Management of CPM Schedule Submission

By Ron Winter

A very dangerous misunderstanding exists in the construction industry that needs to be corrected. Project Owners and many professional Construction Management firms are still of the mistaken opinion that a CPM schedule submittal exists of several pages of listings and/or a plot or two. Ask any Claims Analyst, and they will tell you that you "have ahold of the wrong end of the horse." A CPM Baseline Schedule or Update Schedule consists of the computer files necessary to recreate the schedule. Everything else is just expensive frills; sometimes very expensive.

A modern Critical Path Method (CPM) schedule consists of four discrete items. If you are missing any of the four, you can't be assured that the schedule you are looking at is the same one as the Contractor submitted.

First of the four is the Activity description including the original and remaining durations, and percent complete. In conjunction with this, you will often see other computed information such as early and late computed start and finish times and various types of floats.

Second is the logical relationships that connect the various activities together to form a 'network' which makes a CPM work. In some cases, the four different logical relation types can be discerned on graphical plots but lags and leads (imposed time durations between activities) cannot. A listing of all of the logical relationships is a standard review submittal, at least for Baseline Schedules.

Much less well known is the third factor, constraints. A Scheduler can override all other duration and logical relationships by specifying various constraint requirements toward an activity. He or she can artificially reduce total float, create an invisible delay, or even have the activity just expand to take all available time. This will never show up on a plot and is only found in a Constraint Listing.

Lastly, each activity will also have invisible codes assigned to it by the Scheduler, which help define the intended workflow or project organization. For example, three activities, all titled "Prepare Foundation" are quite confusing until you discover that each is coded so as to refer to different areas in the project site. Resource and cost codes and values are also often stored inside and shed a lot of light on the intention and progress of the project.

So now you say, "We have the listings of the four items mentioned above, can you analyze them and tell me if there was a delay on the project?" Not quite. The amount of data involved is usually quite massive and no Analyst is smart enough to become 'a living schedule.' We are going to have to try to reconstruct the schedule first. I have reconstructed schedules from parts or all of the above data with various degrees of success.

Here is a tip for Contractors who don't like to fight fair. If you want to make a schedule practically useless to a Claims Analyst, print it out a listing sorted by some computed value such as Total Float or Early Start. Don't include a predecessor/successor listing (or sort this also by a computed value.) Don't list constraints used with the activity. Don't print out a calendar listing. Don't include a backup diskette. Follow my advice, and it is practically impossible to recreate a schedule under these circumstances.

But here is the rub. Once you have recreated the schedule, can you swear in a Court of Law that this is the same schedule as was used by the Contractor those many months or years ago? How do we know that you didn't make a mistake, missed or misunderstood some ever-important piece of logic or constraint, or even purposely misled us in your recreation? Can you prove that this schedule submitted here is identical to the original? (The trial goes downhill from here.)

You need the original files. There is no substitute. At the time of the submittal, you need to 'open' the files to confirm that the data is readable. You need to leave the originals untouched and analyze a copy of the files. Then you can prove that the basis of your analysis is on firm grounds.

In fact, you do not need any of those listings. With the original files, you can recreate your own. And why would you want to create your own when the Contractor typically produces them? Security and cost are hugely involved.

Listings can be faked. Plots can be altered. The only way to be sure of what you are reading is to list and plot for yourself. We have all been too trusting in the past. Although I have yet to see such instances, the Contractor can now make the computer "lie" without any special programming skills. It no longer takes a 'whiz kid' in order to doctor reports in a way that cannot be traced. That's what they mean by "User Friendly."

In addition, you can save money. The Contractor is not providing those listings and plots for free. You pay for them in General Conditions. I bet that with the typical Owner's or Construction Manager's resources, you can prepare more informative presentations at less cost than your Contractor. Save the money and only include the requirement of a schedule backup in your next project.

There are a lot of advantages of only requiring a backup copy of the schedule instead of paper. Electronic submittals of schedules will give more timely submittals and cost the Contractor less. It is easier to reject a schedule and ask for a resubmittal if listings and plots are not involved. You can code and arrange the output to be more useful to management. You can even use the Internet to speed up the delivery process.

My last point is that modern Schedulers don't read listings, even if they have them. How comfortable are you that your Scheduler will find that a specific activity changed the scope of work when the description is buried on Page 111 and the logic is shown on Page 284? You have a computer, use it.

Whenever I get a schedule update, I compare it to the previous update with an automated schedule checker program. I use "Schedule Analyzer" (written by myself) but there are others on the market such as "Claim Digger", "COMPSCHD", and "UpdatePro". You still need the smarts of an experienced Scheduler, but by using Schedule Analyzer I have reduced my typical review time from two days to four hours. In addition, I guarantee that I have spotted all significant changes in the schedule. Don't try this at home with paper.