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cause&effect

news from CPMI® on construction claims analysis and resolution

When the best-laid plans go astray

A primer on labor productivity

Ronald F. Parisi, P.E.

It all begins with the bid

When a contractor bids on a construction project, the bid usually is based on an estimate, which is factored from a similar project. The bid contains materials and labor as its two primary components.

In estimating labor, the contracting company must consider several key factors:

- Productivity of its field forces;
- Union labor agreements and requirements;
- Past experience with the owner, designer, and construction manager;
- Labor availability; and
- Specialty trades.

If actual construction work deviates from the anticipated plan, once the contract is signed and the project is underway, several situations may result:

- The job may take more *time*, because progress is not being made at the rate projected in the original baseline schedule and, thus, project completion must be extended. (In such cases, acceleration of the remaining activities may be implemented to recover time.)
- More hours of *labor* may be required to install the work items, because materials are not being installed by the contractor's workforce at the productivity rates (the anticipated quantities of material to be installed per hour) estimated in the original bid.
- An overrun of both time and labor may occur.

Staking a claim

If the contracting company believes the circumstances above are due to the owner or its agents, the contractor will submit a **delay claim** — a request for an extension of the contract time and compensation for any associated costs. The contractor may also submit a **labor productivity claim** — a request for an increase in the contract price to cover labor cost overruns.

Problem projects typically suffer from both schedule delays and some form of disruption to the planned labor productivity rate. In order to resolve the situation, it is necessary to segregate these two types of occurrences (time delays and productivity issues) and analyze them to determine: a) the causes; b) who was responsible; and c) what damages (costs) were incurred as a result of deviation from the original plan. If responsibility can be tied to a party involved in the contract, the cost of the loss may be recoverable from that party.

Analyzing the issues

A *schedule analysis* helps demonstrate the reasons for delay by identifying the circumstances that negatively affected the original baseline schedule dates. The reasons for disruption to labor productivity generally are more complicated.

Lost labor productivity claims require a detailed *issue analysis* in order to assess responsibility for the cause-and-effect relationships. This can be difficult, as more than one party may be responsible and the potential causes are many, including out-of-

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Capital Project Management, Inc.

Work-site congestion and overcrowding can significantly impede productivity.

sequence work, skilled labor shortages, worker crowding/ congested work areas, interference of trades, owner interference, design problems and defects, contractor's inadequate management/ supervision, failure to properly staff the project, overtime, and acceleration.

The most persuasive argument for lost labor productivity requires a cause-and-effect demonstration of actual job performance, using contemporaneous records of hours expended and quantities installed. In order to perform this analysis, actual labor productivity data must be sufficiently detailed to demonstrate the variation.

The as-built labor productivity data may be retrieved from sources such as the project daily reports, quantity and man-hour reports, progress payments, and certified payroll records. The comparison of this data for certain periods of time during the project may identify stretches of both poor and acceptable productivity, further isolating the causes of specific events on the project and demonstrating their effect on labor.

The challenge lies in demonstrating the cause and effect on the project schedule and labor productivity and making the case persuasively.

As-planned labor productivity may be compared to actual productivity rates, which would quantify the variation vis-à-vis the original plan. This comparison would not, however, adequately validate the original labor estimate. Comparing similar work activities between non-affected and affected work periods — for example, comparing labor productivity during installation of ductwork in an enclosed, watertight building to the installation of ductwork on open decks where a waterproof roof had not been installed — is a better and more persuasive method of validating the estimate. In comparing such activities, the variation in installation rates can be attributed to a specific cause (in this case, environmental factors) with the responsibility allocated to a contractual party.

The recovery of cost overruns by any contractual party would require proof that:

- The additional labor hours were attributable to lost labor productivity;
- The alleged disruption was the cause for this lost labor productivity;
- The original labor estimate was valid; and
- The party responsible for the alleged disruption can be clearly identified.

Proving the point

In summary, **delay claims** are filed for losses caused primarily due to *project time* overruns. **Labor productivity claims** originate from disruptions to the work that add additional labor hours for the installation of the original contract quantities and, thus, result in *labor cost* overruns.

When it comes to problem projects, the challenge lies in demonstrating the cause and subsequent effect on the project schedule and labor productivity. And, of course, making the case persuasively.

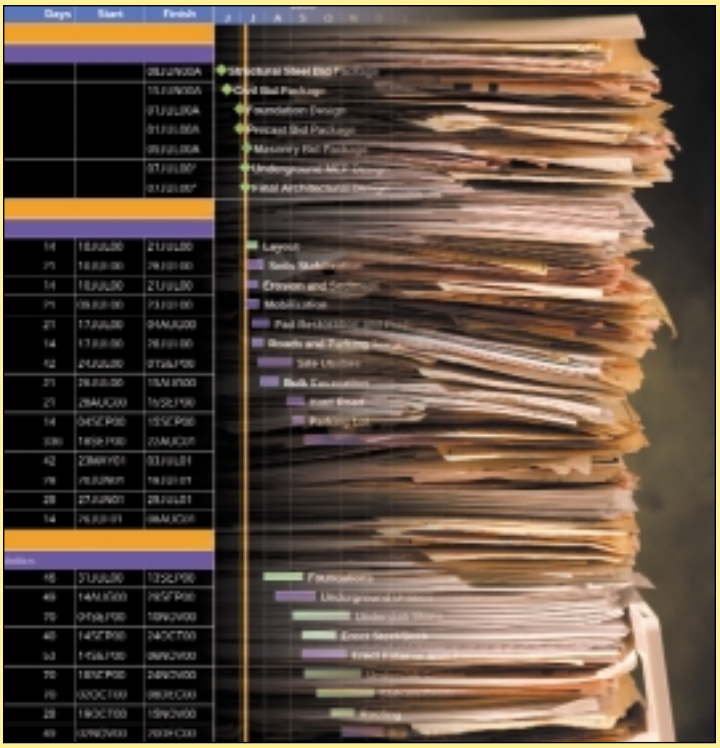
During his 30 year career, Ronald F. Parisi, P.E. has managed construction and engaged in design coordination, scheduling, constructability, and engineering support for projects including educational buildings, power plants, and pharmaceutical facilities. As a principal at CPMI, Ron provides litigation support and claims analysis/avoidance services to a wide array of clients.

Project control records: The foundation of a comprehensive delay analysis

Scott A. Beisler, PMP

In the end, it all comes down to paperwork.

A comprehensive delay analysis, which usually is performed after the project has been completed, generally relies on a variety of project control documents that are typically maintained by the construction manager, general contractor, and/or its subcontractors. These documents include the following:



The as-planned schedule. This schedule illustrates the contractor's plan to perform the contractual scope of work and serves as the baseline for measuring actual progress.

Schedule updates. These updates are issued at various points in the project and typically reflect as-built (historical or to-date) information, such as actual activity start and finish dates and *percent complete* data for activities in progress. The schedule update also includes the projected (as-planned) schedule for the remaining work. However, schedule updates do not necessarily maintain the original as-planned schedule logic (the relationships or interdependencies between activities).

Quantity data. The contractor establishes the scope of work from the as-planned quantities by category or type of work, such as the number of linear feet of pipe, pounds of ductwork, or tons of steel to be installed. The as-planned quantities are determined from the contract drawings and documents and provide the basis for the contractor's budget and baseline schedule. As-built quantities are used to determine quantity increases or decreases over the course of the project, due to change orders or errors in the original quantity estimates. The quantities installed on a particular date also can be used to determine the status of the schedule's individual work activities. Typically, the status of a work activity can be determined by computing its percent complete. This can be accomplished by dividing the quantity installed to date by its total quantity, provided the schedule activity has only one type of quantity associated with it. The *percent complete* forms the basis for the activity's remaining duration, which, in turn, eventually determines the end date of the project via the as-planned schedule logic.

It is important to note that the progress of activities is measured by the *actual work installed* as of the data date of the schedule.

Man-hour data. *Labor man-hours,* like quantities, are computed in the contractor's original estimate and help the contracting firm formulate its labor costs and manpower requirements, as well as determine the construction schedule. *Budget man-hours* are derived from quantities by means of a *budget unit rate,* which is stated in the form of man-hour per quantity. Hence, a quantity of work can be converted to man-hours by multiplying the quantity by its budget unit rate.

Another method of stating progress is the *earned value method.* The number of "earned" man-hours (progress) for a particular type of work is calculated as installed quantity times its budget unit rate. Earned man-hours divided by total budget man-hours for that activity are also equal to the percent complete for that category of work. The earned value method also allows for the computation of the overall percent complete of differing quantities (i.e., linear feet of pipe, pounds of ductwork, tons of steel, etc. can all be converted to a common "denominator" or measure of man-hours). A weighted overall percent complete can be calculated by adding together all the earned man-hours of specific activities.

It is also common for contractors to track their actual man-hours expended. A comparison of actual man-hours versus earned man-hours determines a contractor's productivity. A contractor's "performance factor" can be calculated as actual hours/earned man-hours either by specific activity or total project.

Status reports. Status reports summarize as-planned and actual man-hours and quantities, typically at monthly intervals. They can be used to determine the status of schedule activities, track performance to date, and project future manpower requirements to complete the project.

Project correspondence and records. These include letters, monthly reports, minutes of meetings, daily reports, or internal logs. Such information is necessary to establish facts and to determine what happened during the project while it was being delayed or when production was disrupted. These records help identify the cause of the delay, as well as the responsible party.

A delay analysis is based on updating the project's as-planned schedule at various impact points to measure the effect of schedule variances (delays) on the project's completion date. Delay methodology is dependent upon an accurate definition of the project's critical path to determine the controlling activity on the schedule. The critical path is the longest path of activities that determines the project's completion date.

On complicated projects, the critical path may change due to lack of progress on schedule activities that were previously non-critical. Likewise, the critical path may remain on course if sufficient progress is made on other less critical paths, relative to the current critical path.

Accurately tracking the status of all activities in the schedule is crucial to defining the project's critical path and determining which event is delaying the project. Accurate as-built quantity and man-hour information is essential to properly update the schedule. Status reports maintained by the construction manager, general contractor, and/or subcontractors will also provide necessary information. When all this important information is available, the contractor is in a better position to pursue or defend a delay claim.▼

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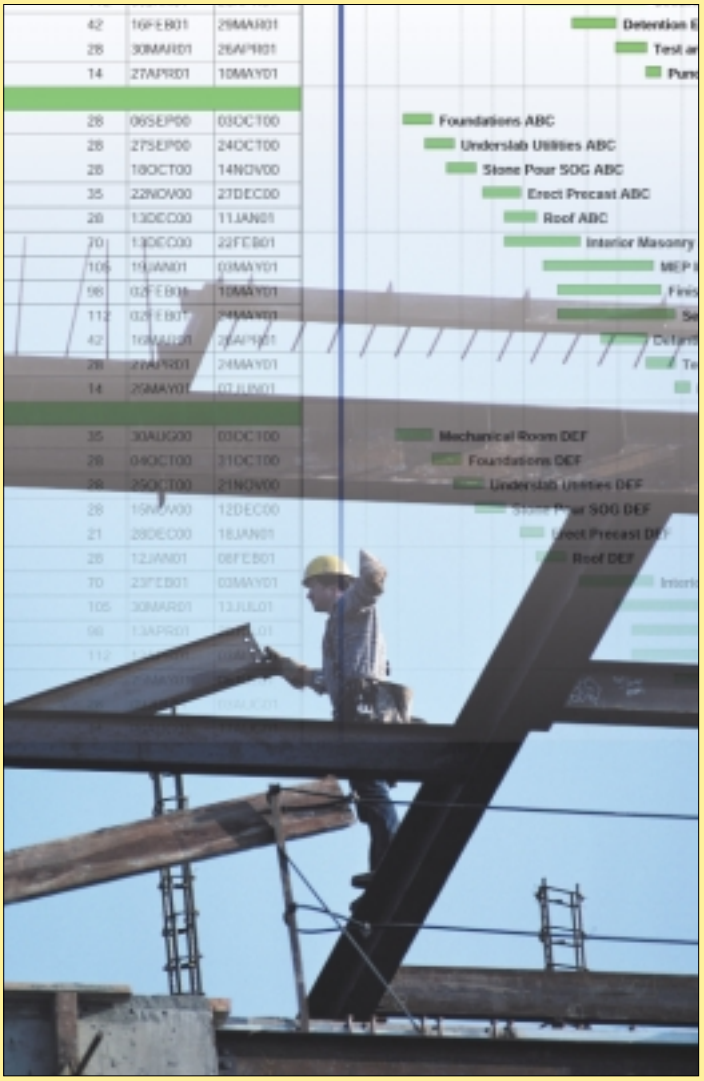

Claims for lost labor productivity: A legal perspective

Jane Goetz, Esq.

On any construction project, a host of factors can hinder a contractor's labor productivity, thus resulting in actual labor costs that far exceed the contractor's estimated costs. These factors include change orders/extra work directives, delays due to adverse weather conditions, delays in contract administration, acceleration orders, stop work orders, etc. Such delays and disruptions often force the contractor to perform work out of sequence, fluctuate manpower, work overtime, and stack trades.

To recover lost labor productivity costs, a contractor must prove both the owner's legal liability and the actual damages attributable to the owner's conduct. Too often, claimants focus their attention on proving the owner's liability and neglect the equally important issue of quantifying their damages. The formula for quantifying damages for lost labor productivity is simple: Damages should reflect the difference between what the work actually cost and what it would have cost had the delay/disruption not occurred. The difficulty lies in calculating and proving the numbers on each side of this equation.

The Measured Mile Method: The most widely accepted approach for proving lost productivity damages involves a comparison of the contractor's productivity during an unimpeded period of the project to productivity during the impeded period. Courts favor *the Measured Mile Method* because it is based on the actual productivity capacity of the contractor, as opposed to the contractor's estimated manpower. The Measured Mile approach provides a very effective basis for comparing work on the same project. The courts have also allowed contractors to compare labor productivity on past projects for which a similar scope of work was performed.

"Damages should reflect the difference between what the work actually cost and what it would have cost had the delay/disruption not occurred."

The Total Cost Method: With this approach, the contractor calculates the total costs incurred on the project and subtracts them from the estimated costs. The difference equals the contractor's damages. *The Total Cost Method* is frowned upon by the courts for two very good reasons: First, it assumes that the contractor's bid was reasonable and had no material defects; and second, it assumes that the owner is responsible for *all* of the contractor's cost overruns. The courts are extremely reluctant to consider either of these as the basis for awarding a contractor lost labor productivity damages.

Industry Guidelines: There are a number of trade organizations that publish manuals and industry guides to establish model labor productivity levels and costs for certain types of work. In litigation, it is not recommended that the contractor rely solely on the industry guides to prove lost labor productivity, as they obviously do not account for actual job conditions or the contractor's performance on the project at issue. However, the use of industry guides in conjunction with an expert witness *has* been accepted by the courts as a means to prove labor productivity loss.

Ultimately, diligent record keeping is the key to proving lost labor productivity damages on any project hampered by delays and disruptions. It is imperative that the contractor keep updated and accurate productivity reports, costs reports, CPM schedules, and project logs in the event that labor productivity problems arise.▼

A partner with the New York City based firm of Goetz Fitzpatrick Most & Bruckman, LLP, Jane Goetz concentrates her practice in construction-related matters, commercial litigation, and commercial transactions, and represents developers, owners, lenders, sureties, design professionals, contractors, subcontractors, and manufacturers throughout all phases of construction. For more information or to contact Jane Goetz, please call 212-695-8100 or e-mail jgoetz@goetzfitz.com.

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Upcoming Events

November 20, 2002
American Society of Civil Engineers (ASCE) – North Jersey Branch

At 6:00 P.M., CPMI principal Ronald F. Parisi will provide a 30-minute introduction to construction claims followed by Q&A. For more information, please contact Gareth Middleton, P.E., Tishman Construction Corporation of NJ, at 973-242-1055 or e-mail gmiddleton@tishman.com.

December 12-13, 2002
The "Contractor's" Construction Superconference

At 8:00 A.M. on December 12, CPMI executive vice president Francis J. Brennan, P.E. will moderate Session 111: "Walking the Tightrope on Schedule Updates – Mitigating Delay vs. Documenting the Claim?" Panel members include CPMI president Michael F. D'Onofrio, P.E.; Richard H. Lowe, Esq. of Jacoby Donner, P.C.; Jack M. Rawlings, a vice president with Hardin Construction Co.; and Jon M. Wickwire, Esq. of Wickwire Gavin, P.C. CPMI will also exhibit at this conference at The Sheraton Palace Hotel in San Francisco, CA. For more information call 301-587-7355 or visit www.andrewsconferences.com.

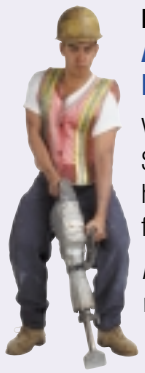
January 30, 2003
ABA Construction Industry Forum Joint Midwinter Educational Program

(Cosponsored by the ABA TIPS Fidelity & Surety Law Committee)

CPMI will exhibit at this one-day conference held at The Waldorf-Astoria Hotel in New York, NY. For more information, visit http://www.abanet.org/forums/construction/html/programs.html.

April 8, 2003
Lorman Educational Services

Lorman Educational Services will present "Pennsylvania Construction Law: Start to Finish — Creative Strategies for Project Completion and Litigation Avoidance." CPMI president Mike D'Onofrio will speak as part of a panel discussion during this symposium in Philadelphia, PA. For information, call 715-833-3940. To register, call 715-833-3959.



April 10-11, 2003
Practising Law Institute Seminar

On April 11, CPMI president Mike D'Onofrio will speak on: "Delay vs. Disruption vs. Inefficiency Claims – Do They Really Differ?" at this meeting held in New York, NY. For more information, call 800-260-4754. Please watch our website for specifics.

May 8-9, 2003
ABA Forum on the Construction Industry, Annual Conference

Visit the CPMI booth at this conference at The Sheraton Boston Hotel. For information, visit http://www.abanet.org/forums/construction/html/programs.html.

More details can be found on our website at www.cpmiteam.com.