

Field Productivity

Inevitable stuff: death, taxeslabor overruns!

Labor intensive contractors confront daily the challenges of field productivity: simply stated, meeting labor budgets. The National Research Council recent study on improving construction productivity concentrated on these challenges – it is an important study for all contractor and contractor associations to study.

The purpose of this article is to identify a few of the major issues which can be addressed with positive effect on productivity and improvement of the probability of project success. Overrunning labor budget often cascades into other problems, such as missed schedules, workmanship problems, costly disputes, supplementations and even terminations for default. So all of the parties to a project have a vested interest in working together to improve productivity because it is a win-win for the entire team. (See my article on Collaboration in the Construction Industry).

1. Reduce the Need for Field Labor

Pre-fabrication, pre-assembly, and modular construction occur, for the most part, off-site in a more controlled, less disruptive environment than on a construction site and reduces workmanship errors. Generally off-site construction and pre-assembly are more efficient than "stick building" on site. Thus, properly implemented, performing assemblages off-site improves:

Safety

Productivity

Quality

Schedule

and reduces re-work, craft conflicts, and variances to the work flow of a project. (See modular.org, "Improving Construction Efficiency and Productivity with Modular Construction".) The Chinese are now erecting 30 story buildings in less than a month. Zachary Construction Company erected a hotel in San Antonio using modular techniques over 30 years ago and yet the concept has not yet received the same momentum here as elsewhere.

Because of skilled labor shortages alone, the use of techniques to reduce the need for field labor will continue to cause a significant shift to the fabrication of as many components and systems as possible to an off-site manufacturing/assembly mode away from the

conventional stick-built mode. The use of BIM and the trend toward turnkey and design/build delivery systems provides both an impetus to and capability for the use of pre-assembly in almost every phase of construction (not only wall panels but mechanical systems as well).

The point is: the trend is here now and it is a robust trend. We will see in the future six sigma mechanical contractors which are largely fabricators (there are some very large industrial pipe fabricators right now who began as plumbing contractors; the same as we are seeing in the structural world, such as the Chinese are having so much success with).

We will also see increased use of *robotics* (e.g. telemetrics, earthmovers guided by GPS and functioning without a human operator; automated machines such as concrete floor surfacing robots, steel frame welders, wall climbing painting robots, etc) the technology for which was largely led by Japanese research and will resurge as their economy strengthens. We will necessarily see American manufacturers begin investing in this type of research as well, and certainly there are creative construction companies which also will begin tinkering with the toy to see how to effectively use this new technology.

2. Don't Lose the Game If the Other Side Doesn't Show Up

Contractors often incur labor overruns even if there are not outside or third party interferences with their work. So, even if the other side doesn't show up, they still lose the ball game. Some of the significant causes are:

- A. Worker Absenteeism and Turnover - Absenteeism and turnover can gobble up 20-40% of your labor for a variety of reasons, including loss of learning curve. So, what to do? The role of the field supervisor is vital. Smaller crews with optimum supervisor/crew ratio and effective daily planning is a start. Getting to know each member of the crew and "Slettenizing" is a huge assist. By "Slettenizing" I mean the approach used by a Sletten Construction Company Superintendent. I was very impressed by the work ethics of his crew, their Enthusiasm and their results. Later I asked him how he achieved this, as many of the crew were "travelers" and not permanent employees of his company. The superintendent, whose name was Virgil Clark, said: "Well, I Slettenize them when they come to work!" What he meant was that when they first came to the job he spent some time with them, telling them about the company, about the project and at the same time learning about the workman, taking an interest in him as a person. He would assign a mentor, a Sletten employee, to the new hand whose job it was to "show him around" and continue to take an interest in how he was doing. That feeling of proprietorship, the feeling that " I am not just an anonymous worker out here, but a real person and I feel like I am a part of the company" goes a long way to improving prompt

attendance, reducing absenteeism, and doing a more effective job. We see productivity that really sucks with outsourced employees, not because those employees are incompetent, but because they are not integrated into the work force when they come to the project, treated like the strangers that they are.

- C. **Rework.** Rework also gobbles up labor budget on a geometric basis. There is the cost doing the same thing twice plus any effort to tear out that which has already been installed. Then there is the effect on the schedule, crew movement, sometimes premium time to do the work and the list goes on. And the more re-work at the end of the project, the greater the cost. Studies show that rework in the last 10-20% of the project is sometimes twice as costly or more than in the early phases of the project. The greater the number of craftsmen on project, the greater the negative impact on productivity by any interference, such as re-work. So, *what to do*: The concept of built-in-quality instead of inspect and correct is the present and effective trend. The three step quality approach of P-I-F (Preparatory - Interim -Final) is an excellent planning and control tool which you will find required now in all COE construction contracts.
- D. **Material Handling** accounts for a large portion of the labor budget, sometimes as much as 30-40%. Few contractors even have a cost code for this account and have no idea how much is being spent for the entire process and impact of getting material/equipment to the craftsmen and the further impact on the crew when it has to wait for material to be delivered or when the material is not of the correct dimensions or complete. **What to do**: Obviously, planning is the key to this problem. The great superintendents I have observed do a retake-off of the material when they first get the job, know that the way the estimator saw the job may be different than the way it is going to be constructed. On a weekly basis, the superintendent does a take-off by area of work to be constructed during the next week or so, then makes sure that the material is pre-loaded on a timely basis (and safely stored and protected as the case may be). At planning meetings, that information is given to the foremen and lead craftsmen so all are on board to what is needed, when it is needed, and to take the steps to assure minimum lengths of transportation of the material, and minimum number of moves and to the maximum extent the use of

apprentices and not craftsmen for this task.

There are other causes, of course. These are just three of those that have been studied and quantified, and which are easy for a contractor to jump on and improve his operation and therefore his labor budget quickly.

5. The Role of Planning

Again, something everyone talks about and too few do something about. But all studies - operational word is "all" - show the measureable benefit of planning on productivity and the negative impact without effective planning.

- ⊞ Planning begins with the contractor bidding and getting the type of work it has the ability to perform.
- ⊞ It continues with the estimator developing at least a rough plan of how the work is to be performed.
- ⊞ It now moves in the turnover phase when the estimator briefs the field crew on how he saw the job.
- ⊞ And into preplanning where the supervisory staff takes a good hard look at the job, studies the plans, details out at least the first part of the job, arranges for resources, et al.
- ⊞ And then at the job kick off where the parties not only review the job but how they will work together.
- ⊞ High standards and discipline of all and fairly administered for all. Weak links in this industry will kill you. The delivery person is as important as a craftsman for if the material doesn't get to the craftsman on time, he has nothing to install and the job suffers. Each person has a role and must be good at that role. There can be no weak links!
- ⊞ And hopefully they will kick in the concepts of the 25/10 rule developed by the Frisby Group. The idea is to identify and meet the priority goals of the first 25% of the project so that the last 10% is just that and doesn't swell into 12 or 15% or more.
- ⊞ The development of coordination drawings

- ⌘ Effective job site coordination meetings
- ⌘ Effective look ahead schedules and the use of 20/20 foresight.
- ⌘ Effective schedule updates
- ⌘ Effective and timely decision making. This is a team effort, a collaborative approach.
- ⌘ The avoidance of accelerations and excessive overtime.
- ⌘ And EXECUTION, EXECUTION, EXECUTION of the plans
- ⌘ And Lessons Learned from each project to figure out how to improve

4. Measurement

Targets must be provided and then measured. Some form of performance measurement is essential to enable the field supervisor to have goals to shoot for, plan for, monitor to assure they are being met and if not, as early as possible to be able to take corrective action. Every company I have seen that instituted some form of earned value improved its productivity, its probability of meeting labor budget. Simply using an arithmetical formula based on planned versus actual hours is false and misleading (say the labor budget for rough-in is 400 hours and 200 hours have actually been spent. Are you 50% complete? What if for simplistic purposes there are 200 feet to install and you have installed only 175 feet and have spent half the labor budget? Are you 50% complete or are you behind?).

In addition to being a necessary mechanism for tracking productivity, if you have a labor impact claim, using a total or modified total cost approach is the most difficult to "sell" to the Owner or the Arbitrator. The method of proving impact damages will be the subject of a future Newsletter; for now, the issue is the importance for having an earned value or performance measurement system for establishing and tracking how well you are doing on the project.

Yet in this industry, more than any other, the resistance to performance measurement at every level (from the foreman to the president) seems to meet resistance. Contractors give lip service to the concept but it reminds me of the prayer of Pope Urban II: "Lord, make me goodbut not just yet."

5. Work Flow

Productivity follows repetitive, uninterrupted functions. (See Frisby article on Work Flow in Construction). Work flow means simply the systematic movement of a crew through a project, without jumping around, stop and go, interruptions while awaiting material or decisions, and without coordination constraints from other crews. Out of sequence work, re-work are also another enemies of work flow, as are General Contractor superintendents who plan by the index finger ("go here, go there, no, stop and go over there") instead of a systematic well planned flow of activities, providing crews the opportunity to develop a learning curve. There is indeed a learning curve in the construction industry: check the earned value for the first few times an activity is performed versus later at say the 75% point and you may find a significant difference in productivity. *Collaboration* by all the parties is required: effective field planning by the contractors with meaningful input from all the subs; timely decision-making by the owner; timely equipment and materials delivery; well thought out recovery schedules when problems do occur instead of immediately initiating legal wars.

6. The Role of the Field Supervisor

The field superintendents are normally the key to field productivity. As much as we rave about the need for good CPM schedules, there are not that many which really do the job that is required to run the job, seldom are they properly updated and for the most part are simply contributors to the destruction of rain forests. Thus the role of field planning by each individual craft contractor and integrated planning by all the contractors has been shown to be most effective in achieving project goals. Registered Nurses must have an attribute that is essential to patient care and that is called *critical thinking*. Critical thinking involves fully understanding the patient issues, figuring out the best approach for dealing with those issues. That is what construction supervisors must also have: Critical thinking. What is the work to be done, how best to do it, making sure it is done that way. Having said that, a construction company will do itself a major favor by:

Hiring the best supervisor (s) possible

Or developing young and talented craftsmen into supervisors

Or both

Having a continuous training program which includes:

Scheduling and Planning

Built-in-Quality

Safety

Communication

Supervisory skills

Contract Management

Documentation

Interpersonal Relations and Conflict Management

Conflict Management

And RECOGNITION of and RESPECT for the field personnel, from a pat on the back to adequate compensation and bonus arrangements.

In addition, establishing a *Best Practices Committee*, comprised of field supervisory personnel who meet on a routine basis to discuss internal issues (such as home office support, tools and equipment, etc) as well as means and methods that seem to work better than others. I have always seen these Committees have a very powerful impact on project success.

7. Effective Coordination Drawings

By “effective” is meant the joint efforts of the craft contractors in developing the coordination drawings so that they indeed become real tools for planning and performing work with minimum conflict between the trades. But it also means that the drawings will actually be used by the trades. So often, trade contractors just disregard the coordination drawings and build from the construction drawings because this “is the way we have always done it” or because they may not have confidence in them. This is the world in which we now live however: develop those coordination drawings on a timely basis, make sure they are accurate and then follow them. It is no longer 1980.

8. Be Obsessed with Supporting the Field

The field is where my risk and my opportunities lie. The home office of a construction company is going to be obsessed with supporting its field operations, with the equipment, information and other resources it needs when it needs it. On a pump storage facility in South Carolina years ago, the above ground contractor responsible for excavating the reservoir and the roads was eventually terminated, not because of the quality of the work or the excellence of its personnel. Its equipment was shoddy, had come from another job and was worn out. The delays caused by its lack of productivity and the amount of down time was insurmountable and eventually the contractor had to be removed from the site. Often

we see in daily reports field personnel actually begging for additional resources to complete the work properly and on a timely basis, with no response from the home office. And yet guess who gets screamed out when the project loses money and is not complete on time. The field personnel are the customers of the home office and should be so served. When they are not, productivity suffers.

9. The Best of Class

The best craft contractor I have run into is an electrical contractor from the midwest. He did all the things above and more. One that I particularly liked was the monthly meeting with supervisory personnel, each of whom would present his progress for the month, target and actual goals, issues dealt with, and dialogue with other supervisors "best practices" ideas. During this time, families had been invited for the morning and enjoyed a nice brunch, and activities for the children. An award of two would be made for the best performances and those would always consist of something for the family . . .an evening out or a gift the family would enjoy. Then on a quarterly basis, there was a similar get together but only more so . . .and the awards were larger and more valuable. This stimulated some good natured rivalry among the supervisors but also generated interest from the wives who were enthusiastic about their spouses working a few extra hours or doing some planning at home in return for the opportunity for a nice prize. So, this guy had a holistic approach that really worked: hired good people, trained them and continued training, had them set goals and measured them, and then competed with his peers for the best of the class, made them feel a real part of the family, gave them feedback and recognition but also listened to their comments and suggestions, engaged their own families and made them feel like there were a part of it as well. It is called "Leadership".

The foregoing is the tip of the iceberg and is simply intended to motivate readers to *think* about field productivity and to *do something* about it instead of *complaining* about it.