

EFFECTIVE SCHEDULING: A KEY MANAGEMENT TOOL

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THE GOAL OF SCHEDULING IS TO ACHIEVE AN EFFECTIVE, REALISTIC, LOGIC-DRIVEN PLAN TO MANAGE THE PROJECT AND ENSURE ON-TIME COMPLETION.

WHETHER YOU'RE SCHEDULING A ONE-DAY maintenance down, a major rebuild, or a new greenfield facility, effective project scheduling is critical. Techniques may vary by software package, user or company, but the goal of scheduling remains the same—an effective, realistic, logic-driven plan that helps you manage your project and ensure on-time completion. The following guidelines will be useful when developing your next project schedule.

Examples are taken from a recent project in Combined Locks, WI in which Appleton Papers replaced their No. 6 paper machine size press with a new size press. In addition to the new size press, the project involved removal of three after-dryer cylinders to make room for a new air turn and IR dryer assembly; new machine drives, drive motors and gearboxes; and new starch makeup and run systems. **Figures 1-3** show the size press area before, during and after the 21-day shutdown.

CREATE A SCHEDULE

Do it fast

You have probably heard the comment, "We can't issue a schedule yet. We don't know when everything is going to happen!" That is exactly when a schedule will do your project the most good. Management and control can be

enhanced by getting a schedule into the hands of all participants early in the game. When developed in the early planning phase, the schedule can be used to drive the project forward by identifying critical and non-critical tasks—what needs to be done today, this week, or this

month, to ensure that schedule milestones are met. Strive to issue a summary schedule showing engineering, procurement, and installation at a project kick-off meeting.

Figure 4 shows a simple summary schedule that will give team members an idea of the overall plan and workflow, including design deliverables, major equipment purchases, pre-shutdown work opportunities, and the estimated shutdown duration. At our example project kickoff we were able to identify design needed to support an aggressive pre-shutdown work plan that included most off-machine piping, ducting, and electrical work, thus reducing the amount of work that had to be done with the large crews and overtime labor costs associated with the main machine down.

Make it comprehensive

Make sure the schedule you issue covers the entire project duration and shows readily identifiable completion milestones, for example "paper to reel." Only by preparing a comprehensive schedule can you predict how current



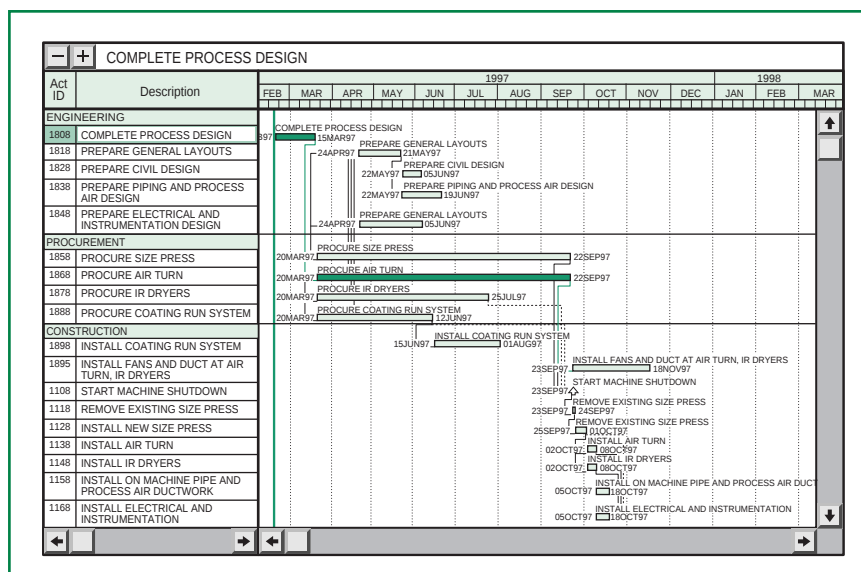
1. Size press area before shutdown, Jan. 16, 1998



2. Size press area during shutdown, Jan. 20, 1998



3. Size press area after shutdown, Feb. 9, 1998



4. Summary schedule of overall plan and work flow

events impact the project end date or important milestones. Schedule slippage happens in almost all projects, but you should be able to predict which slippage is critical and which can be made up at another time with no impact to the overall plan.

Keep it at a summary level

Don't use excessive detail to start, or your schedule will sink from its own weight. Used as a scoping document, a schedule will become unwieldy, and important planning concepts will be lost. Tailor the amount of detail to the audience so that needed information about dates, sequences, and durations can be transmitted efficiently and in a user-friendly fashion to project participants.

Use verb-object-location descriptions

Be descriptive with tasks, starting each with a verb that tells what needs to be done—for instance, release design, order equipment, unpack and inspect a shipment, form

and pour concrete, connect hydraulic lines, pull and terminate power and control wiring. Indicate the location where these activities will take place to eliminate confusion as to which machine section is being worked. Don't count on proximity to adjacent schedule activities to let a user know which work item is being described. Figure 5 gives examples of verb-object-location descriptions.

Use logical relationships to determine dates

All project tasks should be linked together logically, and start and finish dates should be calculated by your scheduling software. Only with a logic driven schedule can you identify critical paths, perform important

“what-if” analyses, and adapt to changing information regarding deliveries or machine shutdowns.

OPTIMIZE A SHUTDOWN

Schedule by the hour

For shutdown planning, most scheduling software packages allow hourly scheduling to verify estimated durations and ensure that enough scheduling control has been factored in to identify problems early. Depending on the length of the down, your planning should allow you to answer the question, “Are we on schedule?” on a daily, per shift, or per hour basis.

By scheduling hourly, you can show the detailed steps of the schedule when it counts the most, when the paper machine is shut down. Figure 6 illustrates the hourly scheduling required during the critical shutdown period of a project.

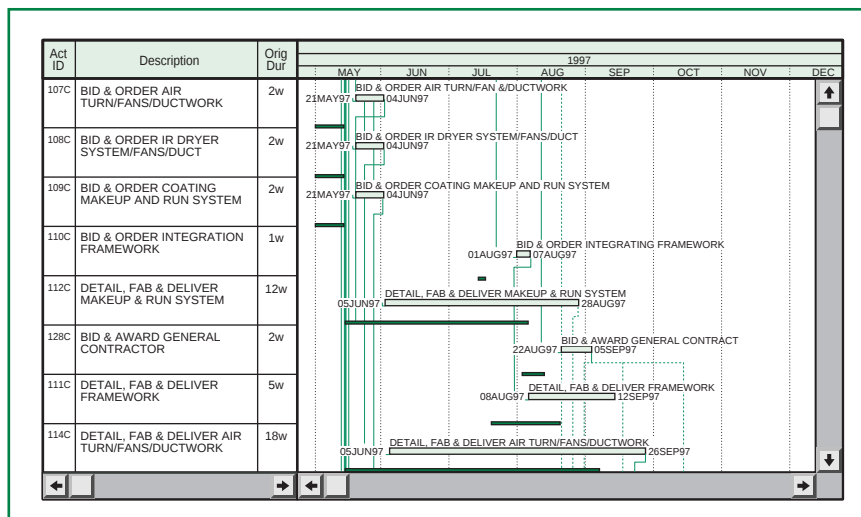
Consider crane usage and access issues

During a machine shutdown, there may be more demand on mill resources not obvious during periods of normal operation. Do consider demands put on overhead cranes, tending aisle space, ramps, elevators and overhead doors to ensure you are not overcommitting any one resource. Schedule activities can be resource loaded in order to identify overcommitments. At Appleton Papers' No. 6 paper machine, the roll storage rails between the reel and the winder were removed solely for access to the back side of the machine for cart traffic used in the removal of demolished equipment and supply of new equipment for installation. While not technically part of the size press replacement project, this work turned out to be critical to the success of the shutdown.

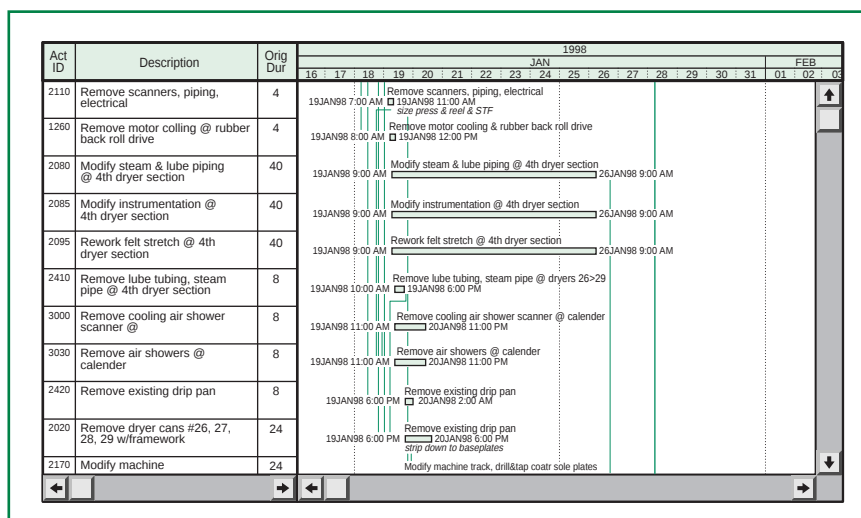
SCHEDULE UPDATES

Do it on a regular basis

Updating your schedule on a regular basis helps you to identify and act upon schedule slippages when they are discovered. A disciplined review of schedule status on a weekly or monthly basis ensures that small variances in the project plan don't slip through the cracks, potentially growing into larger problems later on in the project. Remember that scheduling problems always manifest themselves as budget problems later in the project. It's almost impossible to bring in a project at budget if it goes over the allotted schedule. During their recent shutdown, Appleton Papers used a simple method to update schedule status. It consisted of a large-scale barchart with a stringline which was advanced on a per-shift basis, with activity status indicated by colored highlighter on a per-contractor basis. Highlighting which fell behind the advancing stringline quickly identified variance from plan for all team participants. For obvious reasons, managers don't want to be the ones left behind as time marches on. **Figure 7** shows this low tech/high results tracking system.



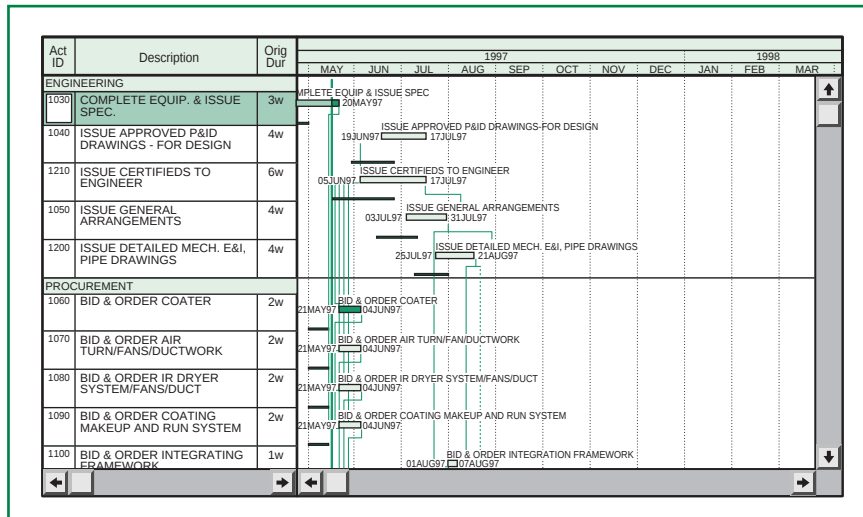
5. Examples of verb-object-location descriptions



6. Example of hourly scheduling during shutdown



7. Schedule status board



8. Schedule status board showing slippage from plan

Highlight variance from plan

Of key importance is how the current schedule varies from original plan. This can be reported using target bars or a calculated end date variance on a per-activity basis. Don't be afraid to let the end date for your schedule accurately show project slippage. Make it a team effort to "fix" the schedule and retrieve the original end date. Recognize that:

1. You had a plan
2. It was not followed
3. A new plan is needed to get back on track.

It is ineffective to "fix" the schedule with each update to cover up for slippage on the front end. The team needs to know who slipped, why, and the resolution. **Figure 8** shows slippage from the plan, with target bars below

each activity reporting their original schedule dates and durations.

Analyze the critical path

Only with a logic driven schedule, one with beginning and end dates calculated by your scheduling software, and based on relationships among activities, can you analyze an updated schedule and determine whether or not a delay in the completion of a task will impact the end date. Some activities can be delayed without a negative impact to the master project plan. If activities are connected by logic, your scheduling software will identify which activities are critical to project success and which are not.

A NOTE ON SOFTWARE

Project management software has become inexpensive and readily available. If your work in project management involves the need for hands-on scheduling, you should invest in scheduling software or become familiar with the software now in use at your company. The learning curve for most software on the market is typically 100 hours of use to achieve effective productivity. Many software development and marketing companies provide one-day or multi-day training in the use of their product. This type of training is highly recommended before attempting a complex scheduling task. TJ

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