

PM WORLD TODAY – MONTHLY COLUMN – JUNE 2010

*Series on Construction Project Scheduling*

*Editor's note: This is the 7<sup>th</sup> article in a series on construction project scheduling by Earl Glenwright, following his Guest Editorial in the January edition of PM World Today. Please read that introduction at <http://www.pmworldtoday.net/archives/2010/Jan.html>, where Earl sets the stage for a series of articles on this important aspect of managing construction projects.*

Planning Ahead: Schedule Framework Preparation

*By Earl Glenwright, PE, PSP  
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**“PLAN AHEAD”**. Who hasn't heard this phrase a hundred times? Who coined it? I don't know, maybe Confucius. Does it ever happen in the scheduling of construction work? I guess not.

The absence of schedule planning is a major problem in Construction today! [One of the May 'issues']

As construction projects become larger and more complex, with increasingly severe cost and time restraints, risk of success becomes marginal at best without adequate pre-construction detailed work and scheduling planning.

Here are some notable quotes:

**Richard Little**, Director of the Keston Institute for Public Finance and Infrastructure Policy, USC:

***“Under pressure to ‘make something happen’, much-needed pre-project planning is being neglected”***

***Construction “managers need adequate lead time to ensure the work is well-planned and coordinated”***

***“There are innumerable studies that show the greatest opportunity for efficiency exists at the pre-project planning stage.”***

***“Despite the illusion of projects being ‘shovel ready’ they generally are not”***

**Barry Lepatner**, Lepatner & Associates LLP New York NY:

*“Going in without a proper plan can make for chaos – and probably the dreaded Scope creep – down the line.”*

*“The contractors, sub-contractors and suppliers are all starting with incomplete information to bid on”.*

And Hardhat’s off to the PAROUZZI PRINCIPLE:

***Given a bad start, trouble will increase at an exponential rate.***

Of course scheduling ‘design’ is a part of ‘pre-project planning’ and that is part of the incomplete information that neither bidders nor the awardee receive. Some call it schedule ‘design’ but I use ‘Schedule Framework Preparation’ because this seems more explicit in saying what ‘it’ is. The key word is ***‘preparation’***

## **NOTE!!!**

The pre-construction Schedule Framework Preparation is **NOT** developing the schedule!

**Only** the contractor can do that according to their own resources, means, and methods.

**But**, having the Activities defined and their scope, materials, trade labor and equipment already estimated in accordance with the contract construction drawings, gives the contractor a big head start in their Schedule Development effort.

Construction is notorious for its lack of schedule planning because Contractor’s have a limited time period after Award to submit their Work Plan and Schedule. Since they have no assurance that they will be the successful bidder, they do not expend the resources required for the schedule planning effort.

While the preparation of the Schedule Framework should have been done prior to putting out a project for Bid, most often it has not been.

**This is the Contractor’s Schedule Submittal, a Catch 22 Dilemma after signing the contract:**

- Contractors are required to submit their work plan and baseline schedule to the owner within 60-90 days after contract Award or Notice-to-Proceed **[why?]**
- **Insufficient time** for schedule planning **after contract Award** and before the Notice-to-Proceed
- The Contractor has not recruited the field scheduling engineer(s), site CM, or superintendents yet

- **But**, the Contractor’s **progress/performance payments** depend on the owner’s acceptance of the contractor’s work plan and baseline schedule.

**The Result:** Contractor’s do not do a sufficient ‘planning’ effort and then the Contractor submits a ‘pro forma’ superficial schedule. **Is it Valid? Is it realistic?** Is it really the contractor’s Work Plan?

Preparation of a **realistic and valid** construction work plan and schedule requires a comprehensive understanding of the scope of work, deciding how the work will be done, and what sub-contractors and suppliers will be used. Of no less importance is the determination of which of the 3 schedule drivers [the traditional Cost/Time/Quality triad] dominate the planning and scheduling constraints.

Now, what is the reality in construction compared to other projects today?

<u>Stage</u>	<u>SHOULD BE:</u>	<u>REALITY</u>	
	<u>Effort</u>	<u>Most Projects</u>	<u>Construction</u>
Schedule <b>Planning</b>	<b>60 + %</b>	<b>15 %</b>	<b>0-5 %</b>
Schedule Development	25 +/- %	20 %	10-15 %
Schedule Management	15 +/- %	35 %	35%
Delays and Claims (Wow)	nil	30 %	<b>50 %</b>

**Experience has shown that project performance is significantly improved when planning is successfully accomplished.**

**The Construction Industry Institute (CII) Pre-Project Planning Research Team conducted a detailed study of 62 capital facility construction projects to determine how the effort expended on pre-project planning affected the success of those projects.**

The CII study reported that the pre-project planning level of effort directly affects the cost and schedule predictability of the project.

Using four significant variables of Budget, **Schedule**, Design Capacity and Plant Utilization, the CII team compared the project’s success to the project authorization estimate.

“As the level of pre-project planning increased,

- average project cost performance favorably decreased by as much as 20 percent
- average **schedule performance improved by as much as 39 percent!**

- Similarly, plant design capacity attained and facility utilization improved by about 15 percent
- In addition, project scope changes tend to decrease as the level of pre-project planning effort increases.”

**“Analysis of the data indicated that pre-project planning is vital to project success and should be adopted as a best practice of corporate business organizations that perform capital facility construction projects.”**

**Based upon those percentages of project improvement, it would seem appropriate that pre-project schedule planning efforts would be a desired investment for all large and/or complex projects.**

The *Construction Industry Institute* concluded that:

*“pre-project planning is vital to project success and should be adopted as a best practice”*

*“pre-project planning effort directly affects the cost and schedule predictability of the project”.*

In Chris Carson’s {psp} seminar, *Schedule Design: Planning for Schedule Development*, he notes that “Just as projects need to be planned, schedules need to be planned to ensure the right product is delivered to the stakeholders.” “This yields significant benefits by achieving project team buy-in at the schedule design level, and ensures that the fully developed schedule will meet all participants’ needs, from superintendent to end user of the project.”

#### **A Proposed Solution: Pre-construction schedule framework preparation during final design:**

- All features are now **known** as to location & size
- The width, depth, and height of each feature, floors, walls, and foundations are **known**
- Exterior **architectural aspects are known**: facades, roof, windows and doors
- Interior **arrangement** of rooms, hallways, stairs, etc are **located**

Between 65% and 85% of the project’s design and engineering, we know what is going to be built, and therefore we can accomplish a major portion of the schedule planning effort in this design and engineering period. After 85%, Constructability reviews will provide feedback to the planning effort and improve the pre-construction schedule planning and avoid surprises during construction.

## Design-Bid-Build Schedule Framework Preparation Tasks

65% Design & Engineering 85%

S{w}BS Major Project/Contract Components

S{w}BS Deliverables & Sub-deliverables

S{w}BS Work Packages

Work Packages:

Activity Identification & Scope

Activity Durations & Calendars

Milestone & Interface Events

Resource Estimates, Crews

Work Package Activity Hard Logic

Database Preparation & Verification

Mathematical Analysis

Soft {preferential} Logic Alternatives

End Date Determination

Milestone Designations & Dates

Construct -  
ability

REVIEW

Plan  
Update  
Revisions

Summary  
Barchart  
for S{w}BS  
Levels 1-3

RFP

Preparing the Schedule Framework usually takes from 5-7 months and will cost from \$80-120,000 depending on the size and complexity of the constructed project. Due to the time needed, it can be done concurrently and integrated with the final design and engineering work. In the completion of the design and engineering work after the 65% design review, the only persons who know the details of the structure, site, and service utilities are the project's architects and engineers. They are the ones who know the sequence and manner of how the project should be built. They, working with an experienced scheduling engineer, are the ones best prepared to plan the schedule framework. The Scheduling Engineer can be on the Owner's staff, within the architect's and/or the engineer's company, or in Design-Build projects, on the Construction Management team. A last resort would be hiring a non-project consultant experienced in the type of project and local means and methods.

Oh, come on now Earl, you can't really advocate spending \$100,000 for scheduling on a \$1 million or even \$5 million projects can you? No. Projects of these scopes are not complex, have a short duration, and are repetitions of precious jobs and therefore contractors intuitively know how they will organize the work and how they will do it with a minimum of risk. **BUT**, take a \$25m, \$50m, \$100 million project [which are not uncommon], and the investment in pre-construction schedule planning becomes very cost effective.

## ***Failing to PLAN, is Planning to FAIL !***

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Previous articles in this series by Earl Glenwright:

Construction Scheduling Specification Issue -

[http://www.pmworldtoday.net/column\\_series/2010/june/Construction-Scheduling-Specification-Issue.html](http://www.pmworldtoday.net/column_series/2010/june/Construction-Scheduling-Specification-Issue.html)

Salient Construction Scheduling Issues, circa 21<sup>st</sup> Century -

[http://www.pmworldtoday.net/column\\_series/2010/may/Salient-Construction-Scheduling-Issues.html](http://www.pmworldtoday.net/column_series/2010/may/Salient-Construction-Scheduling-Issues.html)

*Career Dilemma: The Psychology of Scheduling* -

[http://www.pmworldtoday.net/column\\_series/2010/april/The-Psychology-Scheduling.html](http://www.pmworldtoday.net/column_series/2010/april/The-Psychology-Scheduling.html)

*The Scheduling Practitioner's Role on the Project Management Team*

[http://www.pmworldtoday.net/column\\_series/2010/march/Column-Scheduling-Practitioner.html](http://www.pmworldtoday.net/column_series/2010/march/Column-Scheduling-Practitioner.html)

*Why Schedule at all?* [http://www.pmworldtoday.net/column\\_series/2010/feb/Column-WhySchedule.html](http://www.pmworldtoday.net/column_series/2010/feb/Column-WhySchedule.html)

*The Principles, Processes and Practices of Construction Project Scheduling* -

[http://www.pmworldtoday.net/column\\_series/2010/jan/Column-Glenwright-](http://www.pmworldtoday.net/column_series/2010/jan/Column-Glenwright-) And they are not the project controls engineer! [PPPOfProjectScheduling.html](http://www.pmworldtoday.net/column_series/2010/jan/Column-Glenwright-PPPOfProjectScheduling.html)

*Construction Project Scheduling Today: Issues and Controversies* -

<http://www.pmworldtoday.net/editorials/2010/jan/GuestEd-Glenwright-SchedulingseriesIntro.html>

**About the Author:*****Earl Glenwright, PSP******Author***

**Earl Glenwright, PSP**, has a career spanning 40+ years in construction project scheduling. Earl is certified as a Planning and Scheduling Professional [PSP] by the Association for the Advancement of Cost Engineering International [AACEi]. He frequently gives presentations at their annual conferences. Earl has both a BS in Civil Engineering and MBA degree and is a Registered Professional Engineer. Earl's career has included multi-year positions in several countries including Brasil, Saudi Arabia, and Sudan. He currently lives in Colorado and Bulgaria. Prior to 1988 he was employed by the [US] Bureau of Reclamation and the [US] Army Corps of Engineers. After retiring in 1988 he has been a free-lance consultant for both contractor's construction scheduling and small business Enterprise Project Management. His experience includes large and very large [super-mega] construction projects, very small projects such as construction planning, and scheduling for home construction by his Habitat for Humanity affiliate. Through his extensive scheduling experience he has been recognized as a Subject Matter Expert [SME], a Master Scheduler, and an Expert Advisor. Earl has been active in the Project Management Institute (PMI) for 30+ years. He has presented "Time & Cost" training at PMI's annual seminar-symposia, and was a member of the initial PMBoK Guide Project Team, the 2000 update team, and the project team that prepared the 3rd edition. Earl has recently presented 'workshop/seminars' for Bulgarian project scheduling and controls persons which cover the 3 phases of scheduling: framework preparation/planning, schedule development, and schedule management and control. The workbooks are dual language English and Bulgarian. Earl can be contacted at [earl\\_csss@yahoo.com](mailto:earl_csss@yahoo.com).