# The Secret to Short-Interval Scheduling

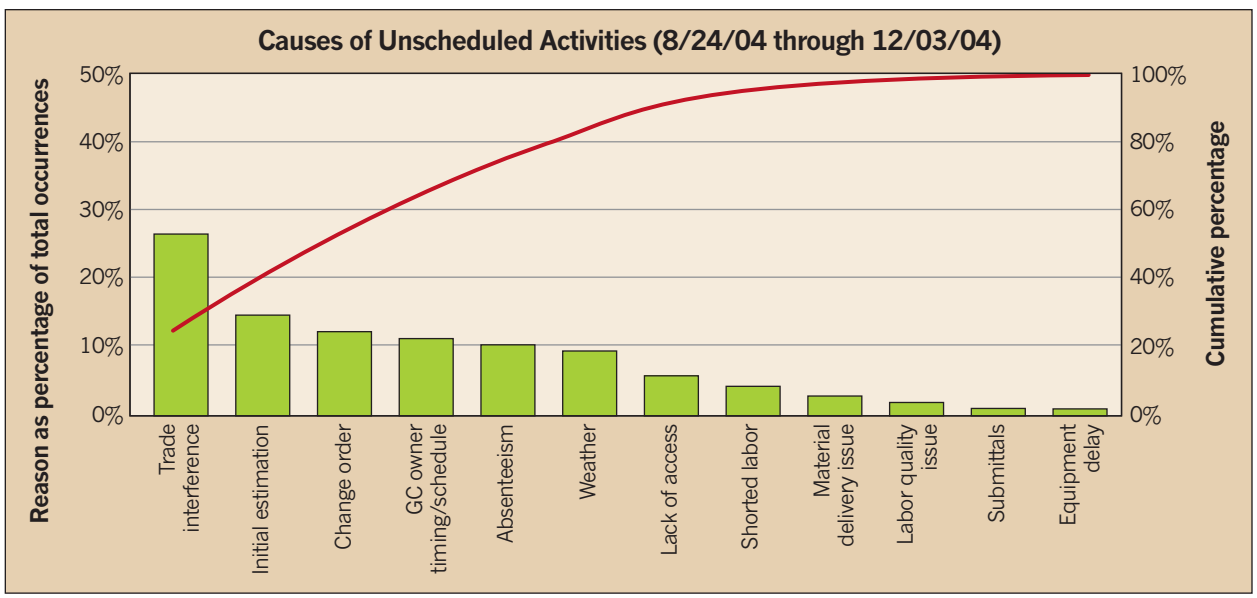


**Fig. 1.** Sample of data from four jobs on reasons why the foreman cannot work his planned schedule.

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When the project manager asked the foreman what he'd accomplished that day, the foreman answered with a slight hesitation. "Well, I installed the pipe on the second floor for the fire alarm, terminated the systems on the first floor, and worked on some other stuff," he said. "Why do you want to know?"

The project manager justified what prompted his inquiry, explaining that he was just wondering if the foreman would need the switchgear this week or if he should ask the distributor to hold off. Next, he asked if the foreman had already put the pipe in the slab. "No," said the foreman quickly. "They wouldn't let us on the floor; I think the concrete was not poured as the GC planned."

"So essentially, you didn't do what you were planning on doing," asks the project manager. "No, I had to move my guys around to keep them busy when I found out this morning that they had a problem with the concrete," said the foreman with mounting frustration. "They naturally did not tell me about it until this morning, and I could not get a hold of you to let you know what was up."

Agitated by this time, the foreman added, "I can't tell you how much time I have lost on this job because of the area not being ready or accessible. In addition,

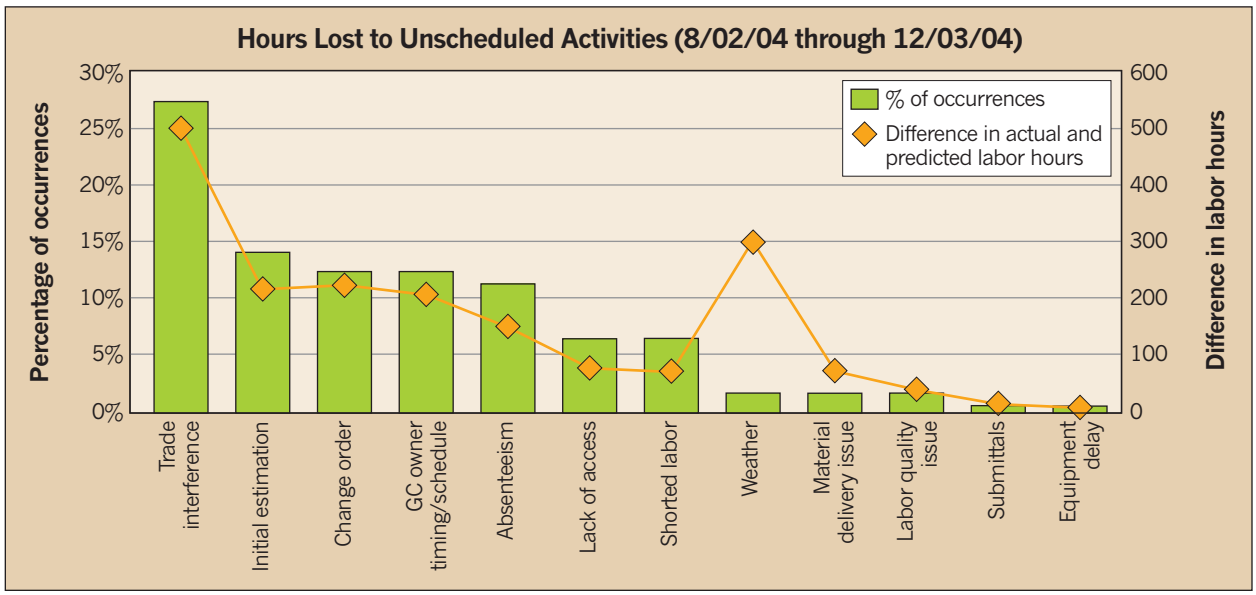


**Fig. 2.** Impact of unscheduled activities in lost hours.

what's up with the distributor? Any time I have to move my guys to do something else, I am out of material and can't get these guys to get me what I need when I need it. We need to have four times as much pipe and wire on this job so we can have the material when we can't work in the areas we want. I am also not getting the tools I need when I have to move my guys."

After listening to the foreman's grievances, the project manager casually asked the him one last question before walking off the job site. "By the way, what is your plan for tomorrow?"

Although he had every intention of putting the pipes in and terminating some more, he answered curtly, "I really won't know until I get here!"

If this situation sounds familiar, you're not alone. According to a multiyear nationwide survey conducted by MCA Corp., Flint, Mich., job-site delays are a common complaint among contractors across the country.

**Survey highlights.** When asked to name the top 10 reasons that cause nonproductive activities, the majority of foremen surveyed noted that they're always being held up by someone or something not being available on the job site (**Table** on page C36). Taking the research a step further, the answers shown in the Table were also compared with hundreds of actual job-site observations for validation. Although the observations do confirm the activities, they do not validate the factors' impact importance or ranking.

To help further clarify the situation found on most job sites, MCA observed four jobs over a four-month period, ranking the impact of the activities based on the hours lost due to the activities' presence (**Fig. 1** on page C32). The labor-hour cost impacts of these activities are shown in **Fig. 2**. The main difference between the survey results and the observation is the ranking of importance of the factors.

This difference can be explained by the way people typically respond when explaining events that take place around them. For example, when foremen respond to the survey they do so with the executive part of their brains. Their answers migrate toward the tangible items and activities they think the owner or the project manager will respond to. The intangible parts of the activities, such as access to the area or trade interferences, are much harder to explain when the foremen are asked an open-ended question about lost labor hours.

As indicated in Fig. 2, the lost scheduled hours for this period of observation for trade interferences alone was more than 500 hours. However, if the contractor did not have feedback of what the foreman sees daily, this fact would be completely hidden to the organization, even if the electricians on the job site were well aware of it. Without this type of observation, the foremen would just write this off as typical job operation issues and deal with the frustration. In MCA's experience, the magnitude of the intangible reasons for lost productivity could be as high as 50% of the labor hours allocated to the job, depending on the difficulty of the production environment.

One way to counteract the ill effects of such job-site delays is to implement a short-interval scheduling (SIS) strategy.

**Just like clockwork.** Although SIS helps correct the gap between the job-site realities and incorrect information flow to the office, before the mechanics of SIS can be explained, the principal difference between scheduling and planning must be clarified.

A project *plan* describes what needs to happen, whereas the *schedule* defines when it will happen. Schedules are made to manage change on the project; plans, on the other hand, do not change as often. MCA's data show that, on average, up to 70% of construction job schedules will change. Plan changes, however, which will be noted as a change order of one kind or another (additions, subtractions,

| Day | Task | Scheduled time | % complete | Reason for <100% complete | Scheduled hours lost |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

**Reason codes (Why couldn't I complete my schedule?):**

1. Other contractors in the way
2. Weather
3. Not having material when we need it; not having the right material
4. Material ordering practices
5. Not having rental equipment in the place we need it
6. Manpower — getting the guys on-site
7. Manpower — having appropriate skill level
8. Preparing areas for other contractors, or our own subs (not known ahead of time)
9. Waiting for other subs
10. Engineering design — design not done
11. Other

**Fig. 3.** Sample format for tracking short-interval schedules.

or replacements) will add to an average of 30% of the total job value. Schedules are made to change, whereas plans are milestones of deliverables. If a building should have 10 bathrooms, it will have 10 bathrooms. If the number reduces to nine or increases to 11, it is recognized as a change order. But *when* they will be built is what the schedule shows. The difference between scheduling and planning is very subtle — to the point that the field personnel avoid planning due to schedule changes.

SIS is a *scheduling* tool, not a *planning* tool. It relies on a three-week look ahead and the overall plan created for the electrical installation of the job. It is a feedback mechanism that will enable the project manger to have an early warning signal for the overall project progress, keeping up and tabulating the impact of the scenario mentioned at the beginning of this article.

SIS's power comes not from projection but from tracking the intangible obstacles that block the labor to be used as scheduled, according to the job's short-term need (daily), mid-term need (next three weeks' plan), or long-term need (overall plan). Each of these events can be used to schedule the daily activities of the field labor. By doing so, the reasons for reduced scheduled installation hours become visible. Because the job's needs changes every day, the foreman should have the flexibility to respond to the daily unforeseen changes.

First and foremost, the daily schedule is what needs to be done today, tomorrow, or the day after tomorrow (**Fig. 3**). Some of these tasks may be future tasks that the project plan does not have scheduled until later in the job; however, if the foreman has an opportunity to flatten the manpower loading curve by pulling some tasks ahead, he definitely should have the freedom to do so.

The project manager should make sure to review the task completion shown in SIS against the project schedule, and invoice ahead of schedule for work completed early. If future tasks have been scheduled early by the foreman, the project manager can reference the three-week look ahead and schedule more tasks accordingly. He can also add any other project planned-schedule tasks to his three-day schedule.

To create the SIS from scratch, the project managers, department managers, and the owners should start in the field. Start with asking your foremen what tasks they are going to complete each day for the next three days, who is going to work on them, and the scheduled time for the activity. Once the data is collected, it needs to be ranked and plotted to identify the obstacles foremen are facing. **EC&M**

| The Top 10 Most Costly Causes of Nonproductive "Wait Time" | |
|---|---|
| **1.** | Waiting for material – warehouse or off site |
| **2.** | Waiting for tools and equipment |
| **3.** | Waiting for equipment breakdowns to be fixed |
| **4.** | Rework due to design, prefabrication, or field errors |
| **5.** | Interfacing with other crews |
| **6.** | Overcrowded work areas |
| **7.** | Work place changes |
| **8.** | Waiting on permits |
| **9.** | Waiting for instructions |
| **10.** | Other delays, the most common of which is waiting for scaffolding to be put up or taken down |

Foreman's perspective of leading causes of nonproductive time on job sites.

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