فرآیند یکپارچه برنامه ریزی، زمانبندی و کنترل پروژه

بخش دهم:

استاندارد اجرایی: بررسی و تایید برنامه زمانبندی از منظر افقی و عمودی

ارائه دهندگان:

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What we will learn?

- **Horizontal traceability**
  - Introduction
  - Horizontal traceability analysis

- **Vertical traceability**
  - Introduction
  - Vertical traceability analysis

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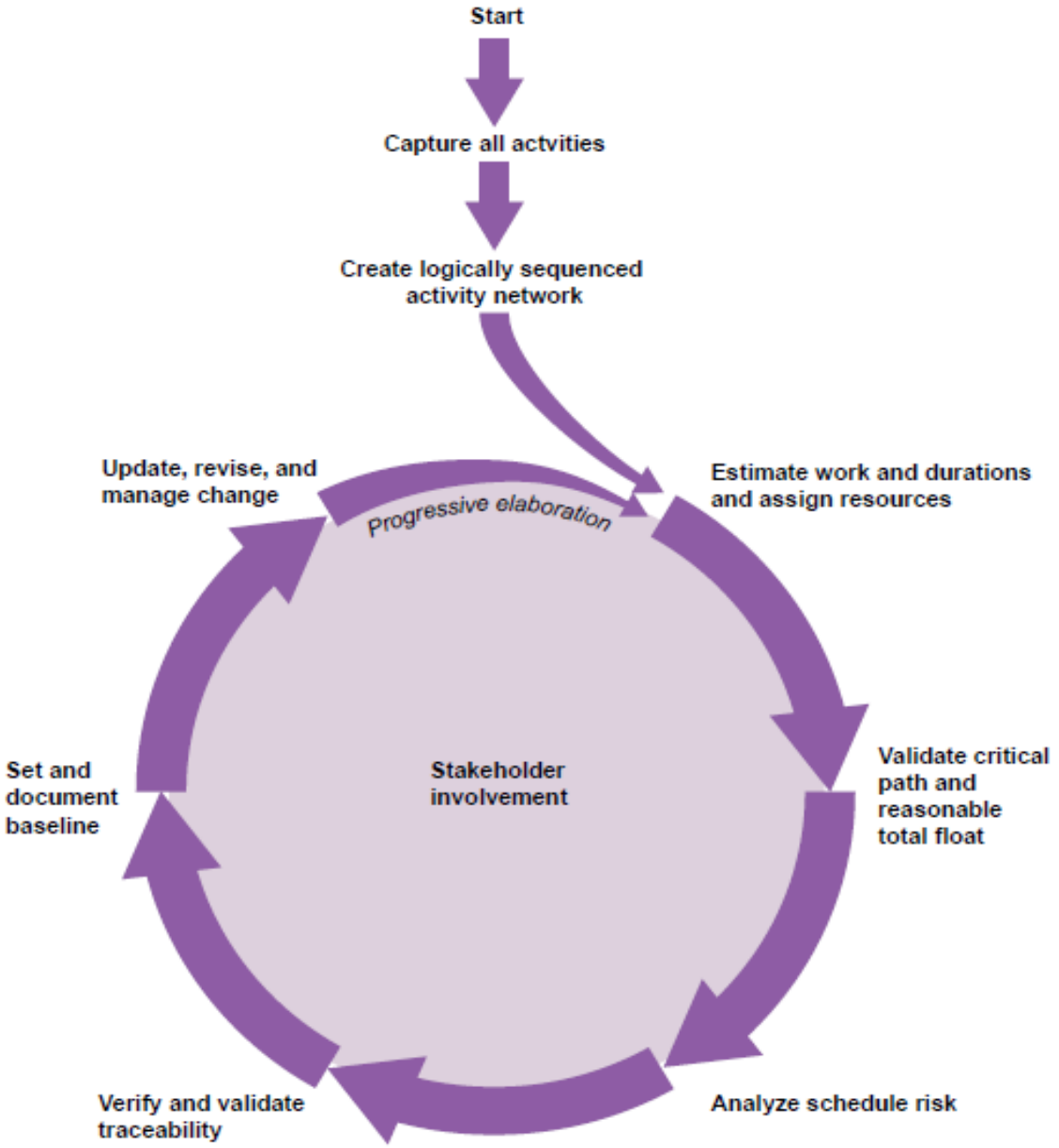
What we will learn?

- **Checklist for a scheduler for verifying that the schedule can be traced horizontally and vertically**
- **An auditor's key questions and documents for verifying that the schedule can be traced horizontally and vertically**
  - Key questions
  - Key documents

A process for creating and maintaining reliable schedules

- This is a cyclic process
- Elaborated through rolling wave process.



A process for creating and maintaining reliable schedules

Process step	Corresponding action	Section
Capture all activities	Capturing all activities	3
Create logically sequenced activity network	Sequencing all activities	4
Estimate work and durations and assign resources	Allocating and leveling resources	5
	Determining and assigning durations to activities	6
Validate critical path and reasonable total float	Critical path determination, assessment, and validation	7
	Ensuring reasonable total float	8
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Verify and validate traceability	Verifying that the schedule can be traced horizontally and vertically	10
Set and document baseline	Setting, monitoring, controlling, and Maintaining a baseline schedule	11
Update, revise, and manage change	Setting, monitoring, controlling, and Maintaining a baseline schedule	11
	Updating the schedule using actual progress and logic	12

General Information

Horizontally traceable

- It refers to the **logical relationships** and **time-phasing** between **tasks** and **milestones** from the project **start to finish**.
- It includes **predecessor** and **successor** relationships and **"hand-offs"** within and across the **various schedule sections**
  - e.g., control accounts, Integrated Product Teams, WBS elements, etc.).
- Help PM/CM to ensure **schedule predictability** for completing **key deliverables** and **events**.
- **Such links** are commonly referred to as **"hand-offs"** and **serve** to **verify** that activities are **arranged** in the **right order** for achieving **aggregated products** or **outcomes**.

Vertically traceable

- **Meaning** that **varying levels** of **activities** and **supporting sub-activities** can be **traced**.

- Vertical Integration & Traceability is defined as having demonstrable **compatibility** between the **baseline**, **actual**, and **forecast dates**, **status**, and **work scope** requirements at **all levels** of **schedule detail**.

- Vertical Integration & Traceability also demonstrates the use of **key technical information** in planning the schedule, indicating **alignment** with documents such as the **Statement of Work (SOW)**, **Work Breakdown Structure (WBS)**, and the **Integrated Master Plan (IMP)**.

Horizontal Traceability

Introduction

- **Horizontal traceability demonstrates** that **overall schedule**
  - **Is rational**
  - **Has been planned** in a **logical sequence**
  - **Accounts** for the **interdependence** of **detailed activities** and **planning packages**
  - **Depicts logical relationships** between **different program elements** and **product handoffs**.
  - **Supports** the **calculation** of **activity** and **milestone** dates
  - **Supports** the **identification** of **critical** and **near-critical** paths.

Introduction

- **Horizontal traceability** applies to **both**:
  1. **Individual** project schedule
  2. **Entire IMS**, which may consist of multiple files

Horizontal traceability analysis

- A **horizontally traceable IMS includes complete logic** from project **start** to project **finish** and **fully integrates** the **entire scope of work** from **all parties in the program**.

- **Horizontal traceability** ensures that forecasted dates within the schedule will be **determined** by **network logic** and **progress to date** rather than by **artificial constraints**.

- **Any logic errors** in the **summary**, **intermediate**, and **detailed schedules** will make **dates** between schedules **inconsistent**.

Horizontal traceability analysis

- **Detail activities**, **milestones**, and **planning packages** in a horizontally traceable schedule are **linked to one another**, **preferably** through straightforward **finish-to-start logic** at the **detailed level**.

- **Milestones representing key decisions** or **deliverables** should have **each predecessor** activity traced.

Horizontal traceability analysis

How to analyze?

1. **Benefits of networking**
   - Nothing restricts starts and finishes and the network is logic
2. **Provides correct order of execution**
   - Logical flow of task execution to accomplish technical work scope
3. **Aids in predictability**
   - The schedule's predictability is valid and no logic is missed or incorrect.
4. **Linking within a control account**
   - Linking the tasks within a control account to accomplish control account.
   - Control accounts have clear start and finish tasks or milestones that span the control account period of performance

Horizontal traceability analysis

- **How to analyze?**

5. **Linking between control accounts**
   - Since the network logic is developed at the task level, the predecessor task will be in one control account and the successor task will be in another control account.
6. **Program/Tollgate milestones**
7. **Reverse planning**
   - Approach for ensuring horizontal integration
8. **Review of logic**
9. **Critical path/Driving path check**
   - Validate the critical path and near critical path to the end of the program.

Horizontal traceability analysis

- **Giver/receiver milestones** represent **dependencies between schedules**, such as
  - **Hand-offs** between **integrated product teams**
  - **Delivery** and **acceptance** of **owner-furnished equipment**

*For example, a **production schedule** may include*

1. ***"Receiver" milestones** from **outside suppliers** representing the **delivery of material.***
2. ***"Giver" milestones** representing the **delivery** of the **produced article** to the **testing team**.*
   - *Likewise, the **test schedule** will include a **receiver milestone** that represents the **receipt** of the **production article**.*

Horizontal traceability analysis

- In particular, **"giver/receiver" (G/R) milestones**, are **common** when **multiple schedules** are **linked** to form the **IMS**.

- **"Giver/receiver" (G/R) milestones** must be clearly **identified** and logically **linked between schedules**.

Key G/R milestones should be defined in the schedule basis document.

Horizontal traceability analysis

Horizontal traceability is directly related to step where activities were sequenced and is the result of a dynamic IMS whose activities are properly sequenced.

Vertical Traceability

Introduction

- **Vertical traceability demonstrates** the **consistency** of
  1. Dates
  2. Status
  3. Scope requirements

between **different levels of a schedule:**

1. Summary
2. Intermediate
3. Detailed

Let's see what does different levels of a schedule mean!

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Introduction

- When schedules are **vertically traceable**, **lower-level schedules** are clearly **consistent** with **upper-level schedule milestones**, **allowing** for
  1. Total schedule integrity
  2. Enabling different teams to work to the same schedule expectations

Vertical traceability allows managers to understand the effect on key program and G/R milestones if their lower-level activities are delayed.

Activity owners should be able to **trace activities** to **higher-level milestones** within **intermediate** and **summary** schedules.

Vertical traceability analysis

- It is **important** to note that **vertical traceability** is **not simply** the ability to **collapse WBS elements** within the **same contractor schedule**.
  - **Vertical traceability** implies the **ability of the contractor schedule** to **roll up into the overall program schedule**, which **includes**:
    - ✓ Government activities
    - ✓ Other contractor schedules
    - ✓ Interfaces with external parties

    even if constructed in a **separate computer file** or **different software package**.

All the program's project schedule information, from the suppliers through the contractors and government agencies, should be collapsible into one overall IMS.

Vertical traceability analysis

How to analyze?

1. **IMP**
   - IMS should be aligned with the IMP.
     - ✓ Tasks and milestones in the IMS are directly traceable to IMP events and criteria.
2. **SOW**
   - The SOW and WBS elements are directly traceable to IMS activities and contractual delivery dates.
3. **TRD (technical requirements document)**
   - One should maintain traceability between TRD and IMS tasking.
4. **CLIN (contract line item) and CDRL (contract data requirements list)**
   - Ensure that all contract requirements are traceable in the IMS.
   - Guidance on the contract (e.g., reporting, formatting, etc.)

Vertical traceability analysis

- **How to analyze?**

5. **OBS**
   - Ensure that each IMS activity is assigned and traceable to one control account.
   - Ensure that each activity has an activity owner.
6. **WBS**
   - Ensure that WBS that is derived from SOW is well-developed.
7. **Control account (CA)**
   - Ensure that each discrete IMS task with resources is assigned and traceable to only one control account.
8. **Working package and planning package**

Vertical traceability analysis

- **How to analyze?**

9. Inch-stone (incremental milestone or quantifiable backup data (QBD))

- This should be traceable in the IMS in lower level schedule

10. Schedule hierarchy

- Summary master schedules
- Intermediate schedules
- Detailed schedules

Checklist For a Scheduler For Verifying That the Schedule Can Be Traced Horizontally and Vertically

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Checklist

- **The schedule is horizontally traceable. That is, the schedule:**
  - Depicts logical relationships between different program elements and product hand-offs and clearly shows when major deliverables and hand-offs are expected.
  - Includes complete logic from program start to program finish and fully integrates the entire scope of work from all involved in the program.
  - Includes milestones representing key decisions or deliverables with traced and validated predecessor activities to ensure that they are directly related to completing the milestone.
  - Clearly identifies and logically links giver/receiver milestones between schedules that are defined in the schedule basis document.
  - Dynamically reforecasts the date of a key milestone through network logic if activities related to accomplishing the milestone are delayed.
  - Is affected by activities whose durations are extended by many days.

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Checklist

- **The schedule is vertically traceable. That is,**
  - It demonstrates that data are consistent between summary, intermediate, and detailed levels including dates that are frequently validated through a process;
  - Allows activity owners to trace activities to higher-level milestones with intermediate and summary schedules;
  - Allows lower-level schedules to be rolled up into the overall program schedule, which includes government activities, other contractor schedules, and interfaces with external parties.

An Auditor’s Key Questions and Documents For Verifying That the Schedule Can Be Traced Horizontally and Vertically

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Key questions

1. Is all logic in place and has the technical content of the schedule been validated?
2. Are major hand-offs and deliverables easily identified in the schedule? How are major hand-offs and deliverables negotiated and monitored?
3. Has horizontal traceability been demonstrated by observing the effects of delaying an activity by many days within the schedule or a similar shock to the network?
4. Are the key dates consistent between lower-level detailed working schedules and higher-level summary schedules?
5. Do all lower-level activities roll up into higher WBS levels?
6. Do major milestones map between the schedule and management documents and presentations?

Key Documents

1. All representations of the schedule are given as of a specific time. These may include different levels of the same schedule used in presentations as well as schedule representation using different platforms (scheduling or presentation packages) for different audiences.
2. The integration between summary, intermediate, and detailed schedules is demonstrated.

فرآیند یکپارچه برنامه ریزی، زمانبندی و کنترل پروژه

بخش یازدهم:

استاندارد اجرایی: تنظیم، نظارت، کنترل و نگهداری Baseline در طول پروژه

ارائه دهندگان:

سید محمدرضا علوی‌پور

(PhD, PMP, CMIT)

What we will learn?

- Project Engineering planning and control
- Project Construction planning and control
- Setting a baseline
- Monitoring baseline
- Controlling and maintaining the baseline
- Checklist for a scheduler for setting, monitoring, controlling, and maintaining a baseline schedule
- An auditor's key questions and documents for setting, monitoring, controlling, and maintaining a baseline schedule

A process for creating and maintaining reliable schedules

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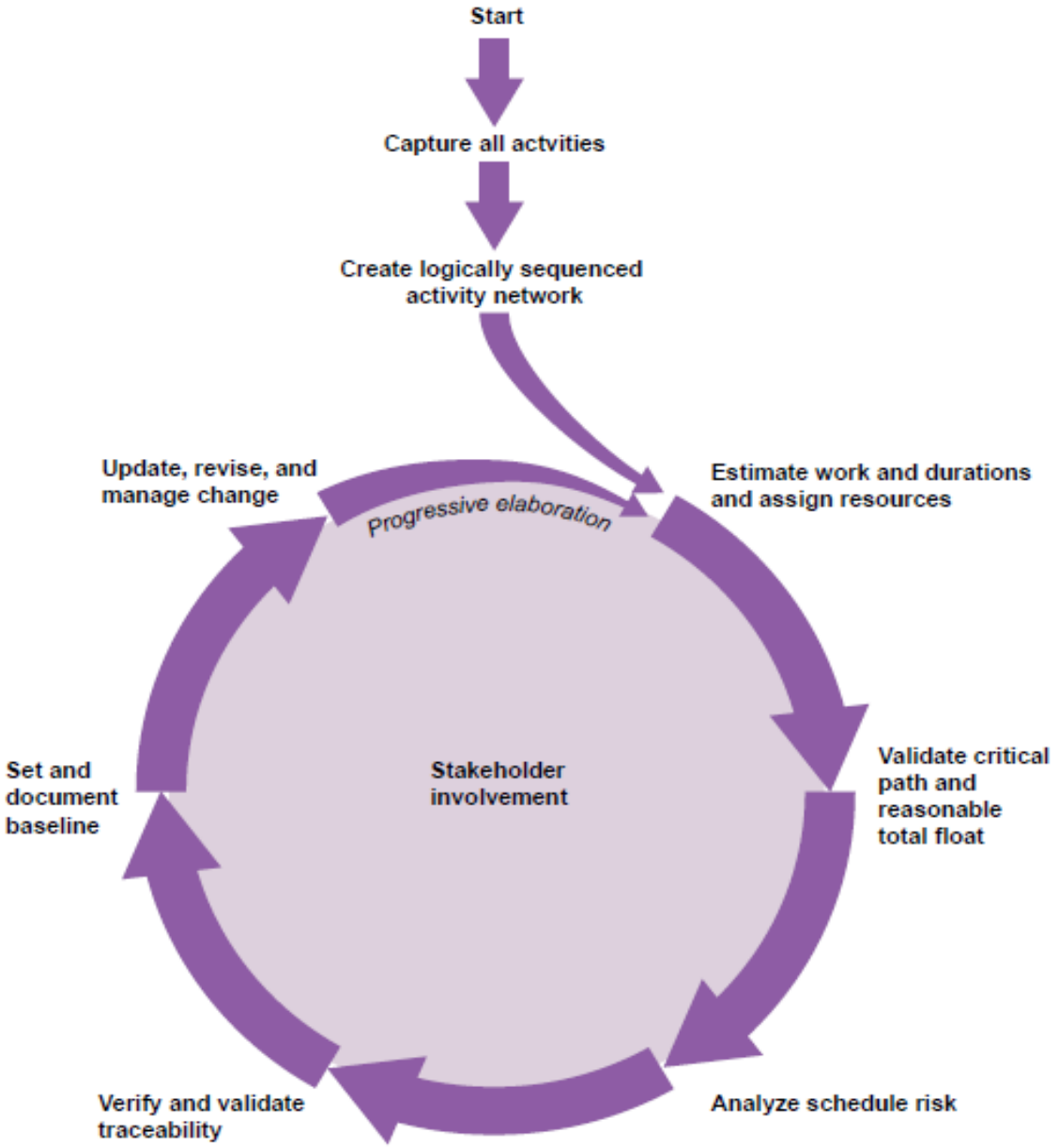

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Project Engineering Planning and Control

(Concept)

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Engineering planning and control

CII Document (P6-1)

General

A properly structured organization is key to effective management and control of any project. The planning and controlling of the engineering for a project, where multiple functional departments and many individuals are involved, is particularly complex. It is essential that the work included within the project be fully scoped and defined, and that responsibility be assigned for its accomplishment. Three types of organizational structures may be utilized for managing this work - a functional organization, a task force organization, or a matrix organization.

Engineering planning and control

CII Document (P6-1)

Control of engineering activity is generally more difficult than control of construction activity because engineering tasks are more difficult to quantify and track between start and completion, tasks are more parallel and overlapping, and the responsibility for a given design often is shared among various disciplines. The challenge is particularly great on those projects in which engineering overlaps procurement and construction. Engineering work, however, can be controlled. Succeeding chapters of this publication provide details of a system for this control.

Engineering planning and control

CII Document (P6-1)

Control of work is best based on control of budgeted work-hours for individual work activities (see discussion in following paragraphs for examples). As part of this control, there must be some method for evaluating percent complete of each activity. The methods are established during the planning operation. Methods available are summarized in Appendix A.

YOU WILL LEARN THIS IN

Project Accounting and Financial Management Course

Because you should learn CBS/WBS relationship

Project Construction Planning and Control

(Concept)

Construction planning and control

CII Document (RS6-1)

Management of the construction portion of a project is one of the most challenging management assignments in the industrial world. Upon contract award and in a short period of time, the field manager must finalize the preliminary plans developed during the pre-bid or proposal phase, order materials and construction equipment, erect construction support facilities, and recruit and mobilize a construction force. Then, while fighting the vagaries of weather, material deliveries, regulations, local politics, changes, and other intervening factors, the manager must guide the efforts of an unpredictable labor force towards a completion date. Of course, the objective is to complete the project under budget and on schedule while surpassing the quality requirements of the specifications.

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Construction planning and control

CII Document (RS6-1)

Project controls is a major function on a construction project that is equal with engineering, business management, procurement, and quality control. As the eyes and ears of management, it should be placed organizationally to respond directly to the field project manager. By no means should it be an element under accounting or data processing. Placing it under project engineering, while not illogical, is not recommended because that operation already has enough responsibilities to fully absorb the attention of the project engineer. This approach also opens the possibility of restricting or prohibiting the flow of control information to other interested parties. The project controls staff functions most effectively when in an independent mode.

Construction planning and control

CII Document (RS6-1)

A computer system will be required to support project controls on all but the smallest of projects. This system should be operationally independent of other systems, such as accounting and payroll, since the system needs to be available at all times. It cannot afford to wait out the production of the payroll. Fortunately, with the capabilities of modern micro and minicomputer systems and associated project controls software, the independence of project controls is affordable and easy to achieve. While the project controls system should be operationally independent of the accounting system, it is desirable to link the two since much of the raw input data is used in both systems. This linking should be designed so that data input is needed only once.

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Construction planning and control

CII Document (RS6-1)

Project controls personnel should be individuals familiar with field operations. Project controls work provides experience in cost, schedule, and materials management, and is a logical step on the career ladder for project management.

Construction planning and control

CII Document (RS6-1)

The project controls function is a key element of proactive project management. As such, its staff should be represented in all work planning. It is the guardian of the Control Budget and Control Schedule, thus it must be organized to advise and assist in any matter involving either. On a routine basis, the project controls staff will prepare status reports for both contractor and owner. The staff also will continually monitor project status for the purposes of identifying unfavorable conditions or trends, preparing appropriate recommendations for project management to control or eliminate negative deviations in cost or schedule, or to capitalize on favorable trends.

Construction planning and control

Although we have some updates in this year regarding CII

1. **Many parts of this document will be added next year**
2. **Some of them are also added to the EVM in Accounting and Financial Management Course**

Setting a Baseline

(Concept)

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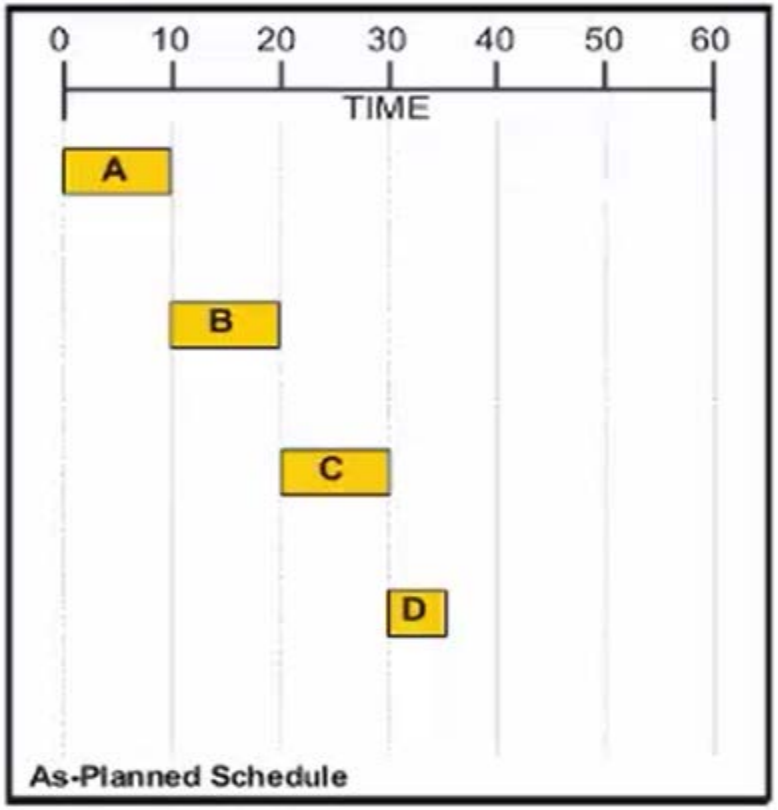
Definition of baseline or as-planned schedule

- The **original schedule** created at the **beginning** of the project **against which** the **project's progress** is **measured**.
- This schedule is **typically saved** as a **separate**, **read-only file** so that it **cannot** be **overwritten** or **modified** and can be referenced later in the project.
- Schedule **submitted** by the **contractor** and **approved** by the **owner**.
- **Important** because you may **have many schedules at the beginning**, but it is **final approved one**.
- It is the **only project document** that depicts the entire project's as-planned **construction sequence**.



Definition of baseline or as-planned schedule

- A **baseline schedule** signifies the **consensus** of **all stakeholders.**
- It is **consistent** with both the **program plan** and the **program budget plan**.
- The baseline schedule includes:
  - Forecasts for activity start and finish dates
  - Original estimates for work
  - Resource assignments
  - Critical paths
  - Total float

Baseline creation and approval

- A **schedule baseline** is typically in place **between 3 and 6 months** of **contract award**, **although** the timing **depends** on contract size and type, requirements, and risk.

۱۸-ب)

پیمانکار متعهد است که سازمان، روش اجرا و برنامه زمانی تفصیلی اجرای کار را طبق نظر مهندس مشاور بر اساس نقشه‌های موجود. برنامه زمانی کلی تهیه کند و ظرف یک ماه از تاریخ مبادله پیمان یا مدت دیگری که در اسناد و مدارک پیمان تعیین شده است، تسلیم مهندس مشاور نماید تا پس از اصلاح و تصویب کارفرما برای اجرا به پیمانکار ابلاغ شود. اگر در اسناد و مدارک پیمان، جزییاتی برای چگونگی تهیه برنامه زمانی تفصیلی و بهنگام کردن آن تهیه شده باشد، پیمانکار ملزم به رعایت آن می‌باشد.

- **Projects** should **operate** on an **interim schedule** **until** the schedule **baseline** is in **place**.

- The **level of detail** in the **baseline** schedule also **depends** on
  - Contract type
  - Industry type
  - Risk
  - Agency guidelines

Baseline creation and approval

What to do in case of rolling wave process?

- **Baseline creation** and **approval** may take place in in **conjunction** with the program's **rolling wave process**.
  - **As periods** of **summary** and i**ntermediate-level** planning packages are planned in **greater detail**, the **baseline** is **updated** to reflect that detail.
    - ✓ The **parties** should **agree** that:
      1. **Baseline** refers to the **maintenance** of a schedule for **meeting:**
         1. Contractual deliverable
         2. Program control milestones

         It typically does **not constitute** a **strict adherence** to **estimates** of **activity durations**, **resource assignments**, or **logic**.

Setting a Baseline

(Schedule basis document preparation)

Schedule basis document

- A **schedule basis document** is a **single document** that **integrates** all **owner** and **contractor** work into one **comprehensive program plan** that:
  - Defines organization of the IMS
  - Describes the logic of the network
  - Describes the basic approach to managing resources
  - Provides a basis for all parameters used to calculate dates

Schedule basis document

- The **owner's representative approves** the **schedule basis document** once the **schedule baseline** is **approved**.
- Both the **baseline schedule** and **basis document** should be **referenced** and **updated** in accordance with the **established change process** as the program progresses.
  - **Basis document** should be considered to be a **life cycle and living document** in that it reflects **updates** to the **baseline schedule.**

What should be included in the "schedule basis document?"

AACE 38R-06 and GAO

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Schedule basis document – AACE 38R-06

The schedule basis document describes essential elements of information such as these listed below:

- Project Description, Schedule Integration Process
- Scope of Work (WBS, OBS)
- Execution Strategy
- Key Project Dates
- Planning Basis
- Cost Basis
- Critical Path
- Path of Execution
- Punchlist, Turnover, and System Startup
- Issues and Concerns
- Risks and Opportunities
- Assumptions
- Exclusions
- Exceptions
- Baseline Changes/Reconciliation
- Schedule Reserve
- Project Buy-In

Read File #1

Schedule basis document – AACE 38R-06

Checklist

APPENDIX A: FORMAT FOR THE BASIS OF THE SCHEDULE

I. Project introduction: project title, contract number, date of contract documentation

II. Project description, schedule integration process
- a. Introduction and description of the project
- b. Schedule integration process
  - i. Integration of engineering, procurement deliveries, owner furnished fixtures or equipment, or commissioning "by others"
  - ii. Integration and coordination with subcontractors
  - iii. Master project schedule – responsibility of owner, GC, or CM
- c. Schedule development checklist

III. Scope of work. Includes:
- a. Work breakdown structure
- b. Organizational breakdown structure
  - i. Project team & stakeholders
- c. Division of responsibility
- d. Regulatory permits and licensing
- e. Scope exclusions and inclusions

IV. Execution strategy
- a. Define project type
- b. Funding (identify the funding source and cash flow profiles)
- c. Contracting strategy
- d. Procurement strategy
- e. Constructability issues
  - i. Resource demand
  - ii. Logistics
- f. Total number of calendar days: from start date to end date
- g. Contract performance periods
- h. Acceleration – options to improve schedule

V. Key project milestones and key events
- a. Key interface dates
- b. Winter productivity dates, summer extended workweek dates
- c. Source of time frames for bids, award, fabrication, and delivery
- d. Basis of time frames for shop drawings, review and approval
- e. Key material samples and submittals
- f. Mock-ups–construct/erect, review and approval dates
- g. Safety and quality: hold points and key inspection dates

VI. Planning basis
- a. Resource planning methodology, crew size expectations and capacity planning
  - i. Travel & housing plan, as well as an understanding of local hire vs. travel cards.
- b. Activity identification, duration estimating: define methodology for establishing activity durations, which may include crew mixes, crew sizes
- c. Project calendars, shift calendars, and crew calendars
- d. Storage facilities, lay-down areas, staging areas usage plan
- e. Logic and sequencing methodology
- f. Labor productivity adjustments & congestion assessment
  - i. Extended work hours, winter work
  - ii. Document all production rates
- g. Equipment utilization plan

Schedule basis document – AACE 38R-06

Checklist

h. Equipment, modular, fabrication and bulk delivery methodologies/strategies
i. Basis for contractor schedules
j. Start-up and sequencing requirements
k. Owner requirements (regulatory, environmental, quality/inspection requirements)

VII. Critical path(s)
a. Description (written) of critical path(s)

VIII. Path of Execution
a. Description of "execution sequencing"
i. Execution priorities list
b. Path of Execution
i. Identifies access restrictions

IX. Punchlist/turn-over/system start-up
a. Testing and functional checkout: mechanical, electrical, plumbing, pre-commissioning

X. Issues and concerns list/log

XI. Risk and opportunities
a. Qualitative risk assessment
i. Risk event log
b. Quantitative risk assessment
i. Schedule risk assessment
1. Probability report
c. "Time versus cost" comparison with budget

XII. Assumptions report

XIII. Exclusions report

XIV. Exceptions report

XV. Baseline changes/reconciliation
a. Baseline change (not a recovery plan, used for stage/gate processes)
b. Reconciliation between master and contractor schedules

XVI. Schedule reserve
a. Schedule "confidence" report
b. Application of schedule reserve (for scheduled activities)
c. Schedule identifying activities with schedule reserve

XVII. Scheduling techniques and software
a. Software compatibility with other project control systems
b. Logical relationships
c. Leads/lags
d. Constraints used
e. Multiple calendars used
f. Activity coding structure/dictionary
g. Float usage
h. Preferential logic
i. Compliance with contract scheduling specifications

Schedule basis document – GAO

- **At a minimum, the basis document should include the following:**

1. **General description of the program:**
   - ✓ General scope
   - ✓ Key estimated life-cycle dates
   - ✓ Descriptions of each stakeholder, including
     - o Program owner
     - o Prime contractor and subcontractors
     - o Key stakeholder agencies
2. **General description of the overall execution strategy:**
   - ✓ Type of work to be performed
   - ✓ Contracting strategies
   - ✓ Procurement strategies

Schedule basis document – GAO

- **At a minimum, the basis document should include the following:**

3. General description of the overall structure of the IMS:

- ✓ Scope and purpose of each project
- ✓ Staff responsible for each project
- ✓ Relationship between projects
- ✓ WBS dictionary
- ✓ Status delivery dates for each project
- ✓ List of key hand-off products and their estimated dates.
- ✓ Relevant **contract data requirements** **lists** and **descriptions** associated with **schedules**.
  - o It is part of **procurement/bidding** document that describes the **standardized format** and **instructions** for preparing and delivering data.

Schedule basis document – GAO

- **At a minimum, the basis document should include the following:**

4. General description of the settings for key options for the relevant software

- ✓ Criticality threshold
- ✓ Progress override contrasted with retained logic
- ✓ Calculation of critical paths
- ✓ Work progresses with duration updates

5. Documentation of each project

- ✓ Activity durations
  - o A justification of each use of a long-duration activity in the near-term.
  - o A description of how LOE activities are identified and statused.
  - o Definitions of all acronyms and abbreviations.
- ✓ key dates or milestones for detail and planning periods are defined.
- ✓ Missing successor or predecessor logic is also justified.

Schedule basis document – GAO

- **At a minimum, the basis document should include the following:**

5. Documentation of each project

- ✓ Resources used in the plan and the basic approach for
  - o Updating resource assignments
  - o Projecting average and peak resource demand
  - o Defining of all resource groups used in the schedule
  - o Justification of planned overallocations in appropriate detail
- ✓ A justification of each use of a lag and date constraint
- ✓ Resource calendar, along with a rationale for workday exceptions (holidays, plant shutdowns, and the like)
- ✓ Working times
- ✓ Planned shifts

Schedule basis document – GAO

- **At a minimum, the basis document should include the following:**

5. Documentation of each project

- ✓ A description of critical paths, longest paths, and total float
- ✓ A discussion of the critical paths including justification for:
  - o Criticality threshold
  - o Rationale for single or multiple critical paths
  - o Any gaps in a noncontinuous critical path
  - o A description of the longest if the project has constraints
  - o Abnormally large amounts of total float
- ✓ A description of the critical risks as prioritized in a quantitative schedule risk analysis
- ✓ A discussion of the appropriate schedule contingency

Schedule basis document – GAO

- **At a minimum, the basis document should include the following:**

5. **Documentation of each project**
   - ✓ A detailed description of the updating
   - ✓ A detailed description of schedule change management processes
   - ✓ Any additional documentation that governs updates and change management process is referenced
   - ✓ Assumptions and rationale taken for relationship between duration, effort, and assigned resource units
   - ✓ A table of the purposes of custom fields.

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Conclusion

Thorough documentation helps with analyzing changes in the program schedule and identifying the reasons for variances between estimates and actual results.

So, we need to maintain the baseline through a change process that will be mentioned in this section

Monitoring the Baseline

(Project execution)

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Short-interval schedule – Definition

- **Project schedules** or **networks** address an essential need for **owners** and **top-level project managers** and **superintendents**.
- **Project networks** generally do **not provide** the **necessary detail** on a **day-to- day** or even a **task-to-task** basis.
  - In essence, a **more detailed plan** must be developed in order to **bridge the gap** at the **crew level**.
    - ✓ This can be **done** through the use of schedules that **cover short periods of time**, such as **1, 2, or 3 weeks**.

Such schedules for organizing the activities of crews are short-interval schedules, also referred to as look-ahead schedules, window schedules, "rollup" schedules, 2-week schedules, or short-range plans.

Short-interval schedule – Definition

- **Short-interval schedules** are a **vital link** between the **IMS** and the **execution of specific tasks**.
- **Short-interval schedule** is an acknowledgment that **limitations** of the **IMS** are severe when trying to plan activities for a short duration.
  - **Short-interval schedules** address that **limitation**.
- **Short-interval schedule** is typically **more accurate**.
  - This is **because** this schedule **must be current**.
  - **While** the **IMS** may be **permitted** to **slip** considerably before it is updated, **short-interval schedules** must be **current** and must therefore reflect conditions as they **actually exist**.

Short-interval schedules can be prepared with accuracy only when clear lines of communication exist between the various parties involved in the construction process.

Short-interval schedule – Definition

With this link between these tasks, the **short-interval schedule** should be **tied** to the **IMS**

as an **additional level of detail**.

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How contractors use short-interval schedules?

- **IMS** schedule is used as the basis for developing **short-interval schedules**.
  - The **daily work plans** that are prepared to describe the **duties and tasks** of individual workers are developed from the **short-interval schedules**.

*The **IMS** is typically prepared by the **project manager (hopefully with input from the job superintendent)**, and the **short-interval schedules** are ideally prepared with input from the **various craft supervisors**.*

- **Supervisors** must **anticipate** the **short-term resource requirements** as identified in short-interval schedules:
  - Materials
  - Equipment
  - Labor
  - subcontractors

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How contractors use short-interval schedules?

- **Common items** to be covered in **short-interval schedules** that are **not included** in the **IMS**:
  - All “work in place” activities
  - Material and equipment deliveries
  - Quantities of selected materials (concrete, water, and fuel)
  - Work performed by subcontractors
  - Equipment maintenance
  - Safety enhancements
  - Quality control (inspections)
  - Issuance of permits
  - Surveying functions (setting grades, alignments, and control points)
  - Planned delays (shutdowns, holidays, and company picnics)
  - Regulatory constraints
  - Owner functions involving the project (meetings and inspections)
  - Project events involving third parties
  - Delays

Care must be exercised to avoid assigning two different crews to perform work in the same area.

How contractors use short-interval schedules?

- The **2-week schedules** were organized to cover the **upcoming 2-week period.**

2-WEEK SHORT-INTERVAL SCHEDULE

Date →																	
Activity	Respon.	F	S	S	M	Tu	W	Th	F	S	S	M	Tu	W	Th	F	Comments

Project: _____ Date Prepared: _____ Prepared by: _____

How contractors use short-interval schedules?

- The **3-week schedules** were either organized to cover
  1. Upcoming 3-week period
  2. Upcoming 2-week period

  with a look back that recorded the accomplishments of the previous week

3-WEEK SHORT-INTERVAL SCHEDULE

Date →																								
Activity	Respon.	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	Comments
Project: _____ Date Prepared: _____ Prepared by: _____																								

How contractors use short-interval schedules?

- The **3-week schedules** were either organized to cover
  1. Upcoming 3-week period
  2. Upcoming 2-week period

  with a look back that recorded the accomplishments of the previous week

3-WEEK SHORT-INTERVAL SCHEDULE

Contractor:_____ Schedule Period: ___/___/___ to ___/___/___ Page ___/___
Project Title:_____ Date Prepared:_____ Prepared by:_____
Job No._____ Month →

Line	Master Activity	Work Item	Day of Month → / Crew ↓																		Special Requirements or Comments on Delay
				M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	

KEY: ☐ Scheduled Activity ☒ Completed Activity

How contractors use short-interval schedules?

When to prepare short-interval schedule?

- For **short-interval schedule** that covers **2 full weeks** of construction activity:
  - ✓ The **ideal time** in which to prepare this schedule would be the **Thursday or Friday** of the week **immediately preceding** the **scheduling period**.
    - This will result in an **accurate schedule**, as **only** the work actually accomplished on **Friday** of that week **must be estimated**.
    - **If** prepared **a week earlier**, the short-interval schedule **may not be current** because of the **variability** of the work actually performed between the **time of schedule preparation** and the **beginning point of the short-interval schedule**.

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How contractors use short-interval schedules?

❑ When to prepare short-interval schedule?

❖ Short-interval schedules are prepared **each week**.

✓ **Although short-interval** schedules **tend** to emphasize the activities and **events** to take place during the **upcoming week**,

Short-interval schedule should be prepared **each week**, because:

- If a **crew** was to produce at a **faster-than-planned rate,** the schedule for the **second week** would be **activated early**.

At any rate, looking a few weeks into the future serves a valuable function in getting all parties to begin devising their own work plans.

How contractors use short-interval schedules?

- **Short-interval schedules** are structured in an **open-ended fashion**.
  - *This allows a **particular type of format** to be utilized on **many different projects without** making any **modifications** to the **general format** as projects change.*

Some firms used 4-week schedules in which 1 week documented the previous week's work and the remainder planned the activities for the upcoming 3 weeks.

- These provide a basis for establishing **continuity** from a **week past** to the **upcoming week**.
  - This link between the **past week** and its **following weeks** could be useful in preparing an **as-built schedule**.

Why we need as-built schedule?

How contractors use short-interval schedules?

- Since short-interval schedules contain considerable detail, this **historical record** can be very valuable.

2-Week Short-Interval Schedule

Date														
Activity	Respon.	M	Tu	W	Th	F	S	S	M	Tu	W	Th	F	Comments
Main Bldg.														
Struct. Steel	STI													
West wing		Stair		Deck	Deck	Insp.								
East wing			Deliver		Steel				Columns		Beams		Deck	
Conc.Deck	R-mix								Pour					Order 3 days early
Fireproofing	ISC	1st	floor	2nd	floor							3rd	floor	
Sprinkler	Jackson		piping									piping		Verify by phone

Project: Rec. Center Date prepared: June 6, 2003

Prepared by: J. Hazden

How contractors use short-interval schedules? – Punch list

- **One type** of **short-term schedule** is the **punch list**.
- The punch list is a form that is generally prepared by the **owner's representative** at the point of **substantial completion**.
- The punch list is used to document the **remaining shortcomings** in the project before it can be declared to have **reached final completion**.
- The punch list itself can take a **variety of forms**.

Punch list

- This **figure** is a punch list that might be used on a **building project**.
  - Naturally, **civil projects** or **industrial projects** utilize **different lists of items**.

PUNCHLIST

Project: _____ Prepared by: _____

Room #: _____ Date: _____

Feature	Spec No.	North	South	East	West	Comments	√
1. Walls							
-Paint							
-Wall Board							
-Base							
-Electric							
2. Ceiling							
-Acoustic							
-Soffit/Coves							
-Wall Board							
-Electric							
-Mechanical							
3. Floors							
-Carpet							
-Tile							
-Fin. Concrete							
-Wood							
4. Doors							
-Frame							
-Jamb							
-Hardware							
-Operation							
-Seals							
5. Windows/Skylights							
-Frame							
-Glass							
-Hardware							
-Operation							
-Seals							
6. Casework							
-Finish							
-Electrical							
-Mechanical							
7. Other							
-Built-ins							
-Furr Downs							

How contractors use short-interval schedules? – Daily project schedule

- Another type of **short-term schedule** is **daily project schedule**.
- The **daily project schedule** is on an even **shorter time** frame **than** the **punch list**.
- It includes:

1. **Specific tasks** to be performed by the **employees** of
   - General contractor
   - Various subcontractors
2. **Tasks** to be performed by **engineering**, with **separate tasks spelled out** for the **surveying crew**.
3. **Large equipment** on the site is scheduled for the **day on an hour-by-hour** basis.

The daily project schedule can take many forms.

Daily schedule

- Sample 1

DAILY PROJECT SCHEDULE
Tasks to Be Performed

Project: _____ Prepared by: _____
Date: _____

Work Items Today	Foreman/Crew
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Work Items Today	Subcontractor
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Work Items Tomorrow
1.
2.
3.

Work Items Tomorrow
1.
2.
3.

Survey Tasks Today
1.
2.
3.

Engineering Tasks
1.
2.
3.

Mat'ls Needed	
1.	5.
2.	6.
3.	7.
4.	8.

General Notes
1.
2.
3.
4.

Equipment Description	Hrs 7–8	8–9	9–10	10–11	11–12	1–2	2–3	3–4	4–5	Remarks
1.										
2.										
3.										
4.										
5.										
6.										

Daily schedule

- Sample 2

Daily Schedule

Date: _____
Daily Activities
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.

How contractors use short-interval schedules? – Daily crew schedule

- Another **short-term schedule** is one that is focused on the **crew level**.
  - e.g., foremen or first-line supervisors
- **Daily crew planning chart** has its **drawbacks**.
  - For example, if **two crews** suddenly have a need for the same **front-end loader** that **neither of two foremen anticipated** at the beginning of the day, the **conflict** between the two crews might have been **resolved** if **daily crew schedule** is used.

In actual practice, these daily crew planning charts exist in a variety of forms

Daily crew schedule

DAILY CREW PLANNING CHART

Tasks to Be Performed

Crew: _____ Prepared by: _____

First Line Supervisor: _____ Date: _____

Worker	7–8	8–9	9–10	10–11	11–12	12–1	1–2	2–3	3–4	4–5
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

Materials Needed
1.
2.
3.
4.
5

Major Tools Needed
1.
2.
3.
4.
5.

Equip. Plan	7–8	8–9	9–10	10–11	11–12	12–1	1–2	2–3	3–4	4–5
1.										
2.										
3.										

Contingency Tasks to Perform (when time is available)
1.
2.
3.
4.

Comments and Notes
1.
2.
3.
4.

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How contractors use short-interval schedules? – Pretask plan

- Some plans such as **pretask plan** take place **more frequently than daily**.
- **Pretask plan** is prepared **prior** to the **performance of each task**.
- **Pretask plan** is **implemented** at the **crew level**.
- **Steps to prepare and use pretask plan:**
  1. **Before** a **new task is performed**, the **foreman or a designated worker** will **meet** with the **crew** to **discuss** how the upcoming task is to be performed.
     - **Although work planning** is **discussed** at this meeting, **particular emphasis** is placed on
       - ✓ **Ensuring** that the task will be performed in a **safe manner**.
       - ✓ **Possible ways** that an **injury might occur** when using the **proposed approach**.

How contractors use short-interval schedules? – Pretask plan

- **Steps to prepare and use pretask plan:**

2. **When** the **crew** has **reached** a **consensus** on how the task is to be performed, **each member** of the crew is asked to **sign the form**.
3. **Pretask plan** is generally **posted** in the **work area for inspection** by other **supervisory** or **safety personnel**.

*It is possible that a **single crew** might have four or **five pretask planning meetings** in a single day.*

*These have been found to be particularly **effective in reducing** the **incidence of injuries** on construction projects.*

Pretask plan

- The **pretask planning form** contains some of the **common hazards** resulting in injury that are listed to help the crew focus on the **possible hazards associated** with a particular task.
- As suggestions of potential hazards are offered, **means** are sought to **minimize or eliminate** those potential hazards.

Pretask Plan

Foreman:

Date: Time: AM or PM

Project:

Location:

Task: _____

_____

_____

_____

Potential Hazards Present

☐ Pinch points	☐ Chemical burn
☐ Materials/scrap	☐ Thermal burn
☐ Elevated work	☐ Slips, trips, falls
☐ Cave-in	☐ Electrical shock
☐ Cuts	☐ Fire
☐ Heat stress	☐ Noise
☐ Rigging	☐ Overhead work
☐ Strains, sprains	☐ Harmful vapors
☐ Abrasions	☐ Overextension

Hazard Elimination

Personal Protective Equipment

☐ Safety harnesses	☐ Special gloves
☐ Protective clothing	☐ Eye protection
☐ Hearing protection	☐ Face shields
☐ Safety footwear	☐ Respirators

☐ Other: _____

_____

Specific Safety Measures

☐ Toeboards, netting	☐ Eyewash, shower
☐ Use monitor	☐ Housekeeping
☐ Slope, shore, t-box	☐ Scaffold
☐ Set safe position	☐ Contain sparks
☐ Fire extinguisher	☐ Erect barricades
☐ Use proper tools	☐ Get help
☐ Change procedure	☐ Contain materials

☐ Other: _____

_____

Items Verified

☐ Permits obtained ☐ Task reviewed

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Pretask plan

Potential Hazards Present (cont'd)		Items Verified (cont'd)	
☐ Particles in eye	☐ Confined space	☐ Lines drained/purged	☐ Others informed
☐ Lockout/tagout	☐ Dropped items	☐ Close drains/vents	☐ Chemical burns
☐ Spill hazard	☐ Open holes	☐ Safety gear present	☐ MSDS reviewed
☐ Overhead work	☐ Asbestos/lead/etc.	☐ Check for low points	☐ LOTO in place
☐ Other: _____		☐ Other: _____	

Description of procedure to perform task: _____

Signatures of persons performing the work

(By signing this form, crew members indicate that they understand the task plan and feel fully prepared to proceed to perform the work safely.)

Short-interval schedules in the contract

- Some construction **contract documents** **mandate** the use of **short-interval schedules**.
- The **90-day schedule** is one in which **sufficient detail** is required in order to:
  1. **Show** the nature of the **activities** that will occur on a **week-by- week basis**
  2. **Cover** a **long time period** during which **progress** can be effectively **monitored**

90-DAY WORK SCHEDULE

Activity	Month / Week												Comments
		1	2	3	4	1	2	3	4	1	2	3	4	

Project: _____ Firm: _____ Date Prepared: _____ Prepared By: _____

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Short-interval schedules in the contract

- **One provision** in a contract on a **large subway project** included the following provision **concerning a 90-day work schedule**:

A schedule covering the first ninety days of the Contract shall be submitted within fifteen days following the date of the Notice to Proceed. The schedule shall be time-scaled and resource loaded for workforce requirements and shall be submitted in critical path method (CPM) format. Work items defined in the schedule shall not exceed fourteen days in duration. The submittal shall be accompanied by a written narrative that describes the schedule and the approach to the work that the Contractor intends to employ during the initial ninety-day period of the Contract.

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Short-interval schedules in the contract

- The **U.S. Army Corps of Engineers** employed the following provision in one of its contracts. Note that **greater detail** is required in this provision.

A preliminary schedule defining the Contractor's planned operation during the first 90 calendar days after notice to proceed will be submitted within 25 days after notice of award or prior to the start of work, whichever is earlier.

The Contractor's general approach for the balance of the project shall be indicated in short-interval schedule.

Costs and resources of activities expected to be completed or partially completed before submission and approval of the whole schedule should be included.

Monitoring the Baseline

(Project monitoring)

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Monitoring and control

- **Project control** can be reduced to **two basic components**.
  1. **Monitoring:**
     - Consists of a means of **understanding** **what is happening** on a project, **obtaining information** about the project **by some means**.
  2. **Control:**
     - Consists of **action taken** in **response** to the **information**.

Thus, it is not sufficient to simply know what is happening on a project; knowledge carries with it the responsibility to respond to the available information.

Monitoring project status

- In order for a **schedule** to be an **effective management tool**, it must be **used**.

- The **first step to use** a schedule is to **monitor progress** in relation to the schedule.

- **In order to the monitoring** of construction activities to be a manageable task, the scheduled items must be organized in a **rational manner**.
  - Work breakdown structures (WBS).

Thus, the WBS helps to monitor progress in terms of both time and money.

Monitoring project status – Small projects

- **Monitoring** can be accomplished through **direct observation**.
- This consists of **field visits** made to the site to determine the **actual status** of a project.
  - In very **small companies,** it is common for the **owner** of the firm to be resident on the project.
    - ✓ Such an owner is **not in need** of any **formal mechanism** of obtaining feedback; the owner will process **ongoing observations intuitively**.
  - **Direct observations** could also be made by a **project manager** who may visit the site on a **daily basis**.

Direct observation is appropriate as the sole monitoring mechanism where there is a short span of control or a shallow hierarchy.

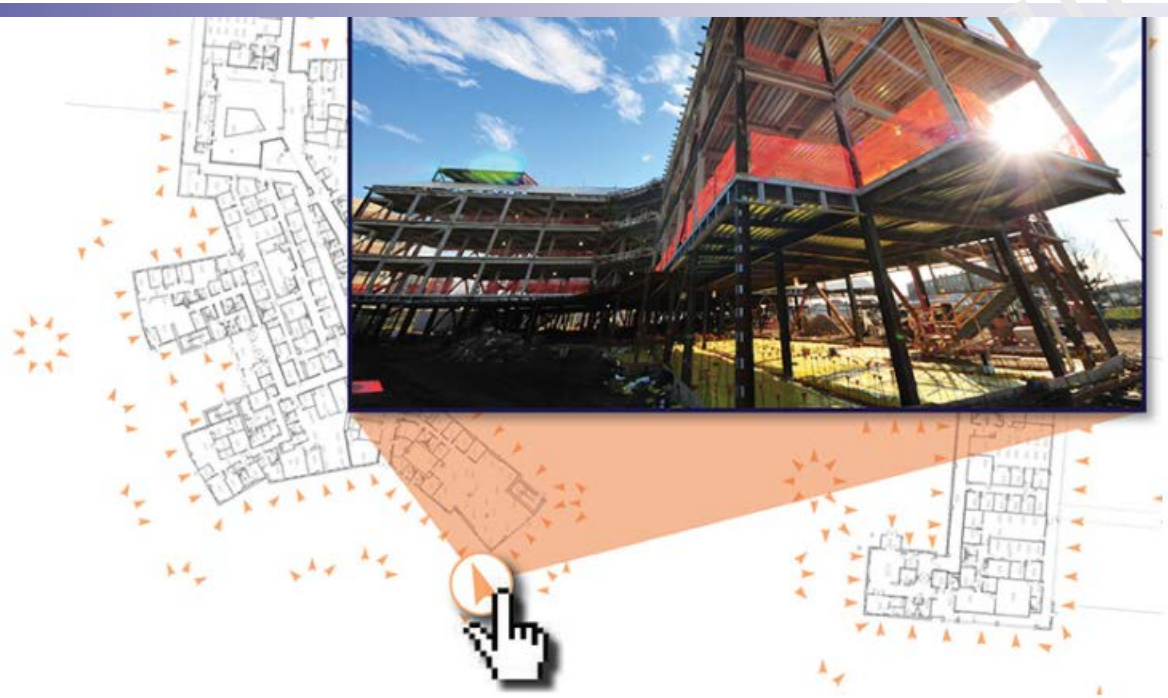
What if the firms get larger and projects get more complex?

Monitoring project status – Large projects

- **Capturing information** about **construction progress**.

- **One common method** is **photography** to record progress and provide **documentation**.
  - **Sequential pictures** taken at **regular intervals** (every day, every week).
  - On some projects, **progress photos** are required by the **owner in the contract**.
  - **Photographs** also serve as a **documentation for claims**.

Monitoring project status – Large projects



Monitoring project status – Large projects

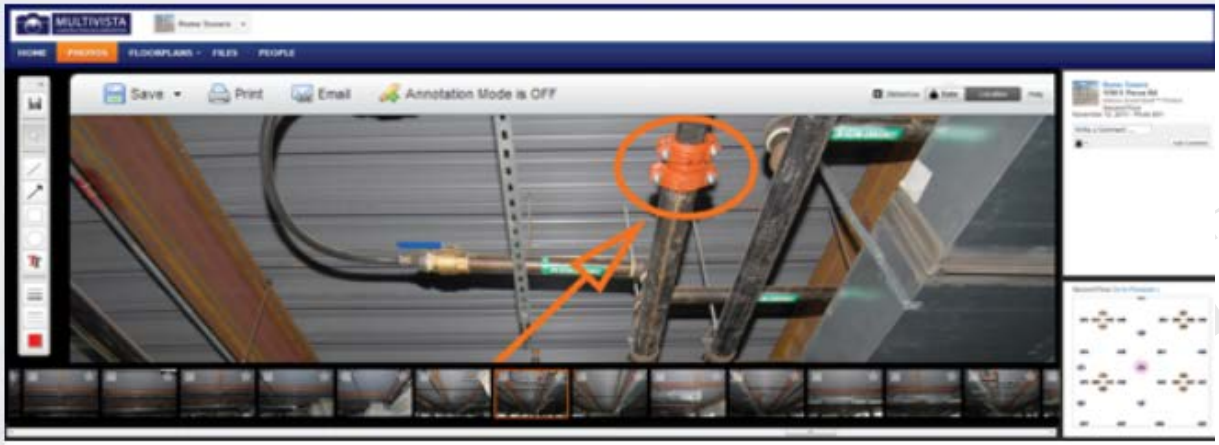
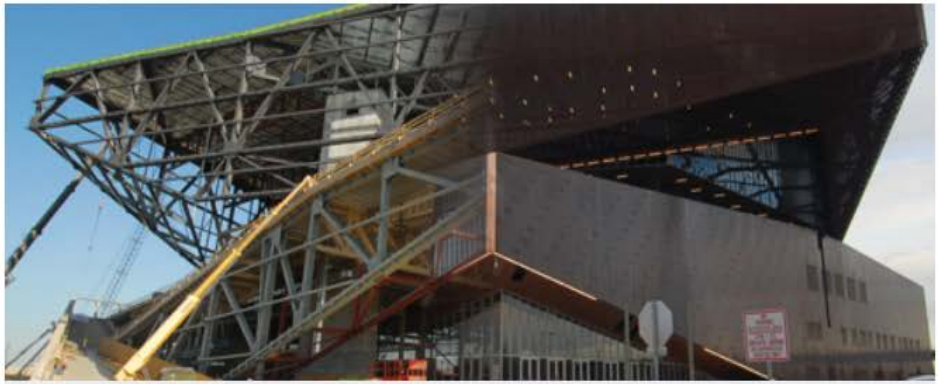


PHOTO DOCUMENTATION MANAGEMENT SOFTWARE

Multivista's online platform gives your team instant access to a complete photographic record of your construction project anytime, anywhere. All photos of your project are available in inspection-grade detail, and indexed according to your project plans by location and date.

Monitoring project status – Large projects

EXACT-BUILT® PHOTO DOCUMENTATION



CONSTRUCTION SITE PROGRESS PHOTOGRAPHY

Monitoring project status – Large projects

3D MEASURABLE CONSTRUCTION PHOTOGRAPHY

Measurable 3D Images capture critical systems that will be covered throughout construction, like underground utilities, in-slab systems, and MEP (mechanical, electrical, plumbing) components. Now users can create precise measurements in moments to answer questions and avoid destructive discovery during construction and for years after.

Monitoring project status – Large projects

However, photographs do not capture or record everything.

- For example, they **photographs** do **not accurately disclose** the **length of time** required to accomplish a **specific activity**.
  - **Time-lapse** and **digital photography** are useful to overcome this **shortcoming**.

*The **camera** is set up to record **one frame** within **every stated time interval**, such as **1 second, 5 minutes, or 1 hour.***

*The **length of time required to perform** each task can then be **determined** with reasonable **accuracy**.*

Monitoring project status – Large projects

DRONE PHOTOGRAPHY, VIDEO, AND SITE MAPS CAPTURE EVERY ANGLE

Multivista offers a full suite of professional construction drone and UAV services tailored to vertical or horizontal construction projects of any size. Learn how professional construction drones deliver the actionable project intelligence your team needs.

- **See Video #1**

Monitoring project status – Large projects

- See Video #2

MANAGEMENT AND VISUALIZATION

3D Virtual Construction Site Walkthroughs

Multivista's immersive 3D construction walkthroughs allow owners, general contractors, and facilities managers to "walk" through their construction site remotely. Utilizing sophisticated reality-capture technology, our 360 degree virtual tours provide complete documentation.

Site-Walk 360° is ideal for:

- QA/QC, Inspection and monitoring
- Validation of as-built conditions
- Capturing hard-to-visualize spaces
- Project marketing

Monitoring project status – Large projects

Is it enough? NO!

In many instances, the information obtained from photography is inadequate.

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Monitoring project status – Large projects

- **Checkoff lists** may then prove to be **effective**.

- **Field personnel** indicates the **status** of various work items in the **checkoff lists**.
  - **Activities** can be noted as “started,” “finished,” or “in progress.”

- It might be **cumbersome** to **review a list** of **several hundred activities**.
  - This can be **simplified** by having the field personnel review a **list of activities** scheduled to take place **during a specified time interval**, namely, **2 weeks or 1 month**.

Is it enough? NO!
We need more detailed schedule status forms!

Monitoring project status – Large projects

- An **extension of a checkoff list** is the use of **more detailed schedule status forms**.
- For these **forms to be useful**, it is important to be **simple**, **easy to understand**, and **short**.

Activity		Scheduled		Actual/Expected		Status	Notes
D	Description	Start	Finish	Start	Finish	%	

Activity Status Report to Monitor Project Schedule Status.

Is it enough? NO!

Monitoring project status – Daily reports

- Project and day info
- Weather reporting
- Work logs by trade and parties
  - What work occurred on specific dates? Who performed on those specific dates? What delays? Use sample like short-intervals
- Areas of work and crew size, including subcontractor work
- Quantities of work performed
- Hours expended
- Supervisory personnel
- Material deliveries
- Equipment mobilized or demobilized to site
  - Not owned or rented, operating or idle, and record serial numbers
- Work area access restraints
- Lack or loss of power or utilities
- Site safety observation
- Photos and attachments

Monitoring project status - Daily reports

Contractors Inc.
340 Fifth Avenue, 24th floor
New York, NY 10118-3299 USA

Daily report for LMPEG Project (87897)

LMPEG Project
Report number: 87897-77
Date: June 21, 2018 10:49

Weather conditions

58 degrees
Rainy

Observations and photos

Observation	Description	Assignee(s):
General daily jobsite checks		
✔ **Number of people working on job [77.1]**	8 people working on the job Work from 07:00 to 16:00 (9 hours)	
✔ **Activities in progress or done [77.2]**	Welding work Unloading of 1 transport (equipment)  	
• **Activities to do tomorrow [77.3]**	Continue welding work	
✔ **Safety Observations [77.4]**	No dangerous situations or incidents	
Delays		
• **Delays due to weather [77.5]**	Lost 2 hours due to rain	
• **Delays due to material/equipment availability [77.6]**	Parts with reference CIL-239 should be delivered at site urgently	Elisa Stenman

General conditions

Disclaimer: Site visits performed by the contractur under this contract have been conducted under the limited conditions as described by site observations in the General Conditions of the Contract for Construction.

Information contained in this Daily Observation Report by firm name has been prepared to the best of our knowledge according to observable conditions at the site. This information will be approved record unless written notice to the contrary is received within seven (7) calendar days of the issue date of this document. Written corrections shall be reported to observer at firm name. Oral rebuttals will not be accepted.

By: Alavipour, PhD, PMP, CMIT

Monitoring project status Daily reports

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CONTRACTOR'S DAILY REPORT

Contractor: _____
Project Name: _____ Project No.: _____
Address: _____
Day and Date: _____ Report No.: _____

Owner Name: _____ A/E Name: _____
Telephone: _____ Telephone: _____
Contact Name: _____ Contact Name: _____
E-mail Address: _____ E-mail Address: _____

Weather:

Temperature at: 7:00 a.m. _____ 11:00 a.m _____ 3:00 p.m. _____

Weather: _____ Wind Velocity: _____

Precipitation: _____ Total Precipitation to Date: _____

Crew:	Name	Hours	OT Hours	DT Hours	Task or Activity Code
Contractor:					

	Company Name	Number of Workers	Hours Worked
Subcontractors:			

	Company Name	Visitor Name	Reason for Visit
Visitors:			

By: Alavipour, PhD, PMP, CM

Monitoring project status Daily reports

- There are many more related to claim and delay analysis
  - ✓ Will see in those courses

CONTRACTOR'S DAILY REPORT

Work Progress (include Areas and Quantities where appropriate):

Contractor: _____

Subcontractors: _____

Equipment on Site (including rental equipment):	Company Name	Equipment Description	Hours Used

Material Deliveries: _____

Meetings: Yes _____ No _____ Led by: _____

Minutes: Yes _____ No _____ Recorded by: _____

Safety Meeting: Yes _____ No _____ Led by: _____

Items Discussed: _____

Safety Inspection: Yes _____ No _____ Inspected by: _____

Comments: _____

Injury Today? Yes _____ No _____ Describe: _____

Issues Raised or Resolved: _____

Reported by: _____ Reviewed/Approved by: _____

Monitoring project status – Daily reports

- **Best practices for creating daily project reports:**
  1. Provide sufficient detail
  2. File reports as early as possible
  3. Report delays in detail
  4. Get it signed
     - Even by parties in the site
  5. Use a checklist
  6. Keep it simple

Is it enough? NO!

Monitoring project status

PMI Best Practice

- Procurement records
- Daily reports and job diaries
- Meeting minutes
- Tracking of contract milestones
- Progress charts, schedules, and reports
- Correspondence and memoranda
- Inspection reports
- Change order files
- Requests for information
- Photographs
- Weather reports
- Shop drawing logs
- Submittal logs
- Cost and budget records
- Non-compliance logs

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Monitoring project status

The next step after monitoring is to update the schedule…

Updating the schedule

- **Careful monitoring** of a project is an effective **means** for **updating**.
- **Project progress** must be accurately **described** through **field personnel**.
  - **Feedback** is important and should come from **competent personnel**.

Why we need updating?

- The **person** who originally **developed** the **network** may have one way of sequencing, while the **field superintendent** now thinks **another approach** is more expedient.
- **Logic** may change due to new and different **constraints**, such as limited resources.

Updating is not needed if all duration/cost estimates are accurate and if the sequencing of the activities is exactly as originally scheduled.

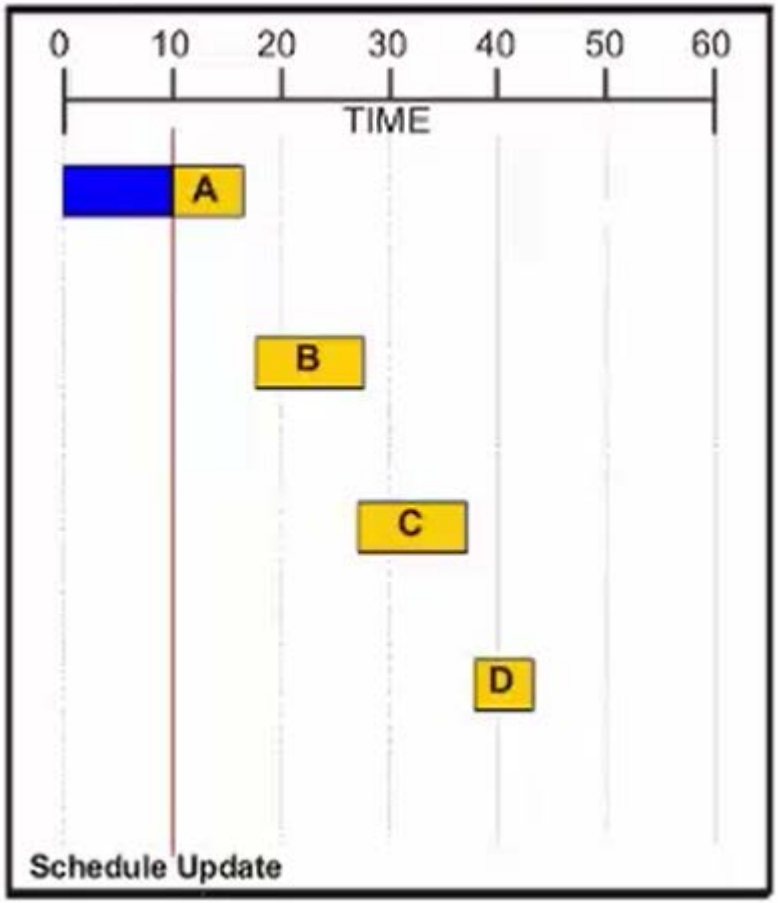
Updating the schedule

- Often, a **contract specification** may require a **measure of delay** to be performed **contemporaneously** and performed through a process called **time impact analysis.**

- One of the significant aspects of **maintaining an accurate schedule update** is that a schedule update may be **used as the basis** to **measure project delays.**

Updating the schedule

- **Updated** to include all **actual progress to date**
- **Updated** by **contractor** at **intervals**
- Project progress must be accurately described through field personnel.
- It is **created to**:
  1. **Monitor progress** on the plan
  2. **Adjust the plan** to **reflect** all **changes** in:
     - ✓ Logic
     - ✓ Duration of the work activities
     - ✓ Resources
     - ✓ Crew sizes
     - ✓ Operating hours
- For example, the **logic** of the network must be **organized** in order to **accommodate new constraints imposed** on the project, such as **limited recourse**.



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Updating the schedule

- A **copy of original** schedule should be **retained for comparison purposes**.
- As **each update** of the network is performed, **a copy** of the file can be made and **retained** as a **"snapshot"** of the project at that **point in time**.

- A **Claim Digger**, a software application from **Primavera**:
  1. Compares **two schedules**,
  2. **Identifies** all **differences** between the schedules, and
  3. Provide a **detailed report** of the differences

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Updating the schedule

- The **current schedule**, once management **approves** it, should be assigned a **version number** and **archived**.

- This ensures that **all status updates** can be **traced** and it **guarantees** that all **stakeholders** are using the **same version** of the current schedule.

Controlling and Maintaining the Baseline

(Project control and strategies for recovery and acceleration)

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