

**AACE**  
INTERNATIONAL  
RECOMMENDED  
PRACTICE

**25R-03**

**ESTIMATING LOST LABOR  
PRODUCTIVITY IN CONSTRUCTION  
CLAIMS**

**SAMPLE**

**AACE**  
INTERNATIONAL



AAACE® International Recommended Practice No. 25R-03

## ESTIMATING LOST LABOR PRODUCTIVITY IN CONSTRUCTION CLAIMS

TCM Framework: 6.4 – Forensic Performance Assessment

Rev. April 15, 2004

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April 13, 2004

## A. INTRODUCTION

One of the most contentious areas in construction claims is the calculation or estimation of lost productivity. Unlike direct costs, lost productivity is often not tracked or cannot be discerned separately and contemporaneously. As a result, both causation and entitlement concerning the recovery of lost productivity are difficult to establish. Compounding this situation, there is no uniform agreement within the construction industry as to a preferred methodology of calculating lost productivity. There are, in fact, numerous ways to calculate lost productivity. Many methods of calculation are open to challenge with respect to validity and applicability to particular cases -- thus making settlement of the issue on a particular project problematic.<sup>1</sup>

What is productivity in construction and how is it measured? Several authors have answered this question in the following manner.

"...productivity refers to quantities produced per employee hour of effort..." and further is  
"...defined as the ratio of output to input... Productivity can be defined by any of the equations ...

$$\begin{aligned}\text{Productivity} &= \text{Output} \div \text{input} \\ &= \text{Units} \div \text{work-hours} \\ &= (\text{Total output}) \div (\text{Total work-hours})\end{aligned}$$

"Productivity is measured generally by the output per hour of input."<sup>3</sup>

"Productivity: [A] relative measure of labor efficiency, either good or bad, when compared to an established base or norm as determined from an area of great experience. Productivity changes may be either an increase or decrease in cost."

"Productivity is defined as the craft hours necessary to produce a unit of finished product."<sup>5</sup>

Simply stated then, productivity is a measurement of rate of output per unit of time or effort usually measured in labor hours. For example, cubic yards/cubic meters of concrete placed, linear feet/meters of conduit installed or pipe placed, etc. per crew hour or some other standard measure.

Productivity loss, therefore, is experienced when a contractor is not accomplishing its anticipated achievable or planned rate of production and is best described as a contractor producing less than its planned output per work hour of input. Thus, the contractor is expending more effort per unit of production than originally planned.<sup>5</sup> The result is a loss of money for a contractor. Therefore, a challenging aspect of construction cost control is measuring and tracking work hours and production in sufficient detail to allow analysis of the data in order to determine the root cause(s) of poor labor productivity, should it occur.

Productivity is critically important in the context of construction contracts, both large and small. Construction contractors are typically paid for work completed in place that conforms to the terms of the contract. This is sometimes referred to as pay item work and is generally true whether the contract is lump sum/firm fixed price, cost reimbursable, target cost, unit cost or pay item work or as a percentage of previously defined categories of work, often referred to as a schedule of values or bill of quantities. That is, unlike automotive manufacturers, construction contractors are rarely paid on the basis of the entire completed product. And, unlike craft labor, construction contractors are rarely paid by hours of labor. Therefore, productivity is related to project cash flow and profitability.

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All too often in construction, the terms “productivity” and “production” are used interchangeably. This is, however, incorrect. Production is the measure of output (i.e., things produced) whereas productivity is the measurement of the production. The following two formulas can be used to calculate these two terms.

$$\text{Productivity} = \frac{\text{Output (units completed)}}{\text{Input (work or equipment hours)}}$$

$$\text{Productivity Factor} = \frac{\text{Actual Productivity}}{\text{Baseline or Planned Productivity}}$$

Given this set of operating terms, it is therefore possible for a contractor to achieve 100% of its planned production but not achieve its planned productivity. That is, a contractor could well be accomplishing the planned rate of production of 300 linear feet of pipe/day in the ground but be expending twice the amount of labor planned to accomplish this daily production rate, for example. In this case, the contractor would be accomplishing 100% of planned production but operating at 50% productivity.

Thus, production and productivity are not reciprocal numbers. It does not necessarily follow that if a contractor is 75% productive then they are 25% inefficient. In the context of this Recommended Practice, production is the measure of output (i.e., how many feet or meters of pipe to be installed per work hour) while productivity is the measure of input (i.e., how many labor hours it takes to install a foot or meter of pipe).

Measurement and allocation of responsibility for loss of productivity can be difficult. There are a number of reasons for this difficulty.<sup>6</sup> Amongst them, are the following:

- Lost productivity resulting from some action which is the responsibility of the owner, may not be easily detected or observed at the outset. Unless a contractor has a good productivity monitoring plan, well known to field project management staff, all that may be known at the outset of a problem is that the field crews are not completing work activities as planned, and project schedule, costs and cash flow are suffering as a result. As a result, appropriate written notice to the project owner is often not promptly filed, kicking off more discreet and detailed project monitoring efforts.<sup>7</sup>
- Productivity is frequently not concretely tracked on construction projects in a contemporaneous manner. Unless a contractor uses some sort of structured earned value system for tracking output units and input units, there is no way to measure productivity contemporaneously. Thus, productivity losses can be difficult to prove with the degree of certainty demanded by many owners.
- Lost productivity is, all too often, calculated at the end of a project during preparation of a claim or request for equitable adjustment. As a result, often times only a gross approximation or a total cost estimate can be made.
- Complicating the issue even more, there are myriad ways to calculate lost productivity. There is no common agreement amongst cost professionals as to how such lost hours should be calculated. Notwithstanding this statement, there is general agreement among cost professionals that a comparison to unimpacted work on the project is generally preferred when there is sufficient data available.<sup>8</sup>
- The quality of some of the methods’ results is not always repeatable, leading to low confidence in the resulting analysis. Often two methods are used to compare results as a check with seemingly wide variances observed that cannot be easily understood or reconciled.
- Finally, once lost productivity is calculated, it is still difficult to establish causation. Contractors tend to blame such losses on owners and ask to be compensated. Owners, on the other hand, often blame a bad

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bid or poor project management and thus deny additional compensation for lost productivity. Given this situation, the root cause of lost productivity is frequently a matter in dispute between owners, contractors and subcontractors.

The key to reconstructing productivity information in support of a lost productivity claim is good record keeping throughout the entire project. From the very start of the project, the contractor ought to establish a uniform system of capturing and recording field labor productivity information on a contemporaneous basis.<sup>9</sup> Actual labor productivity ought to be compared on a routine basis to as-bid or as-planned labor productivity to determine how the project is progressing against the plan. The earlier productivity loss can be detected on a project, the greater the likelihood that corrective action can be implemented to mitigate damages. If progress is not per plan, analysis for causation must be made. In the event that poor productivity is, to a greater or lesser extent, brought about by some action or lack of action by the owner, then appropriate written notice should be filed. Regardless of causation, corrective action ought to be initiated as soon as the decline in labor productivity is detected.

## B. PURPOSE

This Recommended Practice focuses on identification of various methods for estimating lost labor productivity in construction claims. Often the claim is the result of one or more change order requests that cannot be fully resolved to capture their full and final effect on the entire project cost and schedule. Specifically, this Recommended Practice examines the issue in terms of claims for cost recovery of lost productivity. Therefore, the purpose of the Recommended Practice is to:

- Identify Lost Productivity Estimating Methodologies: That is, survey as many of the various methodologies employed in litigation throughout North America as can be identified;
- Rank Order the Methodologies: This is, based on reliability, professional acceptance, case law and construction claims literature, rank the identified methodologies from most to least reliable with respect to documenting estimating damages in claim situations. While it may not be possible to state with certainty which methods are absolutely most or least reliable, it can be stated that under certain sets of circumstances some methods are generally considered more reliable than others. (**CAUTION:** This Recommended Practice was prepared on the basis of the author's understanding of Canadian and U.S. case law. It is recommended that anyone preparing a lost productivity claim seek appropriate legal advice on the methodology to be used. This is especially true if the claim is being pursued under national law other than Canada or the United States.)
- Define and Discuss Each Methodology: That is, discuss the method and how it is employed. Also, when possible, discuss the strong and weak points of each method;
- Identify Selected Studies Applicable to Each Methodology: Herein, identify as many studies and professional or technical papers as possible which will help the practitioner in learning more about and/or employing a particular method.

It needs to be noted that this Recommended Practice does not define in detail how one should properly perform the various analytical methods identified herein. The Recommended Practice gives a brief description of each method only in an effort to help claimants properly identify the method. That is, different claimants may have differing nomenclature for the same methodology. In this case, the brief description of each method is intended to help overcome this situation.