Become a Better Superintendent – Learn to Speak Scheduler

Abstract

Field Superintendents are basically integrators. Reporting to them they have direct employees, sub-contractors, and vendors, to name a few. On a day-to-day basis Superintendents are responsible for coordinating the actions of these disparate stakeholders to produce a physical result. Superintendents report to Project Managers who have contractual authority over all the stakeholders who report to the Superintendent. Constant personal contact is not sufficient to accomplish the extensive coordination required to achieve the goals of the project. On the best run projects a network analysis schedule is used to convey the intentions of the Project Manager/Superintendent reducing the need for constant communication.

Given their critical position in the executing organization, what does the Superintendent need to know about schedule preparation and maintenance? How do they ensure their intentions are reliably represented in the schedule so they can be conveyed to the stakeholders that report to them? On a periodic basis are they providing the right information to the Project Manager to understand the state of the project? If the project goes "off the rails" has the Superintendent maintained sufficient documentation to support a claim?

Where Do Superintendents Come From

How someone becomes a Superintendent depends a lot on the size of the company that hires them. Large nationwide contractors sometimes have formal training programs, or at least established policies for how they develop their Superintendents. Among middle size companies you are more likely to find journeyman who move up from the trades, moving from company to company. They may be trade superintendents, or assistant superintendents for a period until they become the lead Superintendent. If they get some formal training along the way, it probably has to do with topics related to safety issues, such as fall protection. Seldom do you find a Superintendent who has formal training in Network Analysis Schedules. More typically they learn about scheduling, "on the job."

The smaller the General Contractor, the more likely it is that the scheduler will encounter the problem Superintendents. Below are two categories of problem superintendents frequently encountered by schedulers:

- The Construction Cowboy – "I know how to build this! I don't need no snotty scheduler. He can't tell me nothin' I don't already know." These guys do not understand the scheduler is there to take some of the load off them. Not tell them what to do. Even worse they tend to employ the "Figure it out as we go," (FIOAWG) approach. They often fail to appreciate they are part of an organization that relies on them for information.
- Secret Squirrel – These guys do not want management to know what they are up to. They seldom last long on a project as they tend to get the Project Manager in trouble. This category of Superintendents also relies on the FIOAWG approach.

The Associated General Contractors (AGC) have attempted to address these issues in some of their course offerings. But there is still a lot of work to be done. A lot of the work is left to the Program / Project Managers.

What Does A Superintendent Need to Know?

The schedule is used for different things by different people. As stated in the Abstract, the Superintendent is responsible for coordinating the actions of numerous stakeholders. If the schedule is to be a useful tool in managing the project and in defending claims, it must reflect the intentions of the general contractor. Further, it must document the progress of the project. This gives the Superintendent a role in virtually every phase of developing and maintaining the schedule.

- Project Planning
- Schedule Maintenance
- Time Impact Analysis
- Claims

The personnel on the ground on a project are not worried about going to court in performing their daily tasks. At the same time, many good management habits that help ensure on time completion will also support the claims effort. Developing a sound schedule that reflects the intensions of the contractor, and maintaining the schedule on a periodic basis that, enables you to anticipate and react to problems will keep you out of court!

Why Are Construction Project Schedules Different?

The first schedules we experience early in our lives are lists of activities with dates or times listed next to the activities. Sometimes we have a parent, or teacher, who writes the events on a calendar. As we matriculate through the school system, we are exposed to matrix schedules. The events or activities are listed down one axis of the matrix with a time scale (hourly, weekly) across the other axis. These are most common in high school and in college, if the rising superintendent advances that far.

Moving to the construction site, the first schedules the young tradesman will see are likely to be two to three week lookaheads. These are often handwritten on a matrix. Or increasingly in the modern era prepared using Microsoft Excel©. These schedules have construction activities listed down the lefthand side. Across the top is a timeline demarcated in days. A bar chart with a bar for each activity extends to the right. The bars corelate with the days the activity is expected to be accomplished. Each week the young tradesman gets a new lookahead schedule. Occasionally the tradesman may see the overall or remaining work schedule. This Schedule will appear in bar chart form, a larger scale version of the lookahead schedule. From the point of view of the tradesman these schedules all appear to flow from the Superintendent. The underlying structure is invisible to the tradesman. When this tradesman gets promoted to a craft lead or assistant superintendent all they know about schedules is what they have seen to that point.

At this point in the evolution of the tradesman into a Superintendent, they should be introduced to the underlying structure and algorithms. The Project Manager, scheduler or AGC via their training modules

should take this prospective Superintendent and introduce them to the project network. It should be emphasized that the relationships between the activities represent physical constraints, and each activity is assigned a duration. It is this essential data that is used to compute the dates in the schedule. The point that should be driven home is that project management is not pulling them out of thin air or lifting them off a calendar. The master schedule or remaining work schedule they have seen periodically have an underlying network structure determining the dates.

Project Planning

This stage of developing the schedule is an excellent opportunity to expand the Superintendent's understanding of how the schedule is developed and functions. By involving the Superintendent at this point also helps ensure the schedule reflects the intentions of how the Contractor is going to execute the project. This is a key element in whether the schedule can be entered into evidence in a court of law. It also helps ensure the stakeholders will have faith in the schedule, and not throw it in the nearest dumpster right after the weekly or monthly scheduling meeting. Where the Superintendent is actively involved its likely he/she will have more faith in the schedule and see it as a genuine management tool.

A method of planning popularized in the 1980s employed white boards and post-its. The activity and duration are written on the post-it. The post-its are then arranged in the order that they are intended to be completed. The post-its are also connected by arrows written on the white board. The scheduler then takes the network from the white board and inputs it into the scheduling application. From there a schedule is produced and printed in the form of a Gantt chart. From this point multiple stakeholders can review the schedule and comment, including the Superintendent.

This is likely the first time the Superintendent has come in contact with the forward and backward pass algorithms, the engines that create the schedule from the network. Conceptually, the Superintendent likely has a sense of what "float" is. They have experienced its physical reality on the job site. At this point they can come to understand "float" has a mathematical definition that flows from the "Early" and "Late" dates that are computed by the algorithms.

The term "Critical Path" is thoroughly overused and abused throughout project management. Many stakeholders on a project will arbitrarily refer to an activity as being on the critical path, without any actual understanding of the true meaning. This is a good point to introduce the concept of the "longest path" trough the network as the proper definition. In the Superintendents role as the onsite coordinator a knowledge of the true critical path, and the near critical paths can be invaluable in keeping the project on track and evaluating if "work arounds" will really work or are even necessary. The relationship between the float and the critical path gives the Superintendent another tool to assist in prioritizing the day-to-day activities of the project.

Schedule Maintenance

Superintendents, by their nature are forward looking. Some see the schedule as a checklist, and they perceive that all that needs to be done to update the schedule is to delete the completed activities. The way you check off items on a list. The problem with this approach is that delay most often occurs in the

past. In order to fully understand an impact, it must be documented with actual dates in the schedule and possibly the addition of activities that help define the impact. The Superintendent needs to be trained to understand the need for documenting the impacts. This is most easily done in daily logs, or update worksheets provided by the scheduler. It is more efficient to do this contemporaneously, than to dredge up dates at the end of the month. More accurate also! This process also helps the Superintendent identify the impacts and related activities as they occur.

The concept of the "Data Date" or "Status Date" is another concept that is not well understood. Superintendents who are not well schooled in how schedules work are stunned when they see activities pushed out into the future, and float values turning negative, indicating they will not complete on time. They may be tempted to take actions which will not actually pull the completion date back and will waste valuable resources. If they have a working understanding of the meaning of float and its relationship to the critical, and near critical paths they can apply their resources where they will have the greatest effect.

In the end the Superintendent should understand that schedule maintenance is a closed loop system. Based on the actual dates the superintendent reports, the schedule will be recomputed periodically. The float values will likely change. The critical path may change. How the Superintendent reacts to these changes will often determine whether the project completes on time or comes in late.

Time Impact Analysis

Most stakeholders on the construction site grasp the concept of an as planned /as-built comparison. This fundamental approach is often the first clue that an impact has potentially caused a delay. The superintendent is in the best position to identify an impact to the scheduler and project manager. Notification is frequently an essential element to obtaining schedule relief. It is useful to document every significant impact. This is the case whether you are at fault or some other party. This can give you more credibility with Owner or architect. Further, "Single Sided" analysis can be barred from being entered as evidence in court.

Where more complex means of time impact analysis are required to prove a delay, a good working relationship between the Superintendent and the scheduler are essential. A good relationship begins with understanding. The Superintendent does not need to become a claims analyst, but they do need to know the elements that go into more sophisticated analysis. Often this is as simple as understanding the importance of accident reports and daily logs. Meeting minutes and notices of delay can figure significantly improve an analysis.

Claims

Very few of us plan to end up in court during or at the end of a project. Well maintained schedules with a solid project record more frequently are settled in discovery or mediation. In the instances where disputes end up in court the daily logs of the Superintendent are going to be thoroughly scrutinized, along many related documents, such as meeting minutes. A Superintendent who is knowledgeable in preparation and maintenance of the project schedule will be a better witness where the disputed issue is a delay.

Conclusion

As in most every other field, effective training can greatly improve outcomes. The construction industry relies only to a limited degree on formal training. On the Job Training (OJT) is the most common form of training experienced in the construction industry. This is particularly true of Field Superintendents. The AGC has created a series of courses to address this problem. Similarly, the Construction Management Association of America (CMAA) offers multiple courses for managers. While the AGC program is more comprehensive starting with the most junior managers. The CMAA focuses more on developing Construction Managers, or Construction Project Managers.

This leaves Construction Managers and certified schedulers to fill the training gap for Superintendents. An obstacle is that many schedulers are developed in a similar manner to Superintendents and lack certifications. These schedulers may have gaps in their body of knowledge and defects in their approach to scheduling. Allowing these personnel to train the Superintendents has the potential to make the problem worse.

The American Association for Cost Engineering (AACE) provides the Project Scheduling Professional (PSP) certification and the Project Management Institute (PMI) provides the PM I-SP specialty certification for project scheduling. These people are not widely available and are most often found in consulting firms. A short course in how to use the Primavera© family of products, Asta Power Project© or Microsoft Project© does not certify someone as a scheduler. These courses are, at best, an introduction to the processes and procedures for developing a project schedule.

Where certified trainers are not available there is one more option. The AACE-I has an extensive library of recommended procedures. Make some of these required reading for your Superintendent. Maybe your scheduler also, if they are not certified.

- RP No. 23R 02 Identification of Activities
- RP No. 24R-02 Developing Activity Logic
- RP No. 30R-03 Implementing Project Constructability
- RP No. 48R-08 Scheduling Claims Protection Methods
- RP No. 53R-06 Schedule Update Review – As Applied In Engineering, Procurement, and Construction

As certified scheduling professionals we need to reach out to local General Contractors and Construction organizations identifying the problem to them. Then offer them opportunities for training of their superintendents.