Learning Curves & Lost Productivity Claims

By Christopher S. Drewry

In construction, productivity is often viewed as manhours per unit of work—greater productivity means fewer manhours spent per unit of work. Since contractors estimate work and prepare their bids based upon predetermined labor productivity, productivity is an important and vital part of a contractor's ultimate success. Because they can drive equipment costs and general overhead, labor costs are typically the largest variable cost for contractors. Similarly, labor is often the largest single cost overrun incurred by a contractor. As such, decreased productivity directly affects the bottom line. For this reason, delay and impact claims typically include as a damage component the loss of productivity due to the events of delay, interferences, disruptions, and/or acceleration of a contractor's performance.

LEARNING CURVES

Although there are numerous causes of labor inefficiencies (e.g., re-sequenced work, trade-stacking, or excessive overtime), many of which are interrelated, one culprit of decreased productivity not often discussed or anticipated is the "learning curve" of workers. It is a generally accepted principle that the time required to perform a certain task decreases with practice and experience doing that task. In the construction industry in particular, the time required for a worker to perform a repetitive activity decreases with each repetition performed by that worker. This is referred to as the "learning curve."

There are essentially two types of learning curves. The "basic curve" is the learning curve necessary for an untrained worker to acquire training, knowledge, and skills fundamental to a particular trade. This curve is necessary in order for the worker to achieve an average level of proficiency. In contrast, the "experience curve" is the worker's attainment of the specialized skill set required to perform a specific repetitive activity. The latter is the curve most likely to have an impact on productivity, especially in the contexts of acceleration. WILLIAM SCHWARTZKOPF, CALCULATING LOST LABOR PRODUCTIVITY IN CONSTRUCTION CLAIMS, § 6.01, p. 125-26 (2 Ed., Aspen Publishers 2004).

In order to accelerate, the contractor may require its labor to work extra shifts or on an overtime basis, which results in increased base wages, fringe benefits, and premiums beyond the standard labor rate. When accelerated, a contractor may also add extra crews to perform the same work. If you have two crews performing the same work originally intended to be performed by one, the number of repetitions by each crew will only be one half of what was originally planned. As a result, neither crew will meet the same planned level of efficiency. Additionally, the contractor may also lose money on the initial work being performed by both crews, as the second, new crew will presumably be at the beginning of its "experience curve" when performing this work as opposed to where the original crew would have been if allowed to perform that work without the acceleration.

In addition to the sheer number of repetitions, the following factors can impact the learning or experience curve: job organization, equipment and crew coordination, crew familiarity with the job through repetitive operations, daily project management and supervision, sufficient workspace for crews (i.e., no trade-stacking or over-manning), development of efficient material supply systems, and development of efficient equipment and tools. Ward & Thomas, A Validation of Learning Curve Models Available to the Construction Industry, Pennsylvania State University,

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Construction Management Research Series, Report No. 20 (Aug. 1984). However, these factors can also directly impact productivity without impacting the experience curve.

MEASURING AND PROVING THE LOST PRODUCTIVITY

The identification and measurement of productivity losses present a unique hurdle to the contractor (and its construction lawyer), in part because productivity on a project is often analyzed after the fact in an attempt to ascertain the full extent of a contractor's labor cost overruns as part of a claim.

A key component to the contractor's ability to establishing a claim for loss of productivity is to first establish a labor cost baseline for the performance of the actual work. This information can most often be derived from the contractor's original cost estimate for the work. The estimate should clearly identify the labor unit productivity factors relied upon in developing the estimated costs. Obviously, the contractor's conflicting interest is protecting the proprietary aspect of its productivity factors utilized in the bidding process. It is also important that the contractor back out of this analysis post-estimate changes to the labor rate and labor burden.

To recover lost productivity damages, a basic as-planned versus as-built analysis, post-construction scheduling analyses, and/or witness testimony (without supporting documentation) will generally be insufficient. Rather, the contractor must first be able to quantify the lost productivity. This typically requires the use of an expert witness as the degree of difficulty in proving these damages can be exacerbated by the lack of centralized and adequate systems and procedures for capturing and measuring labor productivity. Three core things are necessary to provide a contractor a good chance of successfully recovering damages for the loss of productivity: (1) contemporaneous project documentation; (2) schedule and productivity analysis conducted by a qualified expert; and (3) contractual terms that the claimant has adhered to and that allow for the types of claims being asserted.

Additional document sources of information for measuring productivity losses can be found in critical path method schedules or through the contractor's cost accounting data. Although absolute accuracy is not necessary in performing the productivity analysis, a post-performance productivity analysis is of limited value if based exclusively on academic studies as opposed to actual project records.

CONCLUSION

Although labor inefficiency is a real consequence of acceleration and/or delay, the resulting damages to the contractor are extremely difficult to quantify and prove. In fact, the methodologies used to measure productivity losses warrant a lengthy discussion of their own that would extend well beyond the scope of, and space available for, this article. However, familiarity with the causes of labor inefficiencies, such as learning curves, will better enable the contractor to identify and document such problems as they arise, thereby increasing the likelihood of recovery of productivity claim components. ■