

Basic Scheduling Rules

PLANNING:

Planning a job is to provide a clear roadmap that helps bring a project to a successful completion. This all-important roadmap involves the following key factors:

- A Network of activities that clearly reflect the project scope of work
- Dependencies that truly reflect the logic of performing the work
- Deployment of adequate Resources to perform the work
- Establishment of reasonable and valid durations for the work.

Top-down is the most logical way to planning a job and is usually the best proven approach. The scope of work is broken down into high level items (i.e. Levels 1 and 2) and later exploded into greater levels of detail as the planning process proceeds (i.e. Levels 3 and 4).

LEVEL 3 CONTROL SCHEDULE:

A well planned and well structured Control Schedule is instrumental to the successful implementation, control and completion of a project. As this is a CPM based network, it is important to understand the concepts and logic that are incorporated into the schedule and the fundamental rules that must be observed in developing such a key document.

- **Rule 1 – No Open-ended Activities**

Ensure activities are logically tied in the network so to provide for valid float calculations. A network with many open ends will result in an erroneous critical path. Ideally, there should only be 2 open-ended activities – the start and end of the Project. It is therefore a must to identify these open-ends and eliminate them.

- **Rule 2 – No Activity Stacking**

Excessive number of parallel activities, while resulting in shorter project duration, undoubtedly create “stacking” of trades resulting in congested areas, resource allocation problems, and construction safety issues. Relationship between activities must be reasonable so to allow for work to flow in accordance with accepted norms and construction practices.

- **Rule 3 – Minimize the number of Constrained Dates**

Normally, start constraints should only be used when logic cannot be effectively imposed and therefore should be used sparingly. The planning team in a given project may chose to use these in large number in order to save time and effort during the update process. If that is the case, this must be clearly documented and communicated to the project team. An example of warranted constrained dates will be to have some ESP's in the Level 3 Schedule (e.g. Building Foundations) shown as a one-day IFC activity with a Start Date downloaded from the Level 4 EPPR schedule (i.e. “IFC “Control Point date), and a Finish-to-Start tie, with the proper Lag duration, to the associated subsequent activity.

Expected Finish Dates should be used mainly in relation to long fabrication durations. This helps avoid having to adjust manually the remaining duration and thus will minimize the time and effort required during the update process. These must however be removed once the update process is completed. Otherwise, Finish constrains should be limited to key milestones.

- **Rule 4 – Control the Level of Details**

Do not repeat the details, which are already covered in the Level 4 Schedule (i.e. EPPR, MR/CP Registers, and Contractor Schedule).

Avoid unnecessary details. Too many activities will make the schedule cumbersome and hard to read. Level 3 should be limited to the ESP (e.g. one construction activity per ESP unless further detailing is warranted). Example, if foundation work for a given pump or a set of pumps takes a few days to complete, then there should not be such details as excavation, footings, base...built into the schedule but only one activity "Pump Foundation".

Do not detail the schedule all at once. In larger projects, it is best to explode the details in concert with the different stages of the project. This means that the detailing of the Level 3 should follow the 4 phases of the project, namely:

- ❖ Basis Engineering and Scope Definition.
- ❖ Detailed Engineering and Procurement.
- ❖ Construction.
- ❖ Pre-Op Testing, Commissioning and Start up.

With greater details added as the project moves from one phase to the next.

As an example, it will not be advisable to detail Pre-Op activities (beyond the one to two line activities at the Facility level) when the project is still at the Basic Engineering phase or even at the beginning of the Detailed Engineering phase. This will cloud the real issues and only render the schedule cumbersome, hard to maintain, and difficult to analyze. Pre-Op activities should be exploded when the Turnover Packages and associated logic sequence are clearly defined and agreed to, which normally takes place at the beginning of the Construction phase.

- **Rule 5 – Avoid Long Lags**

The ideal network schedule will be one that only has a "Finish-to-Start" type of relationship logic between activities. Unfortunately such a network will have to contain a greater deal of often unnecessary details for this logic to work, not to mention that it will increase to overall project duration. To alleviate this, we normally and often use such dependencies as Start-to-Start, Finish-to-Finish, etc...with varying duration lags. These lags must however be reasonably small to be meaningful.

Long lags should be avoided and replaced by a discrete activity. An example of this case will be an activity "IFC Steel" tied to an "Erect Steel" activity with an FS 100. This should be replaced by inserting an activity "Shop Detailing, Fabrication, and Delivery" between the two.

- ***Rule 6 - Zero-Free Float should be used sparingly and only when warranted.***
- ***Rule 7 – Analyze the Float***

The Critical Path determines the overall project duration and as such it is important that the activity duration and logic are valid.

Float analysis is therefore instrumental in the determination of the various Critical Paths (i.e. primary, secondary and tertiary critical paths). The float must however be reasonable for this analysis to be meaningful and reflective of the true critical paths.

Excessive floats (positive or negative) must be identified and dealt with accordingly.

These usually are a result of invalid logic and/or open-ended activities. It is mandatory to correct these errors to provide for valid float calculations.