially better financial outcomes.

While no two construction projects have the exact same conditions, they have more in common than many contractors initially recognize. Nearly all construction projects have similarities that allow them to be comparable, despite differences in size, type of work, or duration. Common characteristics include jobsite obstacles (absenteeism), common phases (planning, procurement, installation, and closeout), and change orders (scope shifts from start to finish).⁴

Recognizing these commonalities, the analysis could investigate how differences in planning relate to project outcomes across a sample of 50 projects over four years, varying in size and type of work. To evaluate planning quality and its relationship to outcomes, the evaluation asked:

- Did the project team (PM and field leader) have a plan for the work?
- How good was the plan?
- Did the team manage the work to the plan throughout installation?

- Was the plan continuously reviewed and updated?

In addition to understanding the project's planning and management behaviors, the study defined project outcomes in terms of financial performance, specifically:

- Profit deviation: Did the project make more, less, or as much profit as expected (measured in dollars and as a percentage of gross profit)?
- End-of-job gross profit.

PROJECT PLANNING: WHAT DOES A GOOD PLAN LOOK LIKE?

Whether you are setting personal goals or developing a work plan for a major project (such as a new data center), the fundamentals of effective planning remain the same. A good plan is clear, specific, measurable, and maintainable, making it easy for everyone involved to understand their responsibilities and work toward a common goal.

On projects large and small, MCA, Inc. has worked with hundreds of contractors that have built the infrastructure needed within their companies to plan and manage projects through implementation of tools such as a work breakdown structure (WBS) to create the plan and JPAC® to measure productivity and manage changes throughout.

Exhibit 1: Gained vs. Faded Projects

	Gained Projects	Faded Projects
Initial BLHB	No significant difference • Initial estimate and initial WBS hours (BLHB) are consistent and represent about 60% of the hours that will be charged by project completion	No significant difference • Initial estimate and initial WBS hours (BLHB) are consistent and represent about 60% of the hours that will be charged by project completion
WBS Management Over Time (Final Profit Categories)	• Capture more of the work in the WBS and recognize more change orders as the project progresses • Final BLHB is 91% of the final actual hours • Final estimate is 86% of the final actual hours	• Capture less of the work in the WBS and recognize fewer change orders as the project progresses • Final BLHB captures 78% of the final actual hours • Final estimate is 79% of the final actual hours
Number & Aptitude of Changes	• Jobs that gain are adding WBS changes to the project more often • Average: 220 changes vs 72 changes (faded) • Jobs that gain have more hours added to their projects	• Less frequent WBS updates • WBS (average 72 per job vs. gained with 220 per job)
Labor Code Usage	• No significant difference	• No significant difference
Task Breakdown/ Task Size	• Jobs that gained have fewer hours per task on average (37 hours) • More tasks: 391 on average	• Jobs that faded have more hours per task on average (45 hours) • Fewer tasks: 310 tasks

What Makes a Good Plan?

It's important to note that the plan for work is different from a plan for hours or installed quantities. Understanding the differences between these is the crux of shifting how an organization plans for and measures work across its projects. These fundamentals of planning for work (not just labor hours) are the basis of JPAC® and ASTM Standard E2691 for productivity measurement, with roots back to Frederick Taylor's *The Principles of Scientific Management*.⁵

A good plan for work also goes beyond creating a "work package," which captures a collection of related activities on a project but misses the full picture of how that work achieves each of a project's deliverables.

A WBS is a hierarchical segmentation of a project's work into smaller, more manageable components. On a construction project, this structure might be broken down by phase, building, floor, or area and type of work. The lowest level of the WBS is a description of the tasks to accomplish the deliverable for that piece of the project.

By utilizing a well-laid-out and detailed WBS, it can:

1. Ensure all the work is captured on a project.
2. Get the project team on the same page about what is included in the scope.
3. Allow the work to be easily understood by field crews.
4. Make resource assignment and hand-off less tacit.
5. Give the project team a baseline labor-hour budget based on the work, which is critical to measuring productivity and capturing changes throughout the job's duration.

EVALUATING THE PLANS

To evaluate the quality of planning across construction projects, this review examined what the project team uses as a reference point for the work plan — at the start of the project and through completion. While most projects had some version of a WBS, some used a list of cost codes with hours budgeted.

To analyze plan quality, the review assessed:

1. Is the work clearly defined?
2. Is the work appropriately broken down?
3. Is there a coherent structure (rather than a flat list)?
4. Is the plan updated as the job progresses?

UNDERSTANDING THE DIFFERENCES BETWEEN A GOOD & NOT-SO-GOOD PLAN

Project A is an example of a strong WBS created for the electrical installation work on construction of a new grocery store using research variables (planning quality and process variables):

- Task definition and breakdown
 - Average task hours (and percent of job total)
 - Largest task hours (and percent of job total)
 - Number of tasks
 - Number of labor codes used
- Change orders and WBS changes
 - Number of WBS changes
 - Change in baseline labor hour budget overall and between different stages of project completion
- Hours captured in the WBS out of the hours spent, as of:
 - Job start/initial update
 - 25% complete
 - 50% complete
 - 100% complete

To illustrate the differences in levels of planning across projects, imagine sample plans for two comparably sized jobs, one being a highly detailed WBS vs. a list.

In the *highly detailed WBS*, the 12,000-hour job was broken down by area and type of work. The 250 tasks that made up the work have clear descriptions and organization. The work is captured in a way that ensures completeness and the placement and visibility (on a whiteboard in the job trailer) ensures the plan

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is visible to the team and can be easily modified as the project goes forward.

In comparison, a similarly sized project (12,000 hours) utilized a *list*; rather than using a WBS, this project team created a list of cost codes, budgeting the crew size and duration for each code and hours for the inside, roof, and three separate buildings.

While this type of list can help establish a rough budget for hours and labor needs, the actual work is not defined and therefore harder to communicate, measure against, and manage.

ANALYSIS FINDINGS

With planning quality analyzed, the review identified some clear differences between projects that *gained* (made more than expected) and projects that *faded* (made less than expected) (Exhibit 1).

BREAKING DOWN THE WORK INTO MANAGEABLE PIECES MATTERS

Projects that did well financially had the work broken down into more tasks with fewer budgeted hours than projects that performed poorly. On average, better jobs had approximately 26% more tasks than projects that faded. The projects

that gained also had about 20% fewer hours per task.

These findings show how breaking down the work into smaller, manageable pieces (such as the project shown in the Project A example) can make a difference.

PLANNING DURING THE JOB IS CRITICAL

Projects that gained not only broke down the work differently than their counterparts, but they also had strikingly different habits in how they managed their plans during installation.

While having a strong plan at the beginning of the job can build confidence across the team and stakeholders, planning during the job proves to be just as, if not more, important. Specifically, the evaluation reviewed how these projects updated their WBS. Were updates made to the WBS with changes? How often and at what magnitude?

UPDATING THE PLAN DRIVES RESULTS

Projects that performed well updated their plan far more often than comparable projects. On average, projects that gained updated their WBS approximately 220 times, compared to about 72 times for projects that faded. Projects

that gained also added more hours to their WBS during the project.

While allowing the project team to add hours to the budget frequently might seem risky, these updates to the baseline labor hour budget translate to approved change order hours. Updating the plan prompts updates to the estimate (i.e., change orders).

ESTIMATE VS. BASELINE LABOR HOUR BUDGET AT START & FINISH

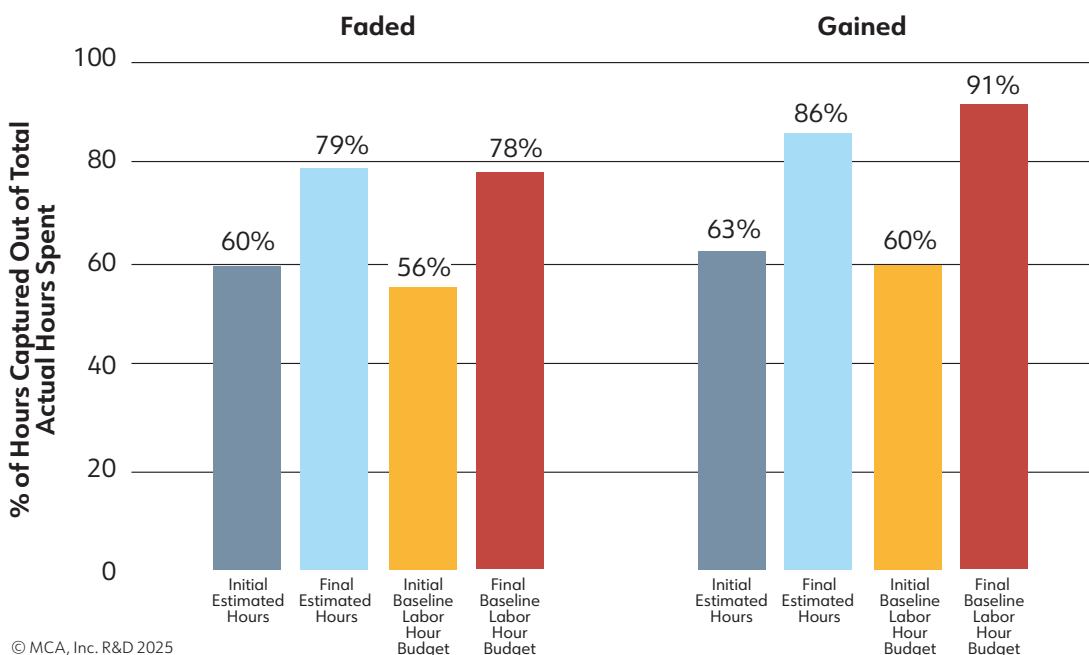
Exhibit 2 shows how the estimate and baseline labor hour budget compare at job start and at completion (as a percentage of actual hours charged).

Initial estimate and initial WBS hours (baseline labor hour budget) are consistent between projects that gained and faded, with both representing about 60% of the hours charged at project completion.

At the end of the projects, however, projects that faded were found to capture fewer hours in both their plan (78% of the final hours) and their contractual changes (79% of the final hours).

Projects that gained captured more hours in both their plan (91% of the final hours) and their contract (86% of the final hours).

Exhibit 2: Changes to the Plan Ensure Change Orders Are Priced & Captured



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Often, when the field leader updates the WBS, this signals to the PM that a contractual change might be necessary, prompting the manager to write a change order. The opposite also happens, in which the PM is made aware of a contractual change and communicates to the field leader onsite to update the plan accordingly.

The relationship between work and money in construction projects is discussed in more detail in the *CFMA Building Profits* article, "The Chicken or the Egg: How Work & Money Are Interconnected."⁶

SCOPE RECOGNITION & CONTRACT VALUE

Ultimately, gained projects updated their plan more frequently than faded projects. For both groups, as the work was recognized, so were change order dollars.

Gained projects captured added scope more often and in higher quantities than their counterparts, allowing the team to

write change orders and increase the contract with increases to the scope of work.

Because both faded and gained projects begin with a similar understanding of the scope — each capturing about 60% of the hours spent — yet end up with markedly different outcomes, the research examined when their paths diverge.

FADED PROJECTS LOSE STEAM HALFWAY THROUGH

In reviewing the projects at various stages — at the start, at 25% complete, at 50% complete, and again at 100% complete — it became clear where the turning point happens between the two groups. Faded projects dropped off in updating their WBS at the halfway point, whereas gained projects continue to update through the entire last 50%.

Exhibit 3 shows how the plans evolved across the two project samples over the life of the project. At 25% complete, gained jobs are slightly ahead of the

faded jobs (with 76% of hours captured vs. 71%). By 50% complete, faded and gained jobs are even closer, with faded now capturing 76% of the hours and gained capturing 79%.

However, in the time between 50% and project completion, faded tend to fall off in updating their plan (only capturing 2% more in scope), while gained continue to update the plan through this last half, increasing the scope from 79% to 91%.

CONCLUSION

Like a commitment to a new fitness regimen, people often leave the gate strong with an idea of how they want it to go, but as soon as work crews start getting the hang of it, other factors come into play that can throw teams off target. Similarly, once a construction project meets the reality of the jobsite, the plan must be adapted.

A good plan accurately represents the effort expected for the job as soon as the work is recognized, and additional work is dynamically recognized as the job progresses.



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What Makes a Good Plan?

Rather than blaming external reasons and unforeseen challenges when performance slips, it is critical to continue to respond to the work environment through regular plan updates.

The analysis indicates that the following behaviors correlate with stronger financial performance:

1. Breaking down the work into manageable pieces
2. Updating the plan frequently in tandem with contractual changes
3. Keeping scope visible and current, especially in the final 50% of the project.

As a result of these findings, MCA, Inc. has introduced new AI technology to support contractors in understanding if their work plans are set up for success at the start and throughout the project.

Contractors can evaluate a project WBS using the criteria established when utilizing software technology to digitalize the WBS. **BP**



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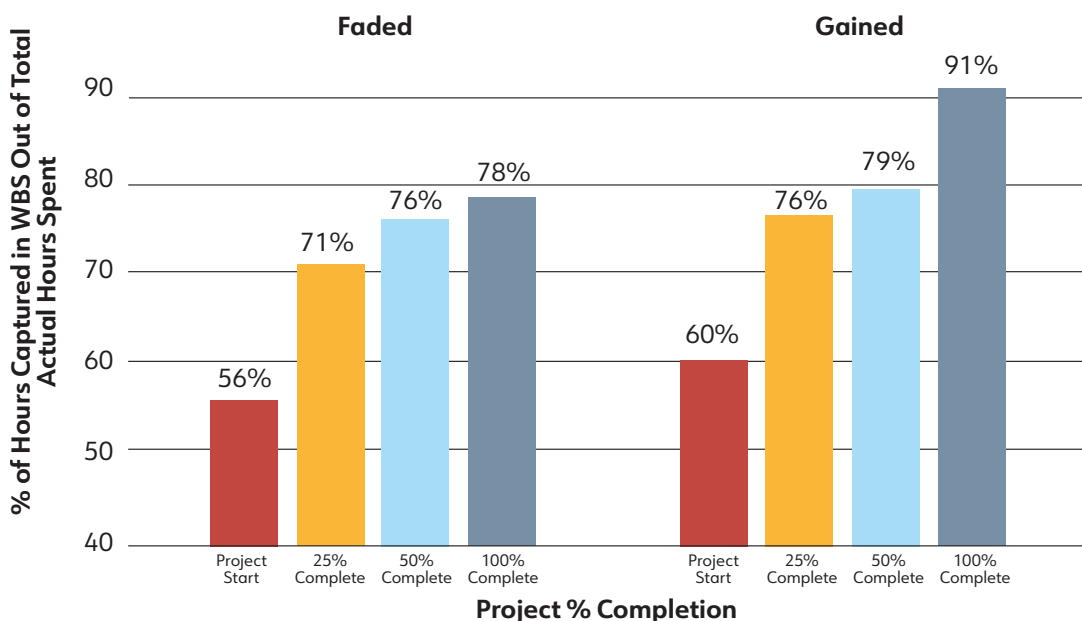
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Endnotes

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Exhibit 3: For Projects That Gained, Planning Continues Through Project Completion



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