

Article #2 of 12 articles in The Productivity Series.
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Efficiency vs. Productivity.

It is important to understand the differences between the concepts of *productivity* and *efficiency*. While both concepts are important to a company's bottom line, the words do not mean the same thing. If you think that these two concepts are the same thing or have similar meanings, you are not alone. This article will help you understand the meaning of each concept and how they relate to your bottom line. If you are already sure of their meanings and how they are different, then you can skip this article. But for those of you who might want a refresher course, or just don't know the difference, please read on. Failing to understanding the difference between *efficiency* and *productivity* might just be the reason why it seems so hard to take your company's work force to the next level of productivity. So, let me explain the difference.

Efficiency.

Efficiency is a term that we use to describe the amount of effort or energy that it takes to accomplish a certain task or operation. When a process such as construction has many operations happening all at the same time, each operation should be as efficient as possible. Office personnel, for example, develop a system to be efficient when paper work needs to be filed. If this is done efficiently, then a piece of paper is easy to find the next time that you need it. In other words, finding that piece of paper requires a small amount of effort.

Productivity.

Productivity, on the other hand, is a measure of how much work is done in a certain amount of time. For example, how many pieces of paper are filed and retrieved in a day. If the filing process is done efficiently, then the office staff is productive, that is if they can work together as a team. If each staff member has an *efficient* system to file documents, but no other person in the office can figure out what folder the document was filed in, it'll be hard to improve the *productivity* of the office staff.

Now, I'll illustrate this difference between the two concepts from another point of view. Let's use a rope and attach a high *efficiency* motor to a cart that is loaded with spindles that need to be installed on a staircase. Turn the motor on and little effort is needed by the carpenter to move the cart over to where he is working. Say **another**

carpenter wants to use the same spindles on a different staircase. He in turn attaches another motor and rope to the other side of the cart. Both motors are exactly the same horsepower. Both carpenters turn their motors on and..... An electrical tug-of-war begins. Even though both motors are operating at the peak of *efficiency*, no spindles are being installed. Then we can say as far as this team of two carpenters is concerned, their *productivity* has taken a disastrous decline. What's a supervisor to do in a case like this?

Working Together.

Let's work together now and attach both high *efficiency* motors to the same side of the cart. When the spindles arrive at the staircase, in far less time I might add, both carpenters could work together...one hold, the other nail, for example. *Productivity* soars!

This a vital distinction to make for anyone who is serious about increasing productivity. How do I use this information to increase my company's productivity? Every operation is different. I can only make some recommendations based on my experience in the building construction industry. But with a little imagination and a little thought, you can come up with your own defined specifics to apply to your own unique operation. Let's look at a few ways that new innovations in the past have made building operations more efficient.

Past Innovations.

The electric motor added to a circular saw blade has been one innovative idea in building technology. Cutting lumber to length is more efficient than it was with the hand saw. Adding a table and rip fence to that circular saw adds to its versatility and makes ripping lumber or trim stock much easier and more efficient than the hand saw. Motorized drills, planes, jointers, routers, reciprocating saws, jackhammers and screw guns have all reduced the amount of energy that it takes to perform the tasks that are required to get the building job done. Even the introduction of the retractable tape measure has made the action of measuring more efficient. So, if these tools have increased efficiency so much, can we increase efficiency even more? The answer is a resoundingYes!

Where Do We Start?

If you have read my article entitled ... Why is Productivity so Important? ...you would have read that ... it is the little things that can eat you up . This could not be more true than when using these modern, electric tools. There are many ways to become more efficient when using these already super efficient tools. The following is a list of things that you can do to add up to 150% efficiency to the normal operating benefits of existing building trades equipment and tools.

Here are a few easy tips that could increase efficiency by at least 20% over all. These tips are simple, yet very effective. These items are often ignored or overlooked on most jobs. I'll take a look at the numbers a little later. Ask yourself if you are guilty of overlooking the importance of any of the simple things on this list.

- Use sharp circular saw blades. Including table saw blades.
- Keep blades free of pitch, tar and grime. This reduces friction on blades.
- Make sure that blades and guides are properly aligned and adjusted.
- Lubricate moving parts regularly.
- Discard or even better, recycle warped and damaged circular saw blades.
- Sharpen or replace utility knife blades, chisels and planer blades often.
- Sharpen or replace even slightly dull drill bits.
- Maintain cords so that bad electrical connections don't cause delays.
- Maintain an electrical repair kit on site for cords and cord ends.
- Maintain extension cords and three-ways on a regular basis.
- Have enough extension cords for the whole crew plus spares.
- Keep spare tape measures and pencils on hand to replace broken ones.
- Supply an **AMPLE** amount of power tools to the job. (This may sound a

little extreme, but realistically, I have personally observed that this one adjustment in thinking could positively impact most bottom lines beyond belief, trust me.)

Numbers Tell The Tale.

Let's take a look at one example of the numbers associated with just one capital purchase ...a new table saw for a crew of 8 carpenters. I was recently observing work flow conditions on a job while the carpenters were doing finish carpentry work. There were 10 carpenters on this job that day. There were only 4 table saws on the job. 1 of the table saws had a burned out motor, so there were only 3 saws available. The guys were a little disgruntled because the supervisor on the job said that there wasn't money in the budget for a new table saw. To compound this problem, one of the remaining three table saws was also used as a router table. The trim detail required a cap that was being milled on site with this saw. During the time that the milling operation was going on, sometimes 2 to 3 hours at a time the number of table saws available for use had now dwindled to 2 saws. As a result, lines would form at the remaining 2 saws sometimes three men deep. On average there was a ten minute wait time, then 5 minutes of talk time per waitee . This went on twice an hour for most of the rest of that day. Let's do the numbers and see what would happen if this condition existed day after day.

New table saw.....\$1000
Will last 2 years..... /2
Cost per year\$500

3 months for this job...../4
Total cost for job\$125

2 carpenters losing 2 hrs/day.....4hrs (conservatively speaking)
Carpenter wage.....\$30/hr
Loss in one day\$120

Work days in one month.....21
3 months.....63 days

63 days x \$120/ day.....**\$7560....Loss for the job.**
(No wonder there wasn't money in the budget)

Research... Ongoing!

There is a mountain of research going on right now to improve information technology so that owners can closely track job costs, waste, down time, delays due to material deficits and labor productivity problems. There are hundreds of thousands of pages on the internet studying and analyzing the statistics and comparing figures that quantify the problems. What I don't see in all this discussion, are many concrete plans or solutions to help contractors produce more from their labor forces.

Some Agreement

There certainly is a general agreement that there is a need in the construction industry to develop solutions that will increase the productivity of the crews that work on the construction sites. Most analysts also agree that direct labor, or that labor that is working on-the-job, accounts for about 40% of the total job cost. While administrative and management costs account for only around 15% of the total. (Material costs and design work complete the remaining 45% of the cost for the job). It only make sense that more research and development is needed to develop better ways to perform the hands-on work at the job site. Recently an extensive survey was conducted and a summery of those results is best summed up by the paragraph below. The American Society of Civil Engineers agrees that the greatest potential for improvements in productivity exists within the work force itself, not in better information technologies that govern design and engineering.

The following excerpt is from a website sponsored by the ASCE Research Library, Journal of Management in Engineering. For more in depth reading go to this web page.....link.aip.org/link/?JMENEA/19/78/1.

The study of labor productivity in the construction industry is gaining increasing attention as the industry faces multiple problems related to its workforce. This paper presents the results of a survey instrument applied to determine the relative level of relevance of construction labor productivity drivers and opportunities. Owners, general contractors, electrical contractors, mechanical contractors, consultants, and others participated in this survey. Management skills and manpower issues were identified as the two areas with the greatest potential to affect productivity according to survey respondents. Surprisingly, external factors, which are often cited as a major cause for reduced productivity in the construction industry, were considered to be one of the least relevant productivity drivers. These results suggest that respondents consider the

improvement of labor productivity within their reach and control rather than determined by external conditions.©2003 American Society of Civil Engineers.

Current Trends.

In the past 40 years productivity in non-farm industries has risen as much as 200% according to some studies. While at the same time, construction productivity has continued to decline at rates estimated to be between 2% -6% per year, depending on the sector. The conclusion then is that the construction industry as a whole is lagging far behind other industries.

I am convinced that these trends don't need to continue. The power to gain control of these current conditions is in understanding how to control the factors that affect productivity. Through extensive research and observations over the last 35 years, I have identified 15 key factors that we, as construction supervisors, can work on in order to achieve positive results and increase our overall job productivity.

15 Key Controllable Factors.

I simply want to touch on these key factors below. Since the topics below deserve proper emphasis, I will be covering each one in a little more depth in up coming articles. In the mean time, here is my list of the top 15 areas that we should concentrate on. All of these topics are important as they are interconnected and have to be considered together.

1. Worker's Attitude and Self Esteem.
2. Worker's Stress Level.
3. Worker's Skill Level.
4. Quantity of Tools.
5. Quality of Tools.
6. Condition of Tools.
7. Climate and Weather Conditions.

8. Team Work Orientation.
9. Availability and Storage of Materials.
10. General Organization.
11. Safety Constraints.
12. Crew Size and Flow Paths.
13. Planning.
14. The Portability Factor.
15. New Technology and Communication.
16. Production Systems.

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