THE PANKOW SCHEDULING MANUAL

POLICY, PHILOSOPHY, BEST PRACTICES, & SureTrak

PLAN THE WORK - WORK THE PLAN

Session 1 – Policy, Philosophy, & Best Practices

1. INTRODUCTION

1.1. The purpose of this training and the reason that each of you are here is that there are those in the company who have determined that it is time for you to understand, know, and learn Pankow Scheduling Philosophy, Policy, Best Practices, and the use Primavera SureTrak scheduling software in order for you to perform your scope of work as you move forward with the company. This is a big step for each of you because scheduling forms one of the three legs that support any construction company. Think of it this way. Think of a triangular shaped table supported by a leg at each point. At each point of the triangle there are three major disciplines of construction – Personnel, Estimating, and Scheduling. This is true for all construction companies. Now all construction companies will claim that they have the best people working for them so disregard that for the moment. That leaves only the estimate (dollars - what the company thinks it will cost to build a project and the profit that they will receive) and the schedule (time - how long it will take to build it). If either of those two legs is not fully thought out and planned for then the table crashes. No body wants that! After this training session you will all have a better idea about Pankow Scheduling.

1.2. The course is divided into two training sessions. The first will be a lecture about Pankow Scheduling Policy, Philosophy, and Best Practices. The second session will be a hands on training in the use of SureTrak where you will use what you learned in the first session and apply it to the actual building of a project schedule. Each session will last approximately four hours.

2. SCHEDULE PHILOSOPHY

2.1. Superior project scheduling is an absolute necessity for project success. A well-planned, accurate schedule is no less important than the project estimate and deserves our fullest attention in its creation and execution.

2.2. One of the cultural hallmarks of the Pankow Companies is its exceptional record of timely project delivery. For over forty years and over 1000 projects, the Company has taken great pride in its record of delivering projects on or ahead of the contract schedule.

2.3. It is necessary for the Company to have a well-conceived philosophy and procedure for creating, reviewing and communicating its schedules at each phase of a project.

2.4. The following sections outline the principals and procedures that form the basis for Pankow's approach to project planning and scheduling. It is less a comprehensive "how-to" approach than a review of the issues and reasons behind our approach. They provide a road map while preserving flexibility in selecting a specific path for individual projects.

3. SCHEDULE POLICY

3.1. Purpose

3.1.1. To provide a basis for what type of Schedule should be generated at specific stages of project budgeting, design development, and construction.

3.1.2. To provide a structured approach to developing, checking, and updating Project Schedules for accurate monitoring of job progress and potential delays.

3.2. General

3.2.1. The Company has decided to place more structure and discipline on the way we produce and manage our project schedules.

3.2.2. Who Owns and Produces the Schedule. The Project Team (Sponsor and/or Project Manager and Superintendent) will always remain responsible for producing, updating, and

maintaining the logic of our project schedules. The Corporate Scheduler is there to assist in the development of the Sponsor's initial Budget and Contract schedules as needed.

3.2.3. Once the contract is signed and as early as possible, preferably two months prior to start of construction, the project team will create a hand written logic schedule diagram outlining the flow of work, talk to the subcontractors and suppliers concerning activity durations and obtain any other information needed to produce a schedule. Once the project team has collected the information, the Corporate Scheduler will help the project team set up the first project schedule. Once the first project schedule is set up, the Corporate Scheduler will be available to review updated schedules and answer questions during the course of the project, but the project team will be responsible for updating the project schedule.

3.2.4. Scheduling Software Knowledge. It is not possible for the Corporate Scheduler to understand the detailed changes for each active project every month, plus set up new project schedules. Therefore, the project team needs to become knowledgeable about the scheduling software being used, as soon as possible, with help from the Corporate Scheduler.

3.3. Schedule Types and Ownership

3.3.1. Key Point – Pankow policy states that there are three schedules that need to be built per project. The following types of schedules are to be used as a guideline to establish minimal expectations; actual number of activities may vary depending on the individual project needs. During each phase of schedule development, the Corporate Scheduler is available to assist the team.

3.3.2. The first is the Budget Schedule to be built by the Sponsor, Project Team, or Corp Scheduler depending on who gets to it first. It will typically be based upon calculations using gross quantities and rule-of-thumb durations. It will generally consist of approximately 50 activities with additional activities outlining pre-construction items such as design, permits, etc. This schedule will change as the various schemes (steel frame, concrete, layout, etc.) are investigated to help the owner make critical decisions. This schedule may or may not have subcontractor input. This schedule should include any contractual weather days if they are applicable to the project. These weather days should

be inserted into the schedule so that they are the sole driver (predecessor) to “Substantial Completion”.

3.3.3. The second is the Contract Schedule that may be built by the Sponsor but is more typically built by the Project Team or the Corp Scheduler with input also from Operations and/or Regional. It is an expansion of the Budget Schedule (same schedule – just added to and tweaked) and is built during the Exhibit “A”, or plans and specs bidding process. Once completed and approved, it may be included in the Owner and subcontractors contract depending upon the contract requirements. The contract schedule will be based upon a more detailed review of the quantities and probable durations. It will consist of approximately 100 to 300 activities per building or as many activities that define the detailed steps critical to the completion of the project with additional activities outlining pre-construction items such as design, permits, etc. This schedule should be constructed so that its activities can be rolled up to more reflect the look of the Budget Schedule. Major subcontract trades such as MEP’s, elevators, steel fabricator, precaster, etc. will have input into the schedule’s logic and durations. The schedule must match the contract terms for such things as early milestones, turnover dates, and number of weather days, etc. This schedule will be reviewed and approved by the Project Team, including the Chief Estimator, Regional Manager, and the Operations Manager, during the first review session prior to subcontract bidding for use during the subcontract bidding process. Final review and approval will occur as part of the final estimate review session prior to submitting the proposal to the Owner.

3.3.4. The third is the Baseline Schedule, which again is an expansion of the Contract Schedule.

3.3.4.1. For Design-build projects, as the project design progresses and preferably two months prior to the start of construction, the project superintendent, with the Corporate Scheduler, will produce the first project schedule. The level of detail should be as follows; no activity greater than 20 working days (excluding hammocks/summary activities and long lead procurement items), detailed enough to identify and track each subcontractors scope of work, and all work based on an initial five-day workweek calendar. Typically the site excavation and structural erection activities will be more

detailed than say the interior build out activities because design is mostly complete for that scope of work at that stage of project development.

3.3.4.2. For Design-assist and plans and spec projects, the Project Superintendent, Corporate Scheduler, or Project Team under supervision of the Group Manager will produce the first project schedule per the terms of the Owner's contract for timing and detail. The same rules apply as to level of activity detail. Schedule development will follow design and drawing development and subcontractor buy-out.

3.3.4.3. Completing the Baseline schedule as soon as possible is important to the project team to help secure commitments from the subcontractors prior to contracting. It is preferable to use the Baseline schedule as the subcontractor's contract schedule if possible. Once the schedule is complete, it will be reviewed and approved by the project team including the Chief Estimator, Operations Manager, Regional/Group Manager, and the Corporate Scheduler. Once the schedule has been approved, it will be distributed to the owner, subcontractors, and others. The new construction schedule transmitted to the owner and subcontractors must state, "they have two weeks to review and comment or this is the new Contract Schedule". Once that is established, this new Contract Schedule also becomes the all-important Baseline Schedule that all future work is targeted against.

4. **Terminology** – Scheduling has specific terms that are unique to the discipline and profession that need to be defined now in order to better understand what follows. These terms are underscored and include:

4.1. <u>CPM or the Critical Path Method</u>. CPM is the methodology used in scheduling to determine the longest path or chain of activities or events through the length of a project. To do that all activities must be linked by logic relationships with at minimum one predecessor and one successor except for the first and last activities of the schedule. To do that either manually or in a scheduling software package both a forward pass and a backward pass are performed to determine the longest path which is the critical path and any float on non-critical activities. Be aware that many project schedules can have multiple critical paths depending on the complexity of the

project and the number of contract and interim milestones that drive project completion.

4.2. Gantt/Bar Charts - Gantt/Bar charts are the ones that most of us are familiar with and the type that Pankow will use for report out.

4.3. Predecessors and Successors

4.3.1. Predecessors are activities that drive another activity – they happen before the fact. They must start first but not necessarily end first to drive their successor.

4.3.2. Successors are activities that are driven by other activities – predecessors - they happen after the fact. Again they are not limited by starting before their predecessors finish.

4.3.3. Concurrence. When activities occur at the same time.

4.3.4. **KEY POINT**– every activity in the schedule **must have** either at minimum one predecessor and one successor unless it is a start milestone or the first activity in a project schedule (no predecessor) or a finish milestone representing the last activity of a project schedule (no successor). Without making this standard operating practice you will **not** have a CPM schedule. You will **not** know the critical path and consequently the amount of float an activity truly has.

4.3.5. Lots of times the predecessor and successor activities to any particular activity are referred to as drivers. An activity can have multiple predecessors and successors – some of them are the real drivers – the ones whose logic takes precedence over the others.

4.4. Logic relationships – are the links, either manual or electronic, that tie activities together. There are four of them and include:

4.4.1. Finish-to-Start – a successor can't start until its predecessor is finished. Use them as much as possible.

4.4.2. Start-to-Finish – this one is kind of screwy – it says a successor cannot complete until its predecessor starts. It is the least used and works well if you want to attach an activity to another as a predecessor. The result is that as the successor moves so does this predecessor. It just tags along.

4.4.3. Finish-to-Finish – finish of the successor activity depends on the finish of its predecessor. Don't use a finish to finish with minus lag – plus lag only.

4.4.4. Start-to-Start – start of the successor depends on the start of the predecessor. Don't use a start to start with minus lag – plus lag only.

4.5. Lags – a delay or an offset in time in a relationship assignment usually measured in days. Types of lags:

4.5.1. Positive – e.g. start-to-start +3 – Positive lags are allowed under the new best practices and procedures philosophy.

4.5.2. Negative – e.g. finish-to-start –3 – NOTE: Finish-to-Start relationships with negative lags are again allowed under the new best practices and procedures philosophy. Use them but do not abuse them – use them where they make logical sense.

4.5.3. A lag is essentially an undefined activity. By creating a lag between two activities - say a start-to-start with a 5 day positive lag – what one is really saying is that 5 days after activity A starts, activity B can start because A has completed enough of his scope for the follow on trade, activity B, to start. You could also get the same end result by using a finish-to-start with a minus 5 day lag. In other words 5 days before activity A finishes activity B can start because A has completed enough of his scope of work for B to start. It can also be said that if every lag were defined as an activity, the schedule would become very detailed and large and an update nightmare. There are several schools of thought as to how much detail to contain in a schedule. Typically constructors want little detail, which gives them more wiggle room to complete a task – especially if the task gets out of sequence. Owners on the other hand want lots of detail in order to better track progress and beat up on the constructor if he didn't get that one activity started on the day that the schedule said he should have. The rule of thumb is somewhere in between. There has to be enough detail to track a potential delay and to create a meaningful critical path or true CPM schedule. Big bars of time are meaningless and lots of little tiny ones are an update nightmare and open up the door to getting hammered by the owner.

4.6. Durations

4.6.1. The length of time it takes to perform a given activity in working days. This is the hard one for non-experienced constructors to calculate. Barring that experience, the estimate is the best place to go to figure it out, or get the superintendent, who is managing the work, to help determine the durations and logic – he should have a good idea. Operations also has available for your use "Deans Rule of Thumb", which is a list different phases of

construction and the typical Pankow crew size and duration that it takes to construct them.

4.6.1.1. Original Duration or OD – The original duration given to an activity at the beginning of the project during the schedule development stage. The planned duration that the project team thought it would take to do the task. The original duration is also sometimes referred to as the Baseline duration when used in the context of comparing schedule updates to the baseline or target schedule.

4.6.1.2. Remaining Duration or RD – once an activity has started its remaining duration is the amount of time left to complete the task.

4.6.1.3. Actual Duration or AD – the actual time it took to complete a task vs. the original duration you thought it would take.

4.7. Percent Complete – percent complete is another way of looking at or thinking about remaining duration during the update process. Remaining duration refers to time left to complete where percent complete refers to the percentage of materials and resources to complete. Percent complete is way more subjective than remaining duration unless the project is very sure astute at tracking the install of materials. Typically don't use for that reason.

4.8. Forward and Backward Pass

4.8.1. The forward pass is the process of building the schedule, linking all activities so that all have a successor, and determining the early start and finish dates. The last activity is "Final Completion" (with a pre-determined by contract constrained late finish date).

4.8.1.1. Early Finish (EF) = Early Start (ES) + Duration

4.8.2. The backward pass is just that – in the process of working backwards from the Final Completion milestone – SureTrak calculates the late start and finish dates and therefore the critical path and the amount of float that each activity has.

4.8.2.1. Late Start (LS) = Late Finish (LF)- Duration

4.9. Float and Early Dates vs. Late Dates

4.9.1. Total Float - the difference between late start and early start or late finish and early finish measured in workdays based on the calendar used. It is a measure of the amount of time an activity can be delayed without affecting the finish date or critical path. It is also known as slack or slide time. Project total float is actually

the amount of time (either positive or negative) between the Project Completion Milestone and its constrained date.

4.9.2. Free Float – float that if used, will not delay the early start of a succeeding activity.

4.9.3. Calculating the schedule is the mathematical operation of performing the forward and backward pass. This operation determines the critical path and the amount of float that each activity has. What falls out of this is that each activity has two sets of dates – early dates and late dates. An early start date is the earliest an activity can start. A late start date is the latest an activity can start without delaying its predecessor or the "Final Completion" milestone. The same is true with the early finish date and the late finish date. The difference in workdays between the early start and late start or early finish and late finish is **positive float**. If the early start date and the late start date are the same date (same is true for the early finish and late finish dates) then the activity has **zero total float & free float**, and is on the critical path. If an early start date is later than the original late start date or if an early finish date is later than the original late finish date then that activity has **negative float** and is now super critical. What happens in scheduling software to activities that have negative float is that the late start date now becomes the earliest date that the activity can start or the early start date. The date in the late start column becomes the date that it should have started. The early start column always portrays the earliest date regardless of the float. The Baseline schedule should have a bunch of activities with zero float depending on the number of critical paths. It shouldn't have any activities with negative float. We do not want to be behind schedule before we begin. The activities that make up the critical path are the ones to watch out for and track because they are the ones that will go negative first if the project gets delayed for whatever reason. Once an activity goes negative, the flag is raised to do whatever is possible to bring the project back on track. If the negativity is due to our lack of performance for whatever reason and it is our responsibility by contract, then it is up to us (Pankow) to figure out how to get back on track. If the negativity is due to outside circumstances beyond our control, then we still need to see what can be done to get back on track in addition to notifying the owner that a delay has

occurred that could be compensable by either time or dollars or both.

4.10. Constraints – A forced condition placed on either an activities start date or its finish date. The types of constraints are listed below:

4.10.1. Start Constraints

4.10.1.1. Early Start – Used to place a start date on any activity or Start Milestone that does not have a predecessor. The first activity of any schedule must have an early start constraint on it – it is the project kick-off start date.

4.10.1.1.1.1. Late Start – Rarely used so **don't**

4.10.2. Finish Constraints

4.10.2.1. Early Finish – Again Rarely used – so **don't**

4.10.2.2. Late Finish – used often to constrain a Finish Milestone or activity. This particular activity or milestone can't finish any later than this date.

4.10.2.3. Expected Finish Constraint – can be used in the update process. Can only be used on an activity that has an actualized start date. Note: If you use an expected finish constraint you must remember where you placed them because as an activity that has an actualized start with an expected finish constraint moves to the left of the data date – SureTrak thinks the activity is complete and will place a 100% in the percent complete box but will not place an "A" (actualized) after the finish date. You must do that manually during the update process.

4.10.3. Start Date – **don't** use

4.10.4. Mandatory Start & Finish – **don't** use – their use messes up logic and total float calculations

4.10.5. Float Constraints – **don't** use.

4.10.6. This looks like a lot of don'ts – but don't use them – the only ones you need are *Early Start, Late Finish, & Expected Finish*

4.11. Types of Activities – Tasks, Milestones, & Hammocks

4.11.1. In SureTrak and P3 you have your choice between defining an activity as either a "task" or an "independent" activity type. Independent activity types are associated with resources and imply leveling which Pankow is not concerned with. Go to Tools/Options/Project and at the default activity type prompt, click on Task as the default activity type – and never worry about it again. The template is already set up that way.

4.11.2. A Milestone can be either a Start or Finish milestone. It is typically a start milestone that initiates a project schedule while a finish milestone ends it. There is no limit to the amount of milestones that can be used. Major milestones help break up a project into chunks that can be used contractually for incentive and/or report out. Major milestones are typically the contractual ones. Minor milestones – or pebbles - can be used to initiate work or signify the end of some flow of work that is not necessarily contractual but which drives some other activity. Note that neither SureTrak, nor P3, differentiate between major and minor milestones. If there is a need to do so it must be handled in the code structure. See below under Code structure for a typical set of suggested major milestones. Sometimes there is confusion in deciding whether an activity is a start milestone or finish milestone – especially if it is an interim milestone. For example an interim milestone that is labeled "Turnover Space to Owner for Tenant Improvement Work" could be either a finish or start milestone depending on how you look at it. It is a finish milestone as far as Pankow is concerned – we finished up our scope of work and turned it over to the Owner. The TI contractor and the Owner on the other hand, may look at it as a Start milestone as it is the start of their scope of work. It is the scheduler's decision as to which to call it, and sometimes it is SureTrak itself that decides if for you because of the logic links of the milestones predecessors.

4.11.2.1. Examples of Milestones – a suggested list and their definitions:

4.11.2.1.1. Construction Start - Does not include pre-contract discovery, e.g.;

4.11.2.1.2. First Concrete – the first yard of foundation concrete poured.

4.11.2.1.3. First Steel or Precast – the first piece of structural steel or precast column set

4.11.2.1.4. Building Topped Out – the last piece of structural steel or Precast set
4.11.2.1.5. Building Weathered In – the building is weather proof – meaning weather sensitive materials can now be safely installed
4.11.2.1.6. Curtain wall complete.
4.11.2.1.7. Glazing complete.
4.11.2.1.8. Roofing complete – or at least the first coat of hot mop
4.11.2.1.9. Crane De-mobed – the last piece of equipment and/or material has been lifted and in place and the crane/cranes can come down. This milestone represents a lot of work completed.
4.11.2.1.10. Man-lift De-mobed – a working permanent elevator is in place and operational to replace the man-lift. Again this indicates a lot of completed work.
4.11.2.1.11. Electrical rooms complete, lockable, & permanently lit.
4.11.2.1.11.1. Permanent Power Is On – This is a big on as it means the end of temporary power and now those systems that need permanent power for installation can begin.
4.11.2.1.11.2. Power companies connection to the vault complete.
4.11.2.1.12. Subcontractor Substantial Completion
4.11.2.1.13. Startup & commissioning
4.11.2.1.14. Electrical pre-testing
4.11.2.1.15. Fire & LSS (Life Safety Systems) Testing
4.11.2.1.16. Fire Marshall inspections
4.11.2.1.17. Owners punch
4.11.2.1.18. City Inspections
4.11.2.1.19. TCO – Temporary Certificate of Occupancy
4.11.2.1.20. CofO – Certificate of Occupance
4.11.2.1.21. Elevator testing and inspections
4.11.2.1.22. Punch Lists Complete
4.11.2.1.23. Final Completion

4.11.3. <u>Hammock/Summary</u> Activities. Two ways:

4.11.3.1. In SureTrak and P3, a summary activity is known as a hammock activity. A hammock is an activity that spans the range of however many activities you choose. For example;

suppose you wanted to create a hammock that covered the entire scope of work to build out a floor of interior finishes in an apartment building. To create the hammock, first copy another activity within that fragnet. Highlight the activity so that its information is shown in the view field. At “Type” scroll, using the down arrow, to hammock and highlight it to choose it. Next, using the pitchfork tool in the Toolbar, grab the start of the first activity in the chain of activities that makeup the fragnet and link it to the start of the hammock on a start-to-start relationship. Note that the connection **has** to start with the first activity in the fragnet – not the hammock. Then from the finish of the hammock activity, using the pitchfork, grab the end of the hammock and attach the logic line to the end of the last activity in the fragnet. Again do not start the linkage process by trying to link the finish of the last activity to the finish of the hammock – which is the exact opposite process from the step above, but that is the way it is. Do not use a hammock as a predecessor or successor to other activities outside of the ones necessary to create the hammock in the first place. SureTrak and P3 will not allow you to use hammocks as predecessors or successors to other activities.

4.12. When describing an activity, use both a verb and a noun and give the location. Also use capital letters for the main words. The small words such as “for”, “or”, “and”, etc can be all small caps.

4.12.1. Don’t just say “Doors” say “Install Doors – Level 1”. Or if you need to abbreviate because you have run out of characters in the activity description line (all you get is 43 characters including spaces between words) say “Inst. Doors – L1”. Get creative while still making it clear to other readers.

4.12.2. The reason for including location - if you are building a multilevel building, there will be an “Install Door” activity for each level. If you need to hook another activity as a predecessor or successor to “Install Doors”, and you have 40 of them, and no location in the description, which one are you going to hook it to?

4.13. Loops - At some point in the building of a schedule you are going to hook an activity to another and a loop will occur. This is not allowed and SureTrak will let you know that a loop has been created and will not let it happen. A loop is a logic error where one activity

may be both a predecessor and a successor to another or some variation there-of. Essentially, the logic goes around in circles.

4.14. Fragnets - A fragnet is a fragment (a group of activities) of the project that you are working in, or from a different project, that can be used repeatedly in the project you are working in or, copied and pasted into another project. This is one of the benefits of creating and using a standard schedule template for all Pankow projects. Once we have a library of as-built schedules, we can rob those schedules of the fragnets they contain to help build new ones.

4.15. Leveling. Can refer to two different principles.

4.15.1. Leveling can refer to resource loading of an entire project. To do this, each activity in a schedule or selected summary/hammock activities are assigned resources (worker head count). SureTrak can then take that information and create a graph that depicts the man loading for that project. The graph will show you the total number of resources working that project by week or month and the accumulated totals of each resource. This is a feature that Pankow is not now concerned with for two reasons. One, it usually requires more scheduling resources to manage the data, and two; it implies that the end date can be pushed out. How many projects have you been on where the client has allowed that?

4.15.2. Leveling can also refer to trade stacking. What is of concern here is that you do not want to have a multitude of trades all working in the same place at the same time and/or one subcontractor working his crews in multiple locations in the building at the same time. To prevent that, link like trade/scope activities together with finish to start relationships to even out the flow of work. Doing so will also reduce your total float values to more meaningful numbers. If in the process of linking like activities, the end date of the project moves out, you will need to go in and adjust the lags of the activities you just linked, or the durations of those activities that went critical, or both to bring back the end date.

4.16. The Data Date – the data date is a line through the schedule depicting a moment in time. In the past, before computers, a project schedule would be created on a huge piece of paper and tacked to a wall of the project office. The Superintendent would then move a red piece of string along the time line to point out where the project should be at any given point in time. There were no updates to the

schedule. As long as the scope of work kept up with the original plan then the project would complete on time.

4.17. "As Planned" vs. "As Built". The Baseline schedule is your plan for construction. It is your "As Planned" schedule. As the project progresses and work is completed the Baseline schedule will eventually become the "As Built" schedule. It is a very rare occurrence that the As Planned schedule and the As Built schedule are a one-for-one match in planned dates vs. actual dates.

4.18. Target Schedules. A Target Schedule is also the Baseline Schedule. In SureTrak a switch can be set that creates a whole other schedule – the Target Schedule - in the same data base that is at this point in time an exact duplicate of the Baseline Schedule. This switch needs to be thrown as soon as the Baseline schedule is completed and accepted by All. As discussed above, as the Historical Record is created – each of those schedules can be "targeted" against the Baseline schedule. This is an excellent tool to compare how you planned to build a project vs. how it real got built. Typically the comparison will show logic changes, duration changes, and an overall assessment if you are working your plan.

5. Building and Maintaining the Schedule

5.1. Schedule Requirements & Strategies. The following issues must be considered when deciding when, and how, to schedule and what specific activities are to be included.

5.1.1. If the project is design-build, the scheduler may be required to make duration and logic decisions at an early stage of the design, which may be difficult to change in the future, as more information is available. Much more caution is required in producing the initial schedules. The company frequently contracts for a design-build project with less than 30% documentation. If the project is not design-build, delaying the contract as long as possible helps the team with more complete information for the contract schedule.

5.1.2. Regardless if the project is design-build or not, the company frequently makes critical scheduling decisions prior to subcontract buy-out for each activity. It is important to obtain some input as soon as possible from helpful subcontractors even if the buy-out does not occur for some time. If possible, buy out the work early instead of waiting until just prior to the start of the

work. The subcontractor input will help identify problems early and may give the team time to make changes to minimize the problems prior to starting work on individual activities.

5.1.3. All project schedules must work in conjunction with the procurement log identifying shop drawing, fabrication and delivery times for materials. If not all materials, then the schedule should include at least the long lead items.

5.1.4. Delivery milestone dates for all owner-furnished items, and milestone dates for all owner decisions must be included.

5.1.5. Show Saturday work if the project schedule is based upon working Saturdays so delays can be requested and tracked if Saturday work is delayed.

5.1.6. Drive the subs and the project to the early start dates only.

5.1.7. Make sure the calendar/calendars reflect all holidays (union and otherwise).

5.1.8. Since Pankow owns the float – PROTECT IT!

5.2. Storing Project Schedule Files

5.2.1. This is a recommendation only because each area office has its own system for storing and filing project information. This recommendation is for your individual laptops and PC's. On your C:\ drive create a folder called **Projects.** In that folder create another folder for each project that you are working on.

5.2.2. The reason for the above is because SureTrak (the current scheduling software) does not like retrieving or placing files deep in some file path – in fact it won't do it at all – a Primavera/SureTrak peculiarity. It is best to keep the schedule as close to the source file as possible. For example - C:\Projects/Project Name.

5.3. The Historical Record

5.3.1. It is very important to have and maintain an historical record of the schedules used on any and all projects. The reason is simple but so important – without it in an arbitration or court proceeding you have already lost the case. That is why at Pankow we demand at minimum a monthly update of the schedule for each project regardless if it is a contractual agreement with the owner or not – we demand it of ourselves. It is the only way the state of a project can be understood and its critical path.

5.3.2. At present, with the use of SureTrak, all schedules are allowed a 4 digit name. That name for the Pankow schedule template is WRKG (which stands simply for WoRKinG). Once the template

has been downloaded into the project folder and restored and opened, the process of building the schedule and the resultant historical record can begin. This is how it works as an example:

5.3.2.1. Say that your project is Montage. You, the Sponsor, have just built the Budget Schedule in WRKG. You are happy with the results of your effort and want to release the Budget Schedule to the world. You have decided that you will use MT in MonTage as the first two characters for your numbering scheme. Open up the project and go to file and click on "Save As". A window will pop up and in the box labeled "Project Name" type in **MT01**. Where it says " Type" make sure it says "Project Groups". Hit "Ok" and the project is now saved as MT01. This is now the Budget Schedule and is forever frozen in time. You cannot go into it and tweak it. If you need to tweak it down the road sometime, you must go back into WRKG and do it there. Exceptions: If you need to tweak it and have yet to release it, you can go into WRKG, do your edits, and re-save it as MT01.

5.3.2.1.1. The Sponsor and Operations will now build the Contract Schedule – but **NOT** in MT01 – but in the original WRKG. ALL work is always done in the WRKG schedule. They will add to, and further refine the Budget Schedule to create the Contract Schedule. This schedule needs to be a well thought out schedule. When that effort is completed – WRKG will be Saved As, **MT02** – and that schedule again is frozen in time. MT02 will forever be the Contract/Exhibit "A" Schedule. Anything and everything used to build and update the schedule needs to be saved. This is the paper trail and the process for protecting and documenting Pankow's efforts. Not only should the schedule be backed up to a disk and stored in the file, but it should also be backed up to a storage CD on the Network for the historical record.

5.3.2.1.2. Now it is the Superintendents & Corp. Schedulers turn to work on the Baseline schedule also know as the Master Project Schedule. This schedule needs to be built regardless of the fact that the complete scope of the project may not be known and 20% drawings may be the only ones available. This is one of the peculiarities of the Fast Track Design/Build schedule development process.

Upon completion of this effort, WRKG gets "Saved As" **MT03** and is now the **Master Project Schedule**. This is the schedule that all subsequent progressed schedules will be targeted against. This is the schedule that Pankow takes to the Owner and the Subcontractors and declares the plan for building the project. This is the schedule that the Subs are held to – even if they were not around to help build it. And likewise, this is the schedule that the Owner is going to hold Pankow to. This is the big Kahuna of schedules. If at some future time Pankow radically alters its means and methods on a project somewhere down the road in the construction cycle, then we will need to create a new Baseline schedule. That schedule would **not** be named **MT03 (but the next number in the numbering system)** and in the comments section of the "Project Overview" window would be so noted as the second Baseline schedule for the project.

5.3.2.1.3. To Recap. No matter which project you are working on, and as schedule development progresses; the Budget Schedule is XX**01**. The Contract Schedule is XX**02**. The Baseline schedule is XX**03**. The first update of the Baseline will be XX**04**, and so on. Every monthly update will increase the numbering by one. That gives you about eight years worth of numeric updates before you have to go to alphanumeric numbering.

5.3.2.1.4. Another Way – Recent projects have devised a new and easier way to number their respective schedules. They still use the WRKG schedule as their working schedule but name their updates by using the month and year of the update. For example if you were going to create a monthly update for July of 2007 you would save WRKG as 0707, the August update would look like 0807 and so on. It is up to the project team to decide what system they prefer to use – as long as they use one of them or some other way and it is consistent.

5.4. 3-Week Look Ahead Schedule. Each week the jobsite team will create a 3 Week Look Ahead Schedule, on a white board at each jobsite conference room that details the activities each trade must accomplish. The 3-week schedule can be built in any software package as dictated and desired by the project team. It should be

published and distributed to the main office of each subcontractor weekly. The project team will complete each weekly 3-week schedule prior to the weekly subcontractor meeting where it is presented and discussed. The 3-week schedule must always be compared to the most recent project schedule to assure they both agree. It is not our intent to divide the project schedule into as many activities, or to be as detailed, as the 3-week schedule should be.

5.5. One schedule and How To Do It - The philosophy, policy and the intent in building the schedule is to be vigorous with the schedule in the beginning phases of its construction. In other words, the excavation/site prep, foundations, structural erection, roof, and exterior finish phases should be well developed and tight in terms of logic and duration of activities. The follow on phases such as interior finishes etc. is where logic and durations can and should be adjusted to build in float time/contingency with out being too obvious. The result of doing so puts pressure on the subs to perform to early schedule phases so that if something does occur that starts to eat away at the float it is not the follow on trades who have to compress their schedules to recover.

5.5.1. Always build a schedule that will set up a project for a win. Doing so will automatically help build in time to help offset delays.

5.5.2. The following is a list of ways to build the schedule;

5.5.2.1. If for example you calculate that it takes 8 days to cycle a floor pour – make it 10 days – don't back yourself into a wall. If, as the floor pours progress, you determine that you are getting it done quicker, readjust the logic and durations to match the actual field conditions.

5.5.2.2. Lags can be adjusted to create time also.

5.5.2.3. Typically one of the last activities of a floor build out is to punch it. So concurrent with the last activity for a particular floors completion, create the following set of activities with the associated durations in ().

5.5.2.3.1. "Pankow Create Scope Completion List" (5 days)

5.5.2.3.2. "1st All Trades Correct Scope Completion List" (10 days)

5.5.2.3.3. "1st Final Clean" (5 days)

5.5.2.3.4. "Owner/Pankow Punch List" (5 days)

5.5.2.3.5. "2nd All Trades Correct Punch List" (10 days)

5.5.2.3.6. "2nd Final Clean" (5 days)

5.5.2.3.7. "Owner Signoff of Punch List" (5 days)

5.5.2.3.8. That set of activities or fragnet when all activities are linked on a finish-to-start relationship accounts for a total of 45 working days. There are instances on certain projects where those 45 days are needed to do just what the activities describe. In many cases though those 45 days are not needed and the durations can be reduced and to accommodate the need to use them somewhere else in the schedule.

5.5.2.4. Create a milestone called “Subcontractor Substantial Completion”. It may not be a contractual milestone between Pankow and the Owner, but we can sure make it one between Pankow and the Sub’s. The milestone should be driven by any and all actual scope of work activities performed by the Sub’s that are at the tail end of the project – excluding as noted above.

5.5.2.5. On the Mechanical and Electrical side of things, insure that the durations for startup and commissioning and Fire/LSS activities are long enough to get the work done.

5.5.2.6. Weather Delays. If in contract negotiations, X number of weather days are agreed upon and contractual, add them as an activity as the sole driver to Substantial Completion. In other words all scope of work such as the commissioning activities and punch list activities should be a predecessor to those weather days and the only successor to the weather days is Substantial Completion. Move the weather days back into the schedule as the need to use them becomes necessary. There is more on this later.

5.5.2.7. The question that you all may have is now that I have built my schedule, which dates do I drive material and equipment deliveries to? The answer is drive them to the as planned early start dates – because right now that is all you know. If in fact you perform a “win” and beat the Baseline schedule, your 3 week look-ahead schedule should reflect that and flag the fact that you may need material and/or equipment sooner than planned and then react accordingly.

5.5.2.8. The bottom line is, be creative, without being obvious in creating a realistic/doable schedule. That way if Mr. Murphy shows up you will be ready for him.

5.6. The Monthly Updating Process.

5.6.1. Move the Data Date forward to the desired date. You can move it forward of the actual/today's date if you want to, and status the schedule as of that date – where do you expect to be in say 3 days.

5.6.2. Remaining duration – the number of days left to finish an activity that has an actual start date.

5.6.3. Percent complete – what percent complete is an activity? This can get real nebulous if the person making the update is not real familiar with the activity in question. It is a guesstimate at best - unless someone is really accurately tracking unit quantity installation. Typically the least accurate update method.

5.6.4. Update monthly at a minimum and keep adding to and adjusting the schedule, as more information is made available.

5.6.5. Make it easy on yourself – The update process can be a painful chore or it can be a piece of cake – it is up to each owner of the schedule as to how they want to approach it. My suggestion is to make it a practice and a habit to carry around the schedule with you as you make your rounds inspecting the work that you are responsible for installing. As you see line items in the schedule actually starting or finishing, make a note of it on the schedule in your back pocket. As you make your daily rounds you should be mentally keeping track of project progression. Take that awareness to the next step and record it in the schedule in your back pocket or better yet, make it a daily practice to update progress directly into your PC. Then when it comes time to do the update, all the information you need to do it, is right there – it's all done. To try and remember a month later when an activity actually started or finished or to go through your daily logs or daily pictures to find those dates is a real chore and the main reason that schedules don't get updated accurately or at all. The prevailing mindset of the field is to worry only about what is about to happen or not happening rather than what is done. Once an activity is complete it is out of sight and out of mind. It is up to you and how much of a glutton for punishment you are as to the manner in which you manage your schedule. It is important for the historical record and for any future like projects, that the information in the schedule be accurate. **Don't** wing the dates just to satisfy schedule requirements and/or Operations. It's the old garbage in = garbage out syndrome.

5.6.6. To insure that schedules get updated on a monthly basis, it is now going to become company policy to include an updated schedule and monthly narrative with projects monthly JCR Report that is submitted to the Operations Department.

6. Best Practices

6.1. The Schedule Format:

6.1.1. All schedules are to be built to conform to a true CPM (Critical Path Method) Schedule using best scheduling procedures and practices to include but not limited to the following:
6.1.2. Software – Primavera SureTrak version 3.0c or P3.
6.1.3. Project to be calculated using Retained Logic.
6.1.4. During the update process, “as planned” logic is to be changed to “as built” if in fact logic has changed.
6.1.5. Pankow encourages the use of Finish-to-Start relationships with no lags as much as practicable, possible and realistic. However: Finish-to-Start relationships may also use negative lags.
6.1.6. No open ends – every activity must have at a minimum, one successor and one predecessor. The only exceptions are the very first activity of the schedule, with no predecessor, and the last activity, with no successor.
6.1.7. The **very** limited use of constraints. If there are no open ended activities, then there is no need for the use of constraints, except a start constraint to begin the project and a late finish constraint on the last activity of the project to determine and lock in the critical path and contractual end date.
6.1.8. No activity duration greater than 20 working days or the reporting period as defined by the calendar except for long lead procurement items. This is important because if a duration is too long for a particular scope of work it will be impossible to understand just what the percent complete or the remaining duration of the work - once the work has started – actually is during the monthly update process. Now the Subs love activities with long durations because it gives them wiggle room to get the work done. Owners on the other hand like activities with short duration so that they have a better idea of the real state of completion of the project and they can nail you if you miss getting something done when the schedule says that it is supposed to

be.

6.1.9. The schedule calendar will depict a typical five day work week with work and non-work (holidays and other Union non-work days) defined in the calendar for the duration and time frame of the project.

6.1.10. The schedule will be built using enough activity code structures and values to properly define and describe the project. Activity codes are a function of the software so when it is time for each of you to take the software training class codes will be further explained then.

6.1.11. The schedules and updates will be saved in the project files located on the project and company server.

6.1.12. At all times and during each phase of construction, there is only one project schedule.

6.1.12.1. This is a key point and very important. In the past and in the construction industry many General Contractors – including Pankow in the past - practiced the use of maintaining two schedules – one to report that state of a project to the owner and another to report the state of the project to its Subcontractors. The two schedules may have contained the same content and scope of work BUT were very different in their reporting of real dates. The schedule given to the owner was typically painting the rosy picture that all was ok on the project when in fact it may actually not be that way at all. The schedule given to the Subcontractors on the other hand showed dates that were very aggressive (the earliest start and finish dates) in order to get them to do their work soonest – especially if the project was delayed for whatever reason and the fault of the delay was the GC's. If there is a delay on a project – whether the GC's or the Owners – it is a very safe bet to say that the project could very likely end up in arbitration. If it does, and the arbitrator through discovery finds that these two schedules existed he will immediately through the case out because "the truth" has been distorted – in other words – which schedule was the real schedule? End of case and the GC loses. ONLY ONE SCHEDULE!

6.1.13. Graphic presentation of the schedule will show the following columns in the following order:

6.1.13.1. Added Scope Or Change

6.1.13.2. Activity ID
6.1.13.3. Activity description
6.1.13.4. Original duration
6.1.13.5. Start (the Early Start date)
6.1.13.6. Finish (the Early Finish date)
6.1.13.7. Total Float
6.1.13.8. The Bar Field/Gantt Chart

6.1.14. Contingency will be provided by first selecting moderately aggressive durations for all project activities throughout the first 70 – 80% of the total contract time. Contingency, buffer, float, or extra time (whatever way one wants to call it) is inserted into those activities occurring during the Close-out phase (in the last 20 -30% of the project). The reason for adding time – contingency – to a schedule is to provide somewhere in the schedule additional time that can be used other places – especially in the beginning of the project - if Pankow gets behind on one phase or operation and needs a few days more to get it done. The contingency is a CYA. It is not intended to be used by anyone other than Pankow – not the Subs or the Owner. You have to remember that because an astute Sub or Owner will know that it is in there and will do his best to get to it and use it. Don't!

6.1.15. Once a Baseline schedule is reviewed and approved, the targets for that schedule will be set for all activities.

6.1.16. The schedule will be updated at a minimum of once a month whether the contract states that or not. Pankow owes itself a monthly update to understand the real state of the project – especially the critical path.

6.1.17. The monthly update will show all work started and completed for that month, started but not completed, and all work to the right of the data date.

6.1.18. Any and all issues and or delays to the project need to be included in each schedule update and detailed enough to show their impact to the schedule – especially as regards those affecting the critical path.

6.1.19. A Monthly Narrative will be provided and submitted with each monthly update of the schedule. The narrative does not have to be written in a narrative format – paragraph by paragraph – but can be a list of line items/bullets depicting the following:

6.1.19.1. Work performed this period

6.1.19.2. Work to be performed during the next period
6.1.19.3. The Critical Path
6.1.19.4. Areas of Concern
6.1.19.5. Owner Issues

6.1.20. Each month a hard copy and electronic copy of the schedule update and narrative is to be filed in the project files located on the Company Server.

6.1.21. Each month a copy of the current updated master schedule and accompanying narrative will be given to the owner per the contract.

6.1.22. Each month a copy of the current updated master schedule will be given to the Subcontractors of the project and anyone else the project team deems it necessary to have the information.

6.2. Any and all schedules should include the following. Think of a schedule as a graphic representation of the process to bring a project from inception (an owners decision to go forward with a project) to completion (the general contractors completion of the project and turnover to the owner) and all the steps in between to make it happen. A schedule is a time line and time when viewed, usually moves from left to right across a page or computer screen. The following is a list of those steps to be considered and are depicted in the order that one would expect to see as one moves through time:

6.2.1. **Project Requirements:**

6.2.1.1. During preconstruction the schedule should evolve in detail and accuracy as project information is developed. The schedule forms the basis for determining the cost estimate, manpower availability, risk assessment and other planning issues. It is also an important communication device for the project team. Examples include:

6.2.1.1.1. Owner issue Request for Proposal
6.2.1.1.2. Prepare and Submit Proposal
6.2.1.1.3. Owner review and approve Proposal
6.2.1.1.4. Negotiation of Contract
6.2.1.1.5. Approval and signing of Contract
6.2.1.1.6. Development of Construction Documents
6.2.1.1.7. Overall Project duration

6.2.1.1.8. Contract Milestones
6.2.1.1.9. Interim Milestones required by the owner
6.2.1.1.10. Interim Milestones for required Addendum pricing and approval
6.2.1.1.11. Owner Obtain required Permits
6.2.1.1.12. Issue Notice to Proceed
6.2.1.1.13. Weather Allowance
6.2.1.1.14. Delays to Schedule – ours or others

6.2.2. **Preconstruction:**

6.2.2.1. Preconstruction activities begin after a final proposal has been tendered to the owner. This proposal includes the scope of work, price, relevant qualifications and the schedule. Examples include:
6.2.2.1.1. Buy out of subcontracts
6.2.2.1.2. Issuance/ execution of Subcontracts
6.2.2.1.3. Obtain Certificates of Insurance
6.2.2.1.4. Existing site documentation
6.2.2.1.5. Contractor Obtain required Permits
6.2.2.1.6. Budget and Project Controls set-up
6.2.2.1.7. Contract required Preconstruction meetings
6.2.2.1.8. Start Shop Drawing Processes
6.2.2.1.9. Obtain Contract required samples/ mock-ups
6.2.2.1.10. Develop and install Pankow Quality Assurance requirements
6.2.2.1.11. Develop and install Pankow Site Specific Safety Plan and Orientation process
6.2.2.1.12. Develop and install Pankow Site Plans

6.2.3. **Construction:**

6.2.3.1. Construction activities begin upon completion of all Pankow requirements to enter onto a jobsite. Some vital activities that preclude the actual construction of the project may include:
6.2.3.1.1. Survey
6.2.3.1.2. Layout and Batterboards
6.2.3.1.3. Barricades
6.2.3.1.4. Erosion Control

6.2.3.1.5. Mobilize equipment
6.2.3.1.6. Mobilize field office
6.2.3.1.7. Verification of existing conditions
6.2.3.1.8. Install temporary utilities
6.2.3.1.9. Subcontractor preconstruction meetings
6.2.3.1.10. JHA (Job Hazard Analysis) development and reviews
6.2.3.1.11. Special coordination meetings
6.2.3.1.12. Quality Assurance Meeting schedules

6.2.3.2. The Construction phase is also to include as many detailed steps critical to the completion of the project. The rule is that the scope of work to build and complete a project by all parties concerned, needs to detailed enough so that the tracking of that scope of work can be used to update the schedule and have it be realistic and meaningful. The project team's understanding of the required levels of work that needs to precede certain finishing activities is crucial to a successful project. Areas of concern include:

6.2.3.2.1. Including steps required towards precautions of any High Hazard Activity
6.2.3.2.2. Pankow consultations regarding water infiltration and flooring
6.2.3.2.3. Required inspections prior to placing concrete, closing walls, applying finishes, etc.
6.2.3.2.4. Installing underground utilities starting at the lowest points/ items.
6.2.3.2.5. Installing interior utilities starting at the highest points/ items.
6.2.3.2.6. Prime paint and first coat finish paint before finishes are installed.
6.2.3.2.7. Final coat of finish paint after finishes are installed.
6.2.3.2.8. Sequence of finishes minimizing damages from succeeding activities.
6.2.3.2.9. Typically the install of interior finishes is from the bottom up.

6.2.4. **Close-out requirements:**

6.2.4.1. Contingency, buffer, or float is inserted into those activities occurring during the Close-out phase (in the last 20

-30% of the project). This contingency can be inserted in the schedule by adding additional time to common activities and through the inclusion of a collection of special activities whose durations are often difficult to determine and which are not typically separately identified activities. Examples of these include:

6.2.4.1.1. Break the punch list down by multiple building or work areas.
6.2.4.1.2. Discrete commissioning activities including owner's personnel training
6.2.4.1.3. Systems testing
6.2.4.1.4. Permit walk-through
6.2.4.1.5. Final glass cleaning
6.2.4.1.6. Demobilization
6.2.4.1.7. Test and air balancing
6.2.4.1.8. MEP testing and certifications
6.2.4.1.9. Elevator/ escalator testing and certifications
6.2.4.1.10. Fire alarm testing and certifications
6.2.4.1.11. First cleaning
6.2.4.1.12. Contract work completions
6.2.4.1.13. Final cleaning and Pankow inspections
6.2.4.1.14. Final inspection and punchlist
6.2.4.1.15. Substantial completion
6.2.4.1.16. Submit Warranty and O&M manuals
6.2.4.1.17. Owner move in

6.2.5. **Schedule Review and Check:**

6.2.5.1. All project schedules must work in conjunction with the procurement log identifying shop drawing, fabrication and delivery times for materials. If not all materials, then the schedule should include at least the long lead items that are potentially near critical or critical.
6.2.5.2. Include delivery milestone dates for all owner-furnished items, and milestone dates for all owner decisions.
6.2.5.3. Saturday work shown if the project schedule is based upon working Saturdays so delays can be requested if Saturday work is delayed.
6.2.5.4. Calendars reflect all holidays (union and Pankow holidays).

6.2.5.5. Schedule names need to accommodate numbering for future updates, first update will be _ _ 01.

6.2.5.6. Schedule activity codes must be broken out at a minimum by:

6.2.5.6.1. Project Requirements

6.2.5.6.2. Preconstruction

6.2.5.6.3. Construction

6.2.5.6.4. Building

6.2.5.6.5. Phase

6.2.5.6.6. Close-out procedures

6.2.5.6.7. Level

6.2.5.6.7.1. Building specified by floor

6.2.5.6.8. Area

6.2.5.6.8.1. Building specified by area

6.2.5.6.9. Responsibility

6.2.5.6.9.1. The party who is actually doing the work

6.2.5.7. All activities except first and last must have at least one predecessor and successor.

6.2.5.8. Constraints only used with first or milestone activities.

6.2.5.9. Durations have been reviewed for accuracy.

6.2.5.10. Schedules are organized by activity codes in a time sensitive manner.

6.2.5.11. Formatted columns include required values.

6.2.5.12. Float is protected in Pankow activities.

6.2.5.13. Schedule is realistic, follows logic, and is achievable.

6.2.5.14. Resources are leveled to avoid stacking activities.

6.2.5.15. Critical path is identified and logical.

6.2.5.16. Data date is up to date.

6.2.5.17. Project overview is up to date.

6.2.5.18. Page footer is properly up to date.

6.2.5.19. Project number, ES, EF, data date and run date

6.2.5.20. Project title with company name, project number, update number and date

6.2.5.21. Schedule is saved in pdf. and electronic form on the Project and Company servers.

6.3. Retained logic vs. Progress override – In SureTrak, there are two choices available on how you want SureTrak to calculate your

schedule and how it interacts with logic. There are still two choices – but now you only get to use just one of them – **RETAINED LOGIC**.

6.3.1. Definition (from SureTrak) - If an activity has been worked on (had progress) before one of its predecessors, choose how SureTrak should display this out-of-sequence progress: with retained logic, so that the rest of the schedule will continue more or less as originally planned, or with progress override, so that you can start work on the successors to the out-of-sequence activity immediately.

6.3.1.1. In the past, Pankow practice was to use Progress Override as the schedule calculation method. For new projects, we will use the Retained Logic calculation method ONLY!

6.3.2. Implications to the Schedule Update Process

6.3.2.1.1. Note: during the process of schedule development – the use of retained logic will have no influence on logic and the creation of the schedule.

6.3.2.1.2. The only time retained logic will influence the schedule is during the update process when the schedule becomes an actual working tool.

6.3.2.1.3. The HIT/CONSEQUENCE – during the update process, if “as planned” logic changes - for whatever reason – the “as planned” logic ties – relationship and lag (if used) – will have to be adjusted to the “as built” logic relationship and lag. So during the update process, not only do you as the scheduler actualize the start and finish dates – now you will also have to adjust the logic to reflect what really happened if that logic is different from the “as planned” logic. It is an extra step in the updating process – but in doing so, the true logic of constructing the project will be maintained.

6.3.2.1.4. A Fix – One of the ways to avoid the adjustment of as planned logic to as built is to use finish-to-start relationships for logic ties as often as is possible and practical.

6.4. The Philosophy Concerning Weather

6.4.1. There are two issues:

6.4.1.1. If the contract allows it, and if it is pertinent to the project, the inclusion of a weather allowance of 10 working days per year is encouraged to mitigate any delays to the project caused by weather. The added bonus of doing so is that if the weather days are not used, they become float for the project, and being that they are placed at the end of the project schedule and are the only predecessor to Substantial Completion, that float usually ends up going to Pankow as a part of contingency and risk management best practices.

6.4.1.2. Building Weathered-in. Current philosophy declares that no building insulation, GWB, or any weather sensitive materials, are to be installed without proper protection to prevent moisture damage to the product – mainly the growth of mold. That means that the building must have enough protection to prevent moisture of any kind from entering the building from all horizontal and vertical surfaces. In other words, either the permanent roofing material must be installed - or a temporary version of it - and the exterior skin of the building must also be installed - or some weather resistant version of it also. This is a mandatory requirement and must be included in all project schedules where applicable. If temporary weather protection is to be used to shorten the overall duration of the project, then it must be accounted for in both the schedule and the estimate.

6.5. Time Impact Delay Analysis

6.5.1. What it is – the operation of tracking delay on a project and determining the resultant impact – if any.

6.5.2. Can and should be tracked on the schedule, but will need a paper trail to back it up.

6.5.3. Use it to track anything and everything that Pankow has no control over that has potential for delaying the project, e.g.;

6.5.3.1. Owners indecision

6.5.3.2. Sub-contractor bankruptcies

6.5.3.3. Weather

6.5.3.4. Strikes

6.5.3.5. Natural disasters

6.5.3.6. Accident/Death

6.5.3.7. Sub-surface conditions

6.5.3.8. Design delays

6.5.3.9. Use it to also to track any delay caused by Pankow or its Subcontractors. This gets tricky because now we are airing our dirty laundry – but at the same time it is important to keep track of how we are impacting ourselves.

6.5.4. What needs to be considered and tracked beyond the original delay is the time it takes to get back on track after the fact. Yes there was a delay – it's now over – the sub's are back at work – but some of them had to re-mobe, or re-hire, and go through the learning curve to get back up to speed. The time needed to accomplish this is part of the time impact delay analysis. There are costs and time impacts from the inception of the delay to its conclusion and subsequent resumption of work.

6.5.5. In some cases the delay may start as a trickle effect. For example if a contractor is going bankrupt, the delay is going to be a slow start – he may start laying off workers because he can't afford to pay their wages. Or materials will start to get held up because his suppliers aren't getting paid. The work is slowing down and starting to impact the follow on trades. That is when the delay starts and needs to be tracked and addressed.

6.5.6. Delay analysis only works on activities on the critical path – which is not to say that activities with float won't become critical due to the delay. You will have a hard time convincing a mediator or judge that a project was delayed by impact to a non-critical activity.

6.5.7. Bear in mind that in some cases the act of tracking delay has the potential of creating an adversarial relationship with the Owner that could become detrimental to the project. Use discretion and finesse in how and when delays are tracked.

6.5.8. How to track delay – the scenario;

6.5.9. You are ready to pour the 8th floor slab. The day of the pour a big old Pacific Storm blows in and it is raining cats and dogs – there is no way you can pull off a successful pour. The activity to "Form/Rebar/Pour Slab – Lvl 8" is an 8-day activity. You are planning to pour on the 8th day. The storm hits and you can't pour. Actualize the start date and actualize the finish date at day 7. Create another activity that represents the storm. The storm lasted for 2 days. Insert the rain delay on a finish to start with the delayed activity. Create another activity that represents the pour (a one day duration activity). Put it on a finish to start with the rain

delay activity. Make sure that the original successors to the original activity are the same for the final one-day pour activity. You have just tracked the delay. Since most structural erection type activities are on the critical path it needs to be tracked. It is essential to track even if the activity delayed is not on the critical path now – it could become part of the critical path as time goes on. It works better to create a delay activity rather than extend the original duration of the activity impacted and make a note explaining that the time extension in the log is in fact the delay.

6.6. What-if Schedules

6.6.1. Save the project by calling it something entirely different from the numbering system used for updates and sequencing. Create a separate What-if file under the Project Name file to avoid confusion. What-ifs are a real handy tool for determining the impact of re-sequencing for whatever reason.

6.7. What not to do, or in other words, knock off the creative scheduling:

6.7.1. Pankow's First Rule of Construction – Never assume anything unless you are a glutton for punishment. On the other hand, if an assumption is all you have at the moment – then make a list of the criteria the assumption is based on to jog your memory later on when someone asks you – how did you figure that? Use the "log" feature described previously to add those assumptions to an activity.

6.7.2. Illogical logic – do not tie activities that have nothing to do with one another together – e.g. don't tie transformer installation to planting trees just because at one time they happened to be happening at the same time.

6.7.3. Don't induce criticality by defining all activities with 150 days of float or less, as critical. Another don't in this department is don't change the color of all bars to red, just to create criticality.

6.7.4. Don't overwrite an existing updated schedule – copy it and re-name/numerical sequence it. As stated above this is real important. If we don't keep an historical record, and God forbid Pankow ends up in litigation or in court – to create a historical record after the fact and from memory is near impossible and extremely costly.

6.7.5. Don't forget to keep hitting the save button

6.7.6. Don't increase duration by increasing the remaining duration without increasing the original also. On an un-actualized activity the OD and the RD should match.

6.7.7. When releasing the schedule only show the early start and finish dates. And if the schedule starts slipping then also show the target early start and finish dates as you hammer on the Sub's.

6.7.8. Don't use the Schedule Template to start your scheduling efforts – Save it as something else first.

6.7.9. Don't do what-ifs in your master schedule. Save the master as something else and do the what-if in it.

6.7.10. Don't forget the importance of Contract Language as pertains to schedule and especially what constitutes excusable delay. Be aware of the local weather conditions and their potential for delay. Right now everyone is concerned about the effect of rain on GWB installation and mold. But don't forget wind. In certain locations wind can be a major factor in shutting down crane time and steel erection. Plan and allow for any and all potential impacts. Don't forget the local labor market and be cognizant of pending union labor contracts that may be coming up for re-negotiation during the project life cycle. When LD's (liquidated damages) are involved, all of the above can have significant impact on their being initiated and mitigated if the potential for delay is planned for in advance rather than after the fact. And if Pankow must live with LD's then the Sub's need to live with them also.

6.8. Contractual Agreements

6.8.1. Pankow owes to Owner – any and/or all - take your pick.

6.8.1.1. A Baseline Schedule reflecting the scope of project work.

6.8.1.2. Baseline due;

6.8.1.2.1. Ideally 2-3 weeks after design completion to allow for the input and buy-in from the last subcontractor on board.

6.8.1.2.2. Realistically due shortly after start of construction.

6.8.1.3. Monthly Update – due date to be determined in contract.

6.8.1.4. No electronic copies!

6.8.1.5. Detailed Predecessor/Successor Report – generated in P3.

6.8.1.6. Milestone Trend Report – based only on contractual milestones.

6.8.1.7. Critical Path Report – a filter of the schedule showing critical activities only.

6.8.1.8. If requested the monthly update can be targeted against the BaseLine.

6.8.1.9. Monthly Schedule narrative highlighting Wins, Losses, Critical Path, and Areas of Concern.

6.8.2. Subcontractors owe Pankow

6.8.2.1. Assuming the Baseline exists prior to subcontractor signing contract;

6.8.2.1.1. Buy-in to the Baseline

6.8.2.1.2. Or a detailed schedule of subcontractor's scope of work to meet the contractual milestones - how are they going to get there

7. Schedule Expertise Definitions

7.1. Prerequisites for those taking the beginning SureTrak Schedule Training Course are:

7.1.1. Basic computer skills

7.1.1.1. Understands and is familiar with the Windows environment

7.1.1.2. Is familiar with working in Outlook

7.1.1.3. Is familiar with browsing through the Pankow Portal

7.1.2. Knows how to type – hunt and peck does not equate to good typing skills

7.2. One is a beginning scheduler if any of the following apply:

7.2.1. You have met the pre-requisites for taking the course

7.2.2. You have no prior scheduling skills

7.2.3. You may have taken a scheduling course in college or at some other venue but have not used that knowledge since then or within the last 4 months.

7.2.4. You have never worked with SureTrak, P3, or Microsoft Project

7.2.5. You are unfamiliar with the Pankow Schedule Philosophy

7.3. One is considered an intermediate scheduler if:

7.3.1. You have taken the beginning class above and used/incorporated the training session during the course of you work with Pankow within the last 4 months. If you haven't met that requirement then you go back to square one and take the beginning class again because – either you use it or lose it, and you probably lost it.

7.3.2. You find that further knowledge and skills needed to use SureTrak would be enhanced with a one-on-one training session with the Corporate Scheduler.

7.4. One is an advanced scheduler if:

7.4.1.1. You can build a detailed construction schedule from scratch on your own and maintain and update it on a monthly basis in SureTrak per company schedule philosophy.

7.4.1.2. You may still have need of the Corporate Scheduler to learn the tricks of the trade

7.4.1.3. You are aware of all current Pankow Schedule Philosophy

7.4.1.4. You know how to track any and all delays whether caused by weather, the Owner, Pankow, or Force Majeure.

8. All of the above is to help create and standardize Pankow's scheduling efforts. To what end? What we really are after is the creation of a good working well thought out plan of how to build a project - A Baseline for project execution. We all know that plans are subject to change and in most cases always will. You have to start somewhere. With a Baseline schedule in place prior to the start of the project, the updating and tracking of the project is much easier and as the project progresses and plans change – and you can count on it that they will – the affect of those changes can be determined and dealt with much more effectively, efficiently, and most important - quickly.

PLAN THE WORK – WORK THE PLAN

Session 2 – A walk thru on how to use SureTrak and build a project schedule.

1. The Template

1.1. The template is just that – a generic schedule to be used as a start for the building of a new project schedule. The following, for the sake of conformity, is the recommended procedure and look. Does that mean that it can't be done differently? No, it can, but you will need to run it by the corporate scheduler for his input.

1.2. **Code Structure** – The following is the recommended code structure. This structure, coupled with the filter function, gives unlimited ways to breakout activities for specific needs. See the attached Code Structure from the Pankow Scheduling Template

1.2.1. **Activity ID** – a minimum of 7 characters long (can be 10 character long if needed)

1.2.1.1. First 2 characters are the Sub-project ID – The Template uses as the default - CP (Charles Pankow) as the first two characters for all activities. The sub-project ID allows a schedule to become a part of a larger much more sophisticated schedule that incorporates the use of sub-project ID's to define different scopes of work or phases of a project.

1.2.1.2. The next two digits define the major 16 divisions of the CSI coding system. The reason for using these codes is to allow some order to the numbering system so that during the process of assigning predecessors and successors to activities the search for them is easier. For example if you wanted to find a successor for an activity without such a system you would have to scroll through all the existing activities to find it rather than just scroll to the activities that start with CP03 (03=Concrete in CSI coding)

1.2.1.3. The next 4 digits are counters.

1.2.1.3.1. For the numbering system above there are 9999 possible numerical combinations. This should be more than enough numbers. If however you use all 9999 numeric possibilities, you can switch to alpha/numeric combinations that will give you unlimited variations

1.2.1.3.2. Note: Get rid of the notion and the practice of trying to link the activity ID number and early start by sorting

on the activity ID number. Sort on Group and Early Start only. In other words do not attempt to have the activity ID numbers show up in a nice sequential manner – it is very hard to do and is being way to anal about the look of your schedule. As the schedule is developed activities and their ID numbers will get shifted around the schedule as scope of work is defined and logic changes.

1.2.2. **Activity Codes** – broken out by:

1.2.2.1. **Building:** broken out by:

1.2.2.1.1. Project Requirements – this breakout is for mainly the Owners benefit in that it shows the Contract Milestones, Construction Milestones, Weather impacts and other delays. It is a snapshot of the overall project.

1.2.2.1.2. Preconstruction – any and all activities that relate to project preconstruction to include: design development, drawing development, bid packages, submittals, and long lead procurement. Anything and everything outside of actual construction that the project team thinks is necessary to track on the schedule. It must include at minimum ALL activities that are on the critical path or have the potential of becoming critical and could potentially delay the project.

1.2.2.1.3. Construction. If there are multiple buildings being constructed on the same project then Construction would be broken out to reflect each of those buildings or phases of the project that the project team deems necessary to individually track.

1.2.2.2. Phase broken out by:

1.2.2.2.1. Contract Milestones
1.2.2.2.2. Construction Milestones
1.2.2.2.3. Weather
1.2.2.2.4. Design Packages
1.2.2.2.5. Bid Packages
1.2.2.2.6. Procurement – Long lead items that are potential schedule impactive
1.2.2.2.7. Site Work - Prep and Excavation
1.2.2.2.8. Concrete Foundations
1.2.2.2.9. Structure
1.2.2.2.10. Roofing

1.2.2.2.11. Exterior Architectural Finishes
1.2.2.2.12. Interior Architectural Finishes
1.2.2.2.13. Mechanical Installations
1.2.2.2.14. Electrical Installations
1.2.2.2.15. Vertical Transportation
1.2.2.2.16. Tennant Improvement
1.2.2.2.17. Closeout

1.2.2.3. **Level** – Building specific by floor – Use whatever agreed upon descriptions you feel are pertinent to your particular project.

1.2.2.4. **Area** – Building specific by area– for example the Core area vs. the TI area on a specific floor

1.2.2.5. **Subcontractor** – the sub who is actually doing the work – Project Specific

1.2.2.6. **Pankow Cost Codes** – yes they show up twice – only this time it is for your use as a tool to look up the appropriate code for insertion into the activity ID. Hit the down arrow and scroll to the desired code. Do not use this field as a replacement for, or instead of, the codes insertion into the ID.

1.2.2.7. **Group** – strictly an editing tool for the scheduler to keep certain activities in either a phase or area together in a "group".

1.2.3. Calendars

1.2.3.1. Two calendars are already defined for you.

1.2.3.1.1. Calendar #1 is a SureTrak/P3 default calendar and **don't** use it.

1.2.3.1.2. Calendar #2 is a standard 5-Day Work Week and labeled as such.

1.2.3.1.3. Calendar #3 is a 6-Day Work Week also labeled as such.

1.2.3.1.4. One of the first things to do in creating a new project schedule using the template is to define the non-working days for the project in the appropriate calendar – either the 5 day or 6 day or both - whichever one applies. Sometimes unions and local holidays are different than the standard ones taken.

1.2.3.1.5. A general note: I have found that the limited use of more than one calendar per project for certain key activities is ok. Using more than two calendars (e.g. half the schedule using a 5 day calendar and the other half

using a 6 day calendar) can influence the float calculations and make things appear, as they are not meant to be. If your float values do not look right, this may be the reason.

2. SureTrak Software Specifics

2.1. The Tool Bar – How to make SureTrak work

2.1.1. **Customizing the tool bar** – Besides the computer itself, this is the scheduler's tool belt. To view the Toolbar go to "View" and put a check mark alongside "Tool Bar". While there, put a checkmark alongside "Activity Form" and "Layout Toolbar" also. To customize the Tool Bar go to "Tools/Customize/Tool Bars" and in the window that pops up create the following suggested arrangement. To add an icon to your tool bar highlight the activity below where you want to insert it. Hit the plus (+) button and then hit the down arrow or click on your right mouse button and scroll to the icon you want to insert, click on it and it is done. To delete an icon, highlight it, and hit the (minus) – button and it is gone. Once you have completed all your edits hit the "Reset" button and then the "Ok" button.

2.1.1.1. New
2.1.1.2. Open
2.1.1.3. Save
2.1.1.4. Separator
2.1.1.5. Print
2.1.1.6. Print Setup
2.1.1.7. Print Preview
2.1.1.8. Separator
2.1.1.9. Cut Activity
2.1.1.10. Copy Activity
2.1.1.11. Paste Activity
2.1.1.12. Separator
2.1.1.13. Undo
2.1.1.14. Redo
2.1.1.15. Separator
2.1.1.16. Find Next
2.1.1.17. Format Columns
2.1.1.18. Organize
2.1.1.19. Relationships – the pitchfork
2.1.1.20. Re-organize

2.1.1.21. Link Activities
2.1.1.22. Unlink Activities
2.1.1.23. Separator
2.1.1.24. Send Mail
2.1.1.25. Receive Mail
2.1.1.26. Separator
2.1.1.27. Schedule Now
2.1.1.28. Format Timescale
2.1.1.29. Progress Spotlight
2.1.1.30. Separator
2.1.1.31. Set Zoom Level
2.1.1.32. Help

2.2. The Tools - what they do and how they work.

2.2.1. View field

2.2.1.1. Should have check marks on Activity Form/Tool Bar/Layout Tool Bar

2.2.2. Creating Filters

2.2.2.1. The schedule template already has many filters created for your use. There are literally hundreds of criteria that are at your disposal to create filters. For example, filters can be created by defining and/or using date ranges, percent complete ranges, code structures, etc. To create a new filter, go to the "Filter" icon in the Tool Bar. Click on it and a box will appear on your screen. Scroll down to the bottom of the existing list of filters and in the "ID" column; create a new ID that reflects what it is you want to name the new filter. Then move the cursor over to the next column and define the filter. Then go to "Modify" and click on it. Another window will appear that lets you pick the criteria that will create the filter. For example, if your project is divided up into several sub-projects that include a high-rise office tower, commercial retail space, and a convention center, and you want to create a filter that defines the critical and near critical activities (activities with 5 days of float or less) of the convention center you would do the following:

2.2.2.1.1. In the section described as Level 1 criteria and in the "Select if" column, highlight the first box in that column. Hit your right mouse button or click on the down arrow and scroll down to "Total Float" and hit enter.

2.2.2.1.2. While in the same row, move the cursor over to the "Is" column and highlight that box. Again click on the right mouse button or hit the down arrow and scroll down to "Less than" and hit enter.

2.2.2.1.3. Still in the same row, place the cursor in the "Low value" column and highlight that box. Type in the number "5" and hit enter.

2.2.2.1.4. Now repeat that process and in the next row under "Total Float" scroll to "SUBP – Project ID" and hit enter.

2.2.2.1.5. Then in the "Is" column scroll down to "Equal To" and hit enter.

2.2.2.1.6. Then in the "Low value" column, highlight that box and scroll down to the two-letter sub-project identifier for the convention center and hit enter.

2.2.2.1.7. Here is where it can get tricky and why I am explaing this whole process. Above the Level 1 criteria box there is a statement that says, "Activities must meet Level 1 - "and" - "or" – Level 2 criteria". Since we do not have any criteria developed in Level 2, choose "and".

2.2.2.1.8. There is also the statement "Level 1 must meet – "any" or "all" – of the following criteria". Since we have two sets of criteria in Level 1 and we want both to apply to the filter, choose "all".

2.2.2.1.9. Now at the bottom of the box is the "Ok" button, hit it, and you have now created the filter. That box will disappear and you will be back at the box that lists the filters. Make sure the new filter is highlighted and there is a dot in front of the statement "Replace current set of activities". At the bottom of the box there is an "Apply" button, hit it, and SureTrak will now run the filter, and if it worked, the only activities that will be visible on the screen are the ones you just filtered for. If it didn't work you will have a blank screen with no activities. Hopefully it worked, because if it didn't, you now have to go back into the modify screen and adjust something to make it work. This is where it can get frustrating because it is now trial and error time. The first thing to do is where you had the choice to pick "any' or "all", choose "all" this time and re-run the filter. If it worked you are in the money. If it didn't, now you have to separate the criteria

in the Level 1 box. To do that, delete either one of the rows, and which ever one you deleted, re-define it in the Level 2 criteria box. In an above step we already defined the filter to meet both Level 1 and Level 2 criteria, so that is done. Close out of that box and run the filter again, and now it should work. If it didn't good luck!

2.2.2.1.10. Don't ask me why SureTrak is so finicky – P3 is also – it is just the way it is. Know that the more criteria that you try to get the filter to do, the harder it is to get SureTrak to do it. That is one of the reasons for the detailed code structure. It gives you more options for filtering.

2.2.3. **Linking activities** – there are several ways:

2.2.3.1. The Pitchfork. Look for the pitchfork button described as Relationships on your Toolbar. Use your cursor to point at whichever end of an activity bar you want, depending on the relationship desired. When the cursor changes form to look like a pitchfork, hold down the left mouse button and drag the line formed to whichever end of the activity bar you wish to make the link to, and let go. This action creates the link. A lag, if wanted, still needs to be edited.

2.2.3.2. Link/Unlink – The icons that look like a piece of chain will link or unlink activities. The link always links activities on a finish to start (default) relationship. To accomplish this highlight one of the activities you wish to link. While holding down the control key, highlight the activity you want to link it to, and hit the link icon to make it happen. Again, lags still need to be edited if wanted.

2.2.3.3. Activity Form/Details. Go to View and scroll down to Activity Form and click on it.

2.2.3.3.1. In this window there is a button called "Details" – click on it and when opened put a check mark at both Predecessors and Successors. You can only open one "Detail" item at a time, so you'll have to go into the detail window each time to place the check mark.

2.2.3.3.2. In each of these windows are a bunch of rows. At the row headed as successor/predecessor, place the cursor in that box and highlight it. Right click your mouse and a list of all activities – arranged by

ascending Activity ID #'s - appears. Scroll that list until the activity you want appears. Highlight it and SureTrak will enter it into the box as a default finish to start relationship. If you want a different relationship highlight the box under "type" and right click your mouse and another box will appear that allows you to choose your relationship of choice. Highlight the next box under lag and enter a lag if desired – either positive or negative. You can also do this in the row which starts off with a minus sign/plus sign/and a down arrow. As before when you highlight the box under successor/predecessor, instead of hitting your right mouse button, you will notice that your cursor is in the box next to the down arrow. Click on the down arrow and again the list of activity ID's will appear. Scroll to the activity wanted. Or you can just type in the activity ID you want. Again SureTrak always defaults to a finish to start relationship.

2.2.3.3.3. When linking activities – make sure that the link you made is the one you want, and the activities once calculated reflect that.

2.2.4. Creating & Saving Layouts

2.2.4.1. An unlimited number of layouts can be created depending on how many ways the schedule needs to be presented. Two already exist; a 3 Week Look ahead and a Work in Progress. You can create layouts for printing to different sizes of paper – 81/2 X 11 to E size. It is easier to create a new layout for a particular look of the schedule rather than continuously altering an existing one to do the same thing.

2.2.5. **Formatting Bars**. This is where you adjust the bars color, look, titles etc. Go to "Format" and scroll down the "Bars" and click on it. A box will appear that is the start point for formatting. For example suppose you don't want to see end points on the ends of your activity bars. Go to the rows that say, "Early start point" and "Early finish point". In the column that says "Visible" remove the check mark that is the default setting for bar format. Hit "Ok" at the bottom of the box and the end points will disappear. This is where you can turn on and off the target bars if you want them displayed.

2.2.6. **Formatting Columns**. This is where you define the column layout for the schedule. Go the "Format" and scroll to "Columns"

and click on it or click on the “Column” icon on the Tool Bar. Typically the layout will look like the following, reading from left to right across the top of the screen.

2.2.6.1. Column arrangement;

2.2.6.1.1. Added Scope Or Change (Mandatory)
2.2.6.1.2. Activity ID (Mandatory)
2.2.6.1.3. Activity Description (Mandatory)
2.2.6.1.4. Original Duration (Mandatory)
2.2.6.1.5. Early Start (Mandatory)
2.2.6.1.6. Early Finish (Mandatory)
2.2.6.1.7. Late Start (Optional)
2.2.6.1.8. Late Finish (Optional)
2.2.6.1.9. Percent Complete (Optional)
2.2.6.1.10. Total Float (Mandatory)

2.2.6.2. In the Column box is where you choose the column data, define the column description if you do no like the default ones, column alignment, and the description font and font size.

2.2.6.3. Know that you can create a column for almost every item in the schedule including the code structure. What I like to do is arrange the columns in such a way that there is a column developed for all the different possible types of information that I would want to work with. For example, I would set up the columns as suggested above. Except I really don’t care at this point in time to see the late start and finish columns, or the percent complete column. So I would place a zero in the “column width” box for those columns. That turns them off and they disappear off the screen. If ever I want to see them again all I have to do is replace the zero with whatever number I need to make the column and its description visible again. I would also create columns for each of the activity codes. I would place them to the right of the Total Float column. The reason for doing this is because when I am building the schedule and assigning codes to the activities, I can use those code columns to copy and paste cell information really quickly. For example, you have created a set of activities (a fragnet) to build out the interior finishes on a floor. It is going to be the same set of activities and logic for each floor. You make a copy of the fragnet for the next floor. Before you organize the schedule you need to recode that

new fragnet for the next floor. You already have the floors defined in the code structure. In your “Level” column for the first activity of the new fragnet you re-place the old “Level” code with the new one for the next level. Next you place your cursor in the box for that new code. You then go into “View” and click on “Copy Cell”. Then while holding down the shift key you scroll on down to the last activity in the fragnet, keeping the cursor in the “Level” column. Once you do that, go back into “View” and scroll to “Paste Cell” and click on it and the code value you had in the first box will now appear in all the boxes for all the activities in that fragnet. This is a whole lot easier than going into each activity and replacing the code value manually.

2.2.6.4. Therefore, for the sake of conformity your column set up should be as follows;

2.2.6.4.1. Added Scope Or Change
2.2.6.4.2. Activity ID – left justified
2.2.6.4.3. Description – left justified
2.2.6.4.4. Original Duration - centered
2.2.6.4.5. Early Start - centered
2.2.6.4.6. Early Finish - centered
2.2.6.4.7. Total Float - centered
2.2.6.4.8. Phase
2.2.6.4.9. Level
2.2.6.4.10. Area
2.2.6.4.11. Group
2.2.6.4.12. Calendar

2.2.6.5. The columns, Activity ID through Total Float, should always be visible in a print out. The other way to hide the columns to the right of the Total Float column is to take your cursor and place it along the heavy black vertical line that separates the rightmost column from the bar field. The cursor will change from an arrow to a heavy vertical line with little arrows on each side. Hold down your left mouse button and drag the line to the right edge of the Total Float column and let go. When you go to “Print Preview” the only columns that should be visible are the ones above (a thru f).

2.2.7. **Logs.** If you want to add notes to an activity you can do so by again going into the Column window and create a new column to the right of the “Calendar” column. Starting with a new row,

highlight the box under the “Column Data” column and scroll down to “Log Text 1” and click on it. Make the column wide enough to type in whatever information you want to add. You can re-name the column to reflect what type of information you want to record in it. You have ten columns of log text at your disposal to write down whatever. So as an example you could make a column of notes for design issues, one for owner issues or deliverables, another for delays etc. For more information on logs, go into the “Help” icon and search on logs, and all you ever wanted to know about them is there for you to read about.

2.2.8. **Formatting Timescale** – There are several places to do this.

2.2.8.1. The first is in the "Page Setup” window described in detail below.

2.2.8.2. The most obvious is in the Bar Chart view, which is the view showing on your screen. Place the cursor in the timeline above the bars and double click the left mouse button and a box will appear that allows you to adjust the timescale. Or go to “Format/Timescale” and get to the same window.

2.2.8.3. In the “Page Setup” window there is also a “Format Timescale” icon where it can be adjusted also.

2.2.9. **Deleting Activities** – two ways

2.2.9.1. Highlight the activity to be deleted. Hit your right mouse button and scroll down to delete and hit your left mouse button and a window will open that will ask you if you really want to do this – if so, hit enter, and it’s done. Or, look up into the left hand corner of your screen above the column description bar and there is a minus sign and a plus sign. Hit the minus sign and again the window will appear asking you for confirmation. Contrarily - hit the plus sign if you want to add and activity.

2.2.9.2. Note: If an activity which you want to delete has both a predecessor and a successor, and if the predecessor to the activity you want to delete, is still a viable predecessor to the deleted activities successor, instead of deleting that activity – **dissolve** it. To do that, go to Edit and scroll down to Dissolve Activity and hit your left mouse button. Again another window will appear asking you if you want to really do this. Hit your left mouse button and it is done. The default is always a finish to start relationship. If you want to change the default to

something else or adjust the lag then go into the predecessor/successor boxes to do so.

2.2.10. **Organizing and Re-organizing** the project

2.2.10.1. To organize the project is to set up the way you want the schedule to look on your screen and in print. The code structure is the instrument for doing so. To get to the "Organize" window go to "Format/Organize" or hit the "Organize" icon on the Tool Bar with your mouse. Take the following steps;

2.2.10.1.1. "Organize by" – make sure there is a dot placed by "Activity data item".

2.2.10.1.2. Highlight the box below the column headed "Group by" in the first row and either hit the down arrow or your right mouse button and scroll to Project ID and hit your left mouse button. The rows should read in ascending order;

2.2.10.1.2.1. SUBP – Project ID

2.2.10.1.2.2. PHAS – Phase

2.2.10.1.2.3. LVL – Level

2.2.10.1.2.4. AREA – Area

2.2.10.1.2.5. The next column titled "Order" should all say "Ascend".

2.2.10.1.2.6. The columns to the right of " Order are pretty self explanatory and if you need further definitions go to the "Help" button at the bottom of the window.

2.2.10.1.3. In the "Sort by" box the first cell under the "Order by" column heading should read "Group" and then "Early Start", both in ascending order.

2.2.10.1.4. Under "Display" there should be a check mark by "Description".

2.2.10.1.5. Tip. In the Organize window there is a box with the following wording to the right of it – Reorganize automatically – make sure that box does **not** have a check mark in it. You do not want to have the schedule reorganize itself each time you make a change – it eats up time and when you are copying and creating fragnets, it will ruin your day. When you want to reorganize the project hit the "Reorganize" icon with your pointer or go into "Format/Reorganize Now". You want to make a practice of doing this every now and

then especially during the building stage of the schedule. You just don't want to do it automatically after every edit.

2.2.11. **Project Utilities** – Found under the Tools utility

2.2.11.1. "Save as" – use to copy a project. This will be used a lot to convert the WRKG schedule to the update for the month schedule. Also use to create what-ifs.

2.2.11.2. "Backup" – use to save a project to a disk. SureTrak and P3 use this feature to also send a project through e-mail.

2.2.11.3. "Restore"– you can't open a backed up project unless it is restored first – and that includes projects sent through e-mail.

2.2.11.4. "Delete" – use to delete a project that no longer is in use. Warning - don't delete archived projects.

2.2.12. **Sending and Receiving** projects through e-mail. There are two ways to do this – one works sometimes – the other all of the time.

2.2.12.1.1. The preferred/sure way to send a project is to first back it up to a file of your choice. Check out the section on how to back up a project. Once the project schedule is backed up, go into Outlook and attach the backed up schedule as you would attach any file to an email.

2.2.12.1.2. The NOT recommended way to send a project via e-mail because it fails more often than it works is to first open up the schedule that you want to send and then click on the send mail button in your toolbar and follow the steps. To receive an e-mailed project you must first have SureTrak opened and go to File, Mail, and Receive and then follow the steps.

2.2.13. **Global Changes** are an advanced feature and one to look out for if you don't know what you are doing. If you want to make a change that is common to a whole bunch of activities you can do it with this tool. To make a global change in SureTrak look at your tool bar and go to "Tools/Basic Scripts". In that window there is a list of files. Highlight the file "gblchng.sbl" and double click your left mouse button on it. In the window that pops up you have only four global change choices; Change Activity RD or PCT, Delete Activity Assignment, Modify Resource Assignment, and Modify Resource/Cost Data. There are only two choices with

potential use because anything that has to do with resources and cost is not a change we are concerned about. If you are familiar with BASIC computer language you can try writing your own changes. Be forewarned - a good practice is - **don't** make the change in your master copy. Make another copy of your project through the "Save As" tool and do it in it, to see if it works. If the results are what you are looking for, then go do it in the master – but be sure – because things can go south real quick!

2.2.14. **Print Preview**. To get to print preview go to "File/Print Preview" or click your cursor on the "Print Preview" icon. This is the window where you edit the look of the schedule when printed. There is a different Tool Bar associated with this window. In the Tool Bar there is to the right of the "Print" icon, the "Page Setup, Define Header, and Define Footer" icons. You can access the header and footer through their own icons or you can go directly into "Page Setup" and access them there also. I have never used the "Define Header" icon, which doesn't mean that your team can't use it – I've just never used it.

2.2.14.1. In the page setup window in the box below "Print", set it up as follows;

2.2.14.1.1. Columns = Visible

2.2.14.1.2. Bars = Yes

2.2.14.1.3. Column Headings = Top

2.2.14.1.4. Timescale – if paper size is;

2.2.14.1.4.1. 81/2x11, 81/2x14, or 11x17 = Top

2.2.14.1.4.2. D or E = Both

2.2.14.1.5. Relationships = No

2.2.14.1.5.1. Make it a practice to <u>not</u> show relationship lines especially when printing out the whole schedule. It may look great but there is no way you can follow the relationship lines to track predecessors or successors. It is ok when printing out a fragnet or a small schedule where you can adjust the row height to help see and track the lines but otherwise don't show them.

2.2.14.1.6. Margins – Typically just set all margins to zero. That way you fill up the whole page with text and help save a tree.

2.2.14.1.7. Units – Set to inches.

2.2.14.1.8. Time Scale Date Span. This is where you adjust the timescale. Where it says;

2.2.14.1.8.1. Begin – with your cursor hit the down arrow and choose “Data Date. Then in the space to the right of the down arrow type in (-20). That way you will always have a space 20 days to the left of the data date and your column layout.

2.2.14.1.8.2. End – follow the steps above but choose “Finish Date” and then type in +40. This keeps a space 40 calendar days between the latest activity and edge of the bar field.

2.2.14.1.9. Scaling – Set it at 100%. You can increase it or decrease it depending on the amount of information you wish to show on the print out.

2.2.14.2. Define Footer. In the footer box there are a bunch of options. – *Pg 469*

2.2.14.2.1. The first is “Include on:”. This gives you the option of including the footer on all, the first, the last, or none of the pages.

2.2.14.2.1.1. Default font allows you to pick and choose the default if you do not specify another one in other windows.

2.2.14.2.2. Height sets the height of the footer box at the bottom of the page and typically a 1-inch setting is sufficient unless you are printing to a D or E size sheet where you would want to increase to say a 2-inch setting.

2.2.14.2.3. Then there is a row of six boxes that allows you to arrange the information you want to show in the footer. A typical setting, reading from left to right;

2.2.14.2.3.1. Box 1 – Dates and in the date box show in the following order and at a minimum;

2.2.14.2.3.1.1. Project name

2.2.14.2.3.1.2. Page number

2.2.14.2.3.1.3. Data Date

2.2.14.2.3.1.4. Run Date

2.2.14.2.3.2. Box 2 – None

2.2.14.2.3.3. Box 3 – Title Block. Here you have three choices as to where and what information you want

to include as well as defining again which font you want to use;

2.2.14.2.3.3.1. Left

2.2.14.2.3.3.2. Center – this is the one typically used and including from the top down;

2.2.14.2.3.3.2.1. Project Title – already defined in the Project Overview window.

2.2.14.2.3.3.2.2. Company Name – same as above

2.2.14.2.3.3.2.3. Words to the effect – Project Statused Through November 30 for Pay App 12

2.2.14.2.3.3.3. Right

2.2.14.2.3.4. Box 4 – None

2.2.14.2.3.5. Box 5 – None

2.2.14.2.3.6. Box 6 – Logo. Insert the project logo if you have one or insert a CPBL or PSPL logo. In the Logo window you can browse to a logo file location, pick whichever logo and insert it into the footer. Know that the logo works best if it is a bitmap file.

2.2.14.2.3.7. To get out of the Print Preview screen and return to the bar chart look in the upper left hand corner of the Tool Bar and find the “Bar Chart” icon and click on it.

2.2.14.3. Remember that if you get stuck and want to know more, in each of the windows mentioned above, there is the “Help” button that will explain in more detail the steps needed to make the task at hand work.

2.2.14.4. An FYI – Typically a print out of a SureTrak or P3 schedule portrays a whole lot of information that 9 times out of 10 the average reader of one these reports has a hard time trying to figure out. That is why I have put a lot of thought into the look, layout, and organization (code structure) of a schedule, any schedule. This compounds itself dramatically the larger the schedule gets. That is why if you notice, the schedule is built and organized to reflect the way a typical project goes together. Past experience says that the larger a schedule gets the less likely anyone is going to read it and understand it. So practice KISS.

2.2.15. **Creating Reports** – To create reports in SureTrak, go to the toolbar and click on “Tools”, and then scroll down to “Basic

Scripts". The Basic Scripts window appears and in that window there is a list of ".sbl" files. The one file that we will use is the "predsucc.sbl" file, which creates a predecessor/successor report. For an explanation of the other listed files go to the Help button in the Basic Scripts window and when that window appears, there is a list of what those files do. If you are knowledgeable in the computer language BASIC, you can create your own report files. Do not ask the corporate scheduler for help in how to do that because he isn't trained in computer programming. The predecessor/successor report created is an alphanumeric list based on the activity ID of all the activities in a schedule – there are no other ways to organize the report. In the report there is a dashed line that separates each activity. The activity in question is the one that is out dented. The activities above the out dented on are its predecessors. The activities below the out dented activity are its successors. At the top of the first page is a description of the information given in the report.

2.2.15.1. Note: P3 has the ability to organize the predecessor/successor report in the same manner as the schedule itself is organized (via the code structure). If you want the schedule and the predecessor/successor report to match, the corporate scheduler will have to create that report for you in P3.

2.2.16. **Retained logic vs. Progress override** – there were two choices available on how you want SureTrak to calculate your schedule and how it interacts with logic. There are still two choices – but you only get to use just one of them.

2.2.16.1. **Retained Logic**.

2.2.16.1.1. Definition (from SureTrak)

2.2.16.1.1.1. If an activity has been worked on (had progress) before one of its predecessors, choose how SureTrak should display this out-of-sequence progress: with retained logic, so that the rest of the schedule will continue more or less as originally planned, or with progress override, so that you can start work on the successors to the out-of-sequence activity immediately. In the past, Pankow practice was to use Progress Override as the schedule calculation method. For new projects, we will use the Retained Logic calculation method.

2.2.16.1.2. Implications to the Schedule Update Process

2.2.16.1.2.1. Note: during the process of schedule development – the use of retained logic will have no influence on logic and the creation of the schedule.

2.2.16.1.2.2. The only time retained logic will influence the schedule is during the update process when the schedule becomes an actual working tool.

2.2.16.1.2.3. The HIT/CONSEQUENCE – during the update process, if "as planned" logic changes - for whatever reason – the "as planned" logic ties – relationship and lag (if used) – will have to be adjusted to the "as built" logic relationship and lag. So during the update process, not only do you as the scheduler actualize the start and finish dates – now you will also have to adjust the logic to reflect what really happened if that logic is different from the "as planned" logic. It is an extra step in the updating process – but in doing so, the true logic of constructing the project will be maintained.

2.2.16.1.2.4. A Fix – One of the ways to avoid the adjustment of as planned logic to as built is to use finish-to-start relationships for logic ties as often as is possible and practical.

2.2.16.2. To toggle on Retained Logic; go to Tools, and then Schedule and in that window look where it says Logic and Out of Sequence, put a mark in the circle for Retained Logic. This is the only calculation method that can be used per Pankow Philosophy.

2.2.17. **Printing**. Picking printers is the basically the same operation as it is in any software package. Just make sure that when you go to print that you are hooked to the right printer.

2.2.18. **Changing the Data Date** – go to Tools, then Schedule, and right at the top of that window is the data date. Hit the down arrow and scroll to the new date and hit enter and it is a done deal

2.2.19. **To identify which predecessor or successor** of an activity is the driver, look in either the predecessor or successor boxes at the column headed "Driving". If there is a "yes" in the box, then that activity with the "yes" is the driving activity. There can be more than one activity with a "yes" in the driving box. If

this is the case than the one that is the real driver is the one with the least amount of float (including negative float).

2.2.20. **Jumping**. In both the predecessor and successor boxes there is a button that can be pushed that says, “Jump”. This is a handy tool for tracking and following the driving relationships in a schedule. Highlight the activity that you want to jump to, and hit the jump button and you are there. All the information in the predecessor and successor boxes as well as the activity form is the information for that activity that you just jumped to.

2.2.21. **Copying**. To copy a fragnet, or any activity for that matter, highlight all the activities (or individual activity) - then hit control C, control V on your keyboard and a window will appear that allows you to adjust the activity ID numbers (the counter or last 3 digits of the activity ID number). Remember the last 3 digits are placeholders only. If you happen to pick a number that already exists, SureTrak will flag you of that fact and you will have to pick another number. A fragnet can contain an unlimited number of activities – what is important is that it be a repeatable chain of events all hooked by logic. This is key because when you copy a fragnet, the copying process retains all the logic relationships within that fragnet. Once the fragnet is copied, and before you re-organize, you will you need to re-code the fragnet to account for which level or area of the building that it pertains to. This is a real important tip because if you do reorganize prematurely before you recode – all the activities that you just created will get mixed in with the ones you copied them from (remember that you are sorting by early start). You will also have to go into each activity and rename the location. Remember each activity needs to contain a noun, a verb, and the location of where that scope of work is being installed. Once you have all that done – then you can reorganize the project to have that fragnet end up in its proper place within the schedule. All that remains to do is hookup the predecessor that drives the first activity in the fragnet, a successor to the last activity, and any links between like scopes of work between fragnets to avoid trade stacking.

2.2.22. **General Note**. Primavera organizes the list of activities in an alphanumeric format based on the Activity ID. So when you go to find an activity in the predecessor, successor, and find windows, etc., the activities will first appear in an alphabetical

order based on the Subproject ID and then in a numeric order based on the Pankow Cost Code (CSI code). This will aid you in finding an activity.

2.2.23. File Types

2.2.23.1. SureTrak

2.2.23.1.1. Used if the project is an independent or stand-alone project. Avoid using this file type.

2.2.23.2. Project Group

2.2.23.2.1. Used if the project is a collection of related or unrelated projects that share project data, such as the Activity Code dictionary. Also used when you want the Baseline schedule to be used as a Target Schedule. Allows multiple users to work in different sub-projects at the same time. This is the file type to use as the default. It allows those who are P3 users to open up a SureTrak schedule without having to change its file type.

2.2.23.3. Concentric (P3)

2.2.23.3.1. This file type is used more in P3 than SureTrak and is one that we do not need to concern ourselves about yet – so again do not use it. If and when the time comes that Pankow uses P3 scheduling software as its standard then we can get into this file type.

PLAN THE WORK – WORK THE PLAN