



اصول تدوین برنامه زمان بندی قابل دفاع در لایحه تاخیرات

ارائه دهنده:

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About me

- ❑ Founder and CEO of Alavipour Construction Engineering and Management Institute (**ACEMI**)
- ❑ PhD in Construction Engineering and Management (**Illinois Tech**)
- ❑ **CMAA Authorized Trainer**
- ❑ Former Research Assistant (Professor **David Arditi**)
- ❑ Former Teaching Assistant (Professor **Raymond Lemming**)
- ❑ Former Research Associates of Construction Management Association of America (**CMAA**)
- ❑ Former Research Associates of Management Practices in Construction Industry (**MPIC**) of American Society of Civil Engineers (**ASCE**)
- ❑ Project Management Professional (**PMP**)
- ❑ Construction Manager in Training (**CMIT**)
- ❑ **Author** of 1st Construction Management Standard (Written in Farsi)
- ❑ **Translation** of 2nd **SCL Delay and Disruption Protocol** (Translated in Farsi)
- ❑ **Outstanding Reviewers** selected by the editor of COENG (ASCE) Journal (2021)
- ❑ **Outstanding Reviewers** selected by the editor of Journal of Procurement for 2022 (ASCE) Journal (2021)
- ❑ The member of **International Construction Law Conference Committee** (2020 & 2022)
- ❑ The referee of **1st National Construction Law Competition** (2022)
- ❑ Lecturer of many conferences internationally
- ❑ Researcher, Reviewer of international publications, Instructor and Consultant for more than 15 years





About me



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About me





About me



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What we will learn?

- ❑ Purpose
- ❑ Recommended Practice
 - ❖ Introduction
 - ❖ Schedule Delay Claims
 - ❖ What Should the Scheduler Know About Schedule Delays?
 - ❖ Causes of Schedule Delays
 - ❖ The Project Scheduler and Schedule Impacts
 - ❖ Schedule Development Preventive Methods
 - ❖ Schedule Management and Control Procedures
 - ❖ Schedule Reviews
 - ❖ Schedule Impact Analysis
 - ❖ Schedule Change Management
 - ❖ As-Built Schedule

References



Primary Reference



AACE® International Recommended Practice No. 45R-08

SCHEDULING CLAIMS PROTECTION METHODS

TCM Framework: 6.4 – Forensic Performance Assessment

7.2 – Schedule Planning and Development

8.1 – Project Control Plan Implementation

Rev. June 1, 2009

Note: As AACE International Recommended Practices evolve over time, please refer to web.aacei.org for the latest revisions.

Any terms found in AACE Recommended Practice 10S-90, *Cost Engineering Terminology*, supersede terms defined in other AACE work products, including but not limited to, other recommended practices, the *Total Cost Management Framework*, and *Skills & Knowledge of Cost Engineering*.



Primary Reference

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Purpose

- ❑ This **recommended practice (RP)** is intended to serve as a **guideline**, **not** establish a standard for schedule claims protection.
- ❑ The RP is intended to provide the **scheduling practitioner** with an **overview of topics** related to
 1. schedule delays as well as
 2. the various schedule practices and proceduresthat should be **considered when** developing and managing the **project schedule**.
- ❑ This **RP** will explain **items** to consider **when creating and maintaining a critical path method (CPM) schedule** in order to be **prepared for potential delay claims**.

- ❑ This RP **begins** by
 1. **describing** schedule delay **terminology** and
 2. **outlining** potential **causes** and required **actions** related to schedule delays.

- ❑ The **sections following** are related to some of
 - ❖ the planning considerations recommended when **developing** a project **schedule**, plus
 - ❖ **good practices** related to the management and control of the **schedule** throughout the project.

Recommended Practice

(Introduction)

Recommended Practice

- ❑ Projects are **supposed** to be completed **on time**.
- ❑ **Despite** the best of efforts,
delay situations arise that often result in a **condition not anticipated** in the original contract.
- ❑ **Schedule delay claims** are the **acceptable processes** for requesting **adjustments** for impacts to the project schedule.
- ❑ **Prompt resolution** of these delay issues are **key to continued harmonious** execution of the project.

How scheduler could help here?





Recommended Practice

- ❑ By **implementing** the **appropriate processes** and **procedures** the **scheduler** can help to **facilitate** the early resolution of schedule related disputes and claims.
 - ❖ The accuracy and completeness of the **project schedule** is important to the early and **successful resolution** of the schedule delay claim issues.

When the schedule is vital element for delay claims?



Recommended Practice

❑ When the **schedule** is

1. properly developed,
2. accurately maintained and
3. supported by the project documentation

it is a **vital element** for successfully **resolving** delay claims.



5 primary purposes of CPM schedule?

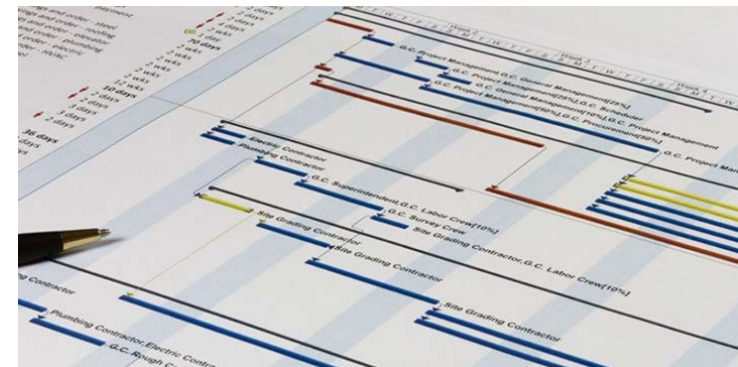


Recommended Practice

- ❑ The project **CPM schedule** is a **multifunctioning management tool** that serves **several purposes**:
 1. For project planning and communication of the intent of that project plan
 2. To **monitor** project progress and **alert** the project team to deviations from the plan
 3. To **evaluate** project time impacts and **help** focus on the alternatives for **timely completion**
 4. To **forecast** the **time required** to
 - ❖ complete the project and
 - ❖ alert the project to the possible need to **accelerate** or develop schedule **recovery plans**
 5. To **provide** a historic time record of **what happened** on the project

Recommended Practice

- ❑ There are **two groups** of schedule delay topics that need to be considered by the **planning and scheduling professional**.



Recommended Practice

1. In the **first group** are those topics that will help the **scheduler** to **understand** the potential issues related to schedule delays:
 - ❖ **Why** is schedule **claims protection** required?
 - ❖ What are the **causes** of project delays?

The **definitions of important terms** related to schedule delay are included in that group of topics.



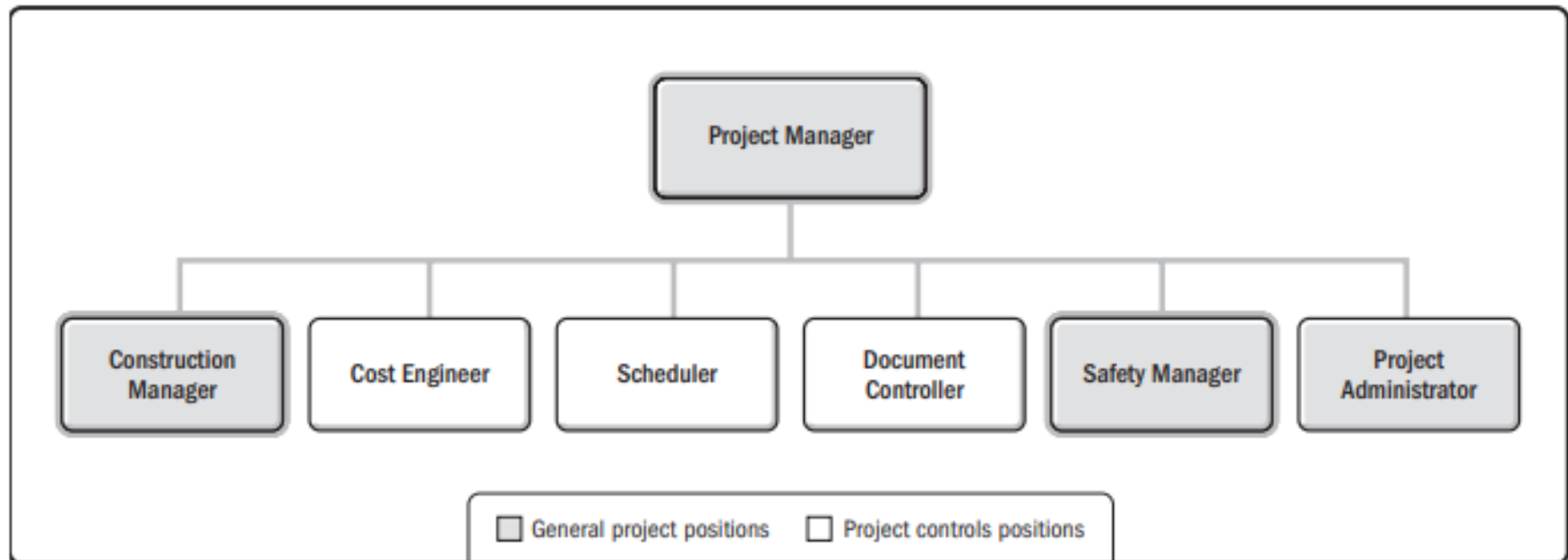
Recommended Practice

2. Secondly, are the **schedule** protection processes and prevention **measures**:
- ❖ **How** should the CPM schedule be **designed (modeled)** and **developed**?
 - ❖ **How** will the **activities** be **structured** and what will be the **level of detail** for monitoring and progress reporting?
 - ❖ **What processes** should be considered for schedule *management* and control during the various phases of the project?
 - ❖ **Do** any of these scheduling **considerations** **change** if **alternate** project delivery **methods** are employed?



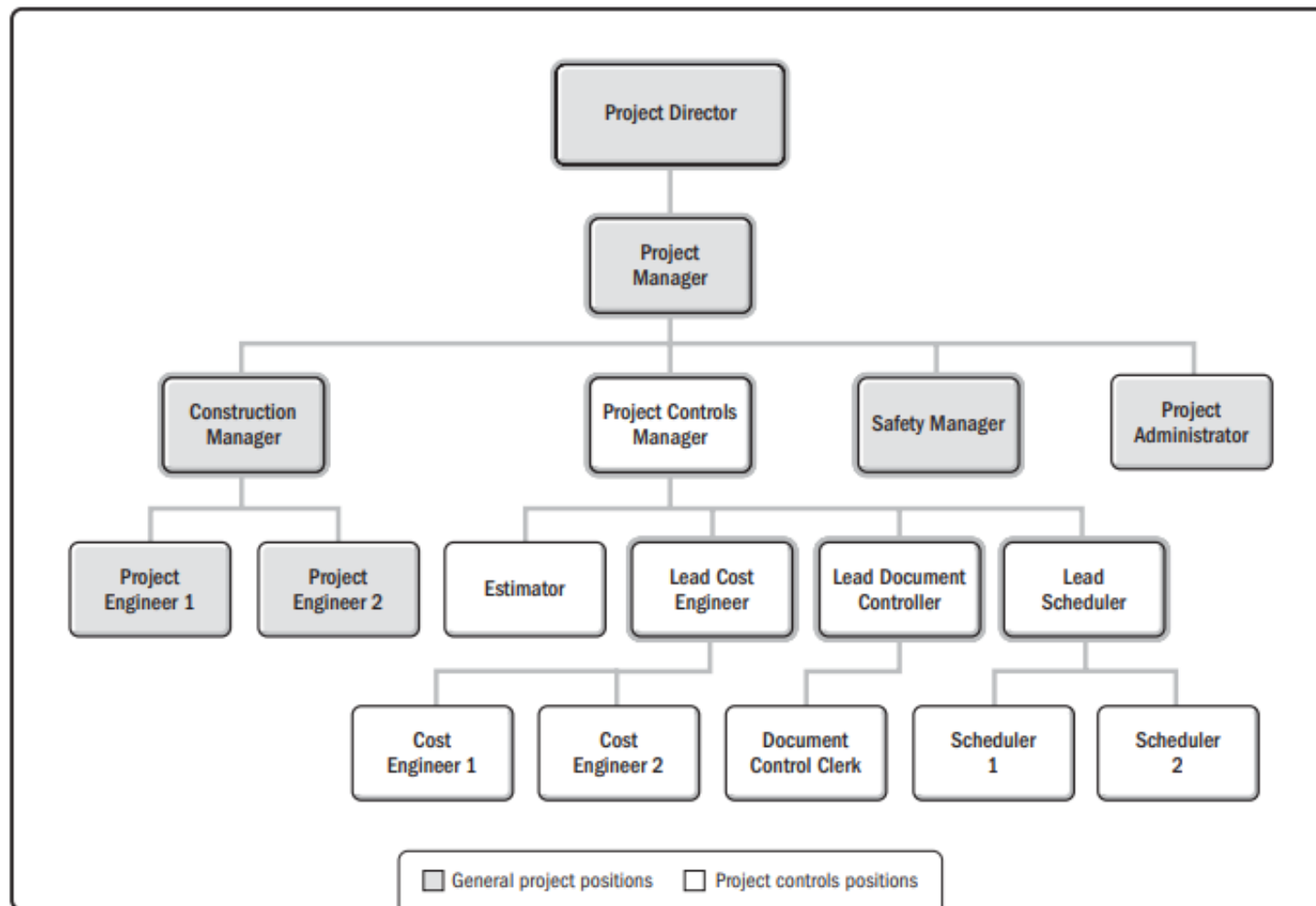
Project controls team structure—simple low-risk project

*Be careful, this CM is different than **CMA** and **CMAR***



Project controls team structure—simple low-risk project

*Be careful, this CM is different than **CMA** and **CMAR***



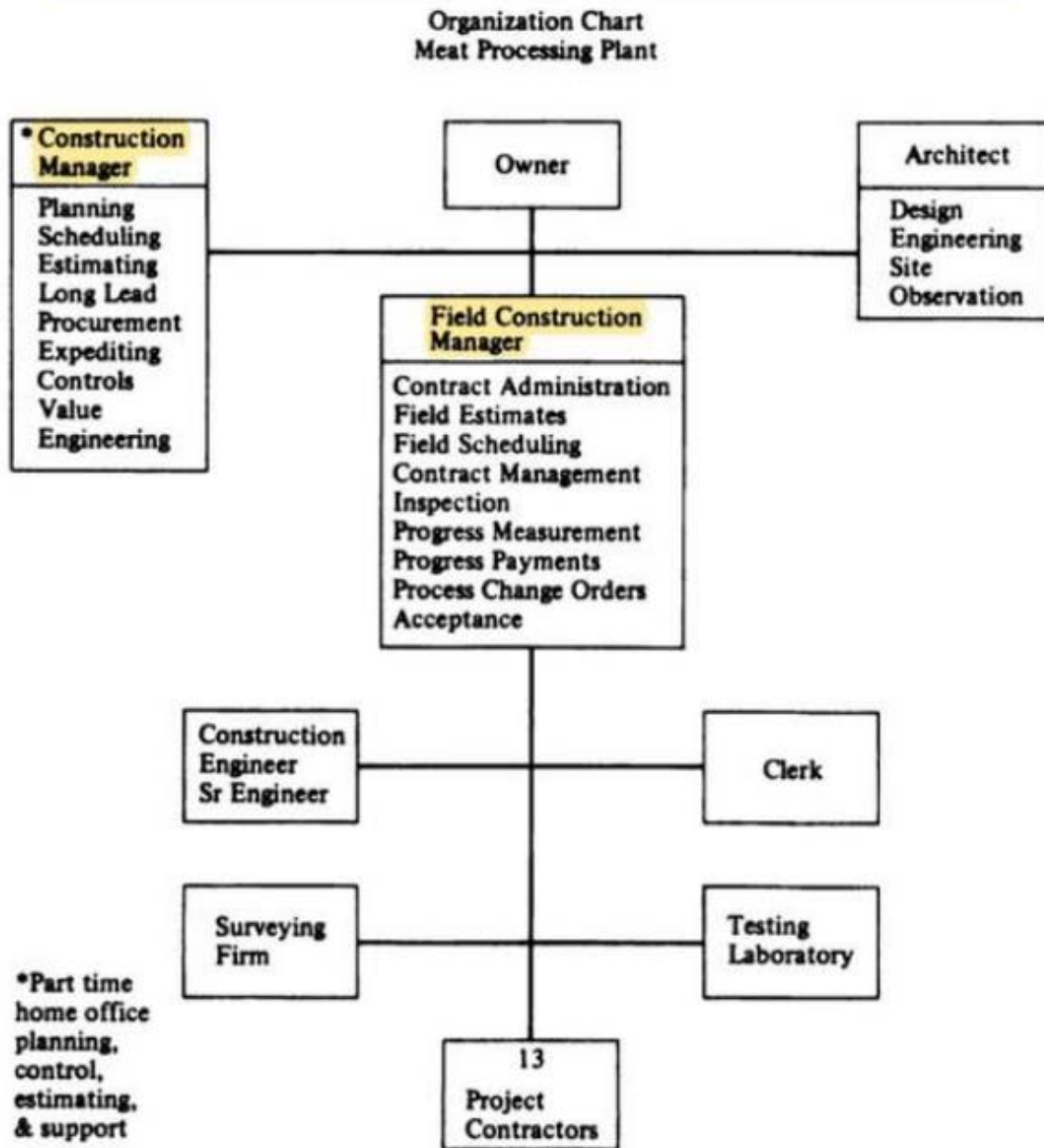


FIGURE 7-1
CM organization chart for \$25 million meat processing plant.



Planning Planet Career Path

- ❑ Knowledge, skill, and ability table, scheduler sample

Responsibilities	Required Knowledge, Skills, or Abilities
Develop baseline schedule	• Knowledge of critical-path-method scheduling • Advanced level proficiency in using the latest Primavera software for scheduling
Prepare monthly schedule report	• Ability to work with project team to obtain project updates • Intermediate level proficiency in using Microsoft PowerPoint software • Strong organizational, presentation, and written skills
Facilitate meetings to develop integrated project schedules	• Ability to work with other scheduler professionals in a collaborative manner to plan projects • Knowledge of integrated project scheduling methods and best practices • Advanced level proficiency in using the latest Primavera software for scheduling • Excellent communication skills



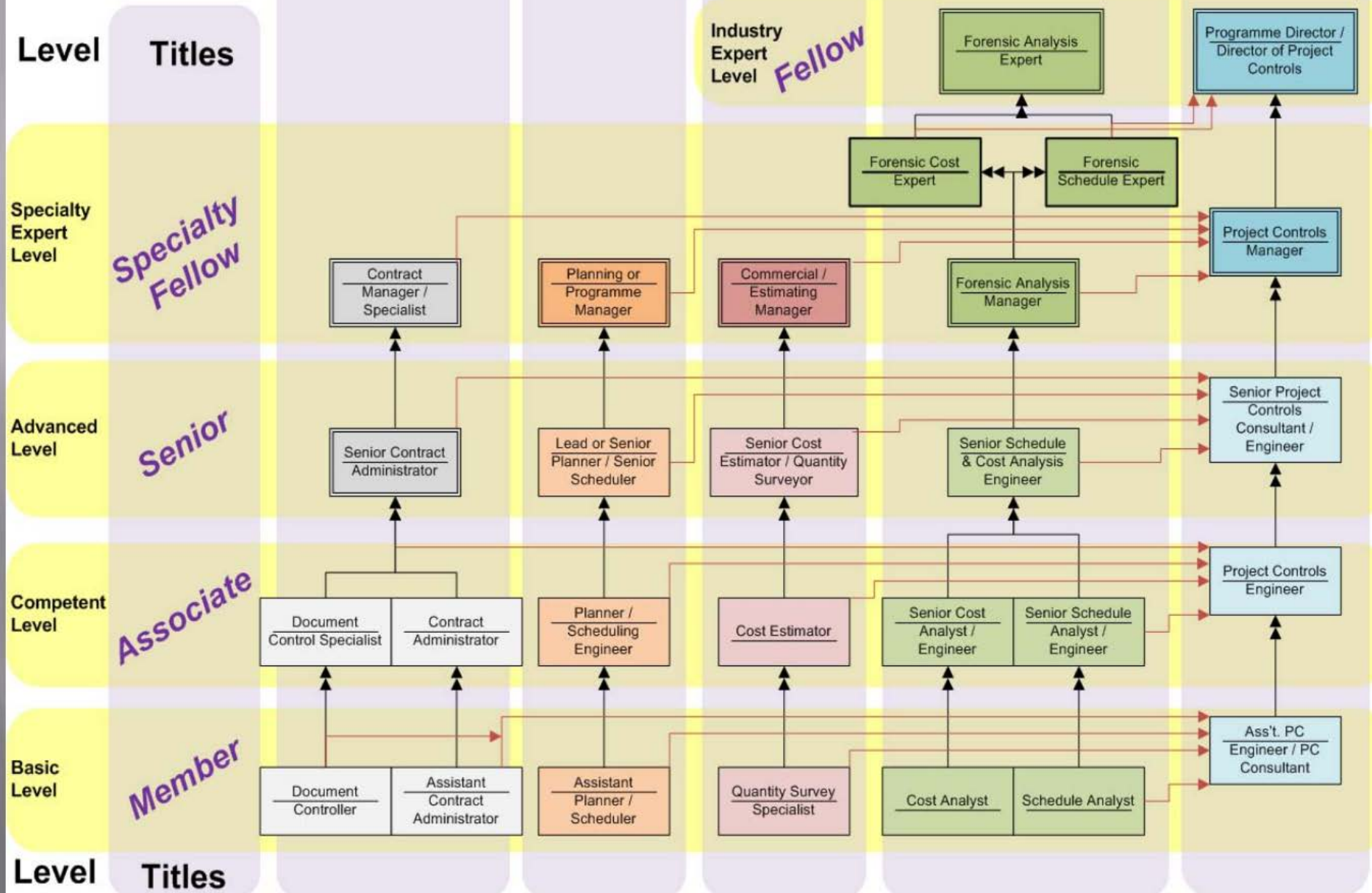
Planning Planet Career Path

☐ Knowledge, skill, and ability table, scheduler sample

Required Knowledge, Skills, or Abilities	Importance Weighting	Score
Knowledge of critical-path-method scheduling	30%	4
Ability to work with other scheduler professionals in a collaborative manner to plan projects	15%	3
Knowledge of integrated project scheduling methods and best practices	10%	1
Advanced level proficiency in using the latest Primavera software for scheduling	25%	3
Excellent communication skills	20%	2
Overall weighted score	100%	2.9

Score	Definition
4	Superior
3	Above acceptable
2	Acceptable
1	Not sufficient

Career Paths



Recommended Practice

(Schedule Delay Claims)

Schedule Delay Claims

- ❑ In the introduction to their *5th edition book CPM in Construction Management* authors Jim O'Brien and Fred Plotnick unequivocally state

“There are NO WINNERS in delay.”





Schedule Delay Claims

❑ **Both** the project owner and the contractors **suffer** when there is a project delay:

- ❖ the **loss** of **productive use** of the project facility or product;
- ❖ **increased finance costs** both direct and indirectly;
- ❖ **extended staffing costs** and contractor **overheads**;
- ❖ the list goes on.

If the project is **delayed** to the stage of dispute resolution,

there are the **costs** for

attorneys, claims consultants, depositions, discovery, mediation, arbitration, and litigation.



Schedule Delay Claims

- ❑ Very rarely will **anyone recover** the full costs for those **time impacts** and **none** of these dispute resolution costs will **bring back** the project **time** that was lost.



What a professional scheduler does to help here?



Schedule Delay Claims

- ❑ Therefore, **professional schedulers** need to be
 1. more **effective** in **developing** and
 2. **using** the CPM **schedule** as a tool **not only** to get the project completed on time, but also to communicate to all of the **project stakeholders** the delay issues.



Schedule Delay Claims

- ☐ The **scheduler** should **consider** the potential for claims when **developing** and **maintaining** the project schedule.
- ☐ By taking appropriate actions the **scheduler** can **help to minimize** the **potential** of the project incurring unanticipated schedule related claims.

Recommended Practice

**(What Should the Scheduler Know About
Schedule Delays?)**

What Should the Scheduler Know About Schedule Delays?

- ❑ It is important for **schedulers** to **understand** the **potential contract issues** that are **related** to delay issues when developing, managing, and controlling the project schedule.
- ❑ It is **not enough** to just create a “good working schedule”, the **scheduler** should also **consider** potential claims when building and maintaining the project schedule.

Which terms and definitions should receive the most attention?



What Should the Scheduler Know About Schedule Delays?

❑ **Schedulers** must **understand** the important **terms and definitions** in relation to the **contract**:

- ❖ excusable;
- ❖ non-excusable;
- ❖ compensable;
- ❖ Non-compensable
- ❖ concurrent or serial;
- ❖ cure notice; and
- ❖ liquidated damages, as well as
- ❖ differentiate between such terms as “delay” and “disruption” which are not synonymous.





What Should the Scheduler Know About Schedule Delays?

❑ The **contract** is the “**rule book**” for the project and contains a **variety of time (schedule) related topics** in the contract documents:

- ❖ “no damage for delay” clauses;
- ❖ ownership of schedule float;
- ❖ treatment of concurrent delays;
- ❖ client notification requirements;
- ❖ definitions and categories of delays;
- ❖ schedule change management and
- ❖ acceptable methods of demonstrating time impact analysis (TIA) issues.

*The **scheduler** should **read** and **fully understand** the project contract.*

What legal elements the scheduler should consider?



What Should the Scheduler Know About Schedule Delays?

❑ **When reviewing** the contract there are also key **legal elements** to consider related to the schedule:

- ❖ Risk allocation (sharing) in construction contracts
- ❖ Responsibility for mitigation of delay, regardless of source
- ❖ Format for dispute resolution
- ❖ Timely written notice
- ❖ Project (schedule) documentation

Recommended Practice

(Causes of Schedule Delays)



Causes of Schedule Delays

❑ Schedulers need to **know** the **probable causes** of construction **delays** and **extra work**.

❖ However, **dependent** on the **type of contract agreement** a myriad of **delay issues are possible** from these few sources:

- ✓ owner caused delays and changes;
- ✓ claims relating to the design professional;
- ✓ contractor caused delays and changes;
- ✓ differing site conditions; and
- ✓ force majeure events.

Causes of Schedule Delays

- ❑ The **owner** is defined as the **public or private entity** ultimately responsible for the proper execution of the project.
- ❑ **Examples of owner caused delays** include:
 - ❖ Late notice to proceed
 - ❖ Lack of site access
 - ❖ Administrative delays
 - ❖ Extended submittal reviews
 - ❖ Funding changes
 - ❖ Owner enhancements
 - ❖ Change directives/orders
 - ❖ Directed suspension of work
 - ❖ Delayed owner furnished equipment
 - ❖ Delayed installation (or performance) by the owner's contractors
 - ❖ Defective contract documents



Causes of Schedule Delays

- ❑ **Design professionals** are routinely employed by the owner and include the **architect/engineer**, and all **related design consultants**.
- ❑ Examples of **designer caused delays** include:
 - ❖ Defective design/contract documents (drawings and technical specifications)
 - ❖ Delayed and/or incomplete design
 - ❖ Design bulletins resulting in change orders
 - ❖ Untimely responses to requests for information (RFIs)
 - ❖ Late approvals/extended submittal reviews
 - ❖ Excessive RFIs required due to incomplete design
 - ❖ Unreasonable inspections



Causes of Schedule Delays

- ❑ The **contractor** is the organization or individual **responsible for performance** of the work in accordance with the plans, specifications and contract documents.
- ❑ The **work includes** providing and controlling labor, material, equipment, vendors and subcontractors.



Causes of Schedule Delays

❑ Examples of **contractor's delays** include:

- ❖ Poor workmanship requiring rework
- ❖ Insufficient labor and/or equipment
- ❖ Low productivity
- ❖ Insufficient planning, coordination, or management of the work
- ❖ Delayed administration of the work, such as late subcontract or purchase order awards
- ❖ Delay in processing required material/equipment submittals
- ❖ Failure to obtain contract approvals
- ❖ Failure to order materials or equipment in time to meet the schedule requirements





Causes of Schedule Delays

- ❑ Most contracts specifically define the **force majeure delay events**.
- ❑ Examples of **force majeure delays** include unusually
 - ❖ severe weather;
 - ❖ acts of war;
 - ❖ acts of god;
 - ❖ extraordinary economic disruptions;
 - ❖ fires;
 - ❖ strikes and
 - ❖ other events not foreseeable at the time of contract.

Generally the contractor will be granted additional time without added compensation for delay related to a force majeure event.

Causes of Schedule Delays

- ❑ The owner has the duty to **disclose** the construction project **site conditions**.
- ❑ If the **contractor encounters** “differing site conditions” that **generally means**:
 - ❖ Subsurface or latent conditions that materially differ from what was shown or indicated in the contract documents (plans and specifications)
 - ❖ Physical conditions of an unusual nature that materially differ from those ordinarily encountered





Causes of Schedule Delays

❑ Often the contract will include

- ❖ **owner disclaimers** (which may or may not be contractually enforceable),
- ❖ **site inspection** requirements, or
- ❖ “variation in quantities”

clauses such as:

“Any increase or decrease in cost or time resulting from such changes in site conditions shall be adjusted in the manner specified in the contract changes clause.”



Causes of Schedule Delays

- ❑ **Differing site conditions** issues have experienced
 1. a **wide range** of interpretations and
 2. **varying degrees** of success during **contract dispute resolutions**.

- ❑ It is important to **remember** that **when encountering** differing site conditions, it is **extremely important** for the contractor to provide *prompt and proper “notice” to the owner.*

Causes of Schedule Delays



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Recommended Practice

(The Project Scheduler and Schedule Impacts)



The Project Scheduler and Schedule Impacts

- ❑ The **project scheduler** should **know** that in **order to receive compensation** (time and/or money) for a project delay,
 - it is the **contractor** who is **responsible** to provide **reasonable proof**:
 - 1. That the delay was not caused by the contractor;
 - 2. That a critical project milestone or the entire project was delayed; and
 - 3. The amount of time delayed.

Another one that must be proved?



The Project Scheduler and Schedule Impacts

❑ Additionally the contractor **must prove** that **reasonable efforts** were made to **mitigate** the delay and its impacts.

❖ **Mitigation** is working to **reduce risk** by

1. lowering its chances of occurring or
2. reducing the effect of that occurrence.

❑ **Mitigation** also refers to

revising the project's scope, budget, schedule or quality,

preferably **without** material impact on the **project's objectives**,

in order to **reduce uncertainty**.

The Project Scheduler and Schedule Impacts

- ❑ The **project scheduler** may be **asked to** develop a **special schedule** and the scheduler should know that there is a **difference** between recovery and acceleration.



The definition has some differences between different contexts?



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ *Directed Acceleration:*

Formal instruction by the **owner directing** the contractor to:

- a) complete **all or a portion** of the work **earlier** than currently scheduled;
- b) undertake **additional work**; or,
- c) perform other actions to complete **all, or a portion**, of the **contract scope** of work in the previously scheduled timeframe that **otherwise** would have been **delayed**.

This could include **mitigation efforts** that usually have **no costs** associated with them.



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ **Constructive Acceleration:**

- 1) A **contractor's acceleration** efforts to **maintain scheduled completion date(s)** undertaken as a result of an owner's action or inaction and **failure** to make a **specific direction** to accelerate;



The Project Scheduler and Schedule Impacts

AACE 29R-03

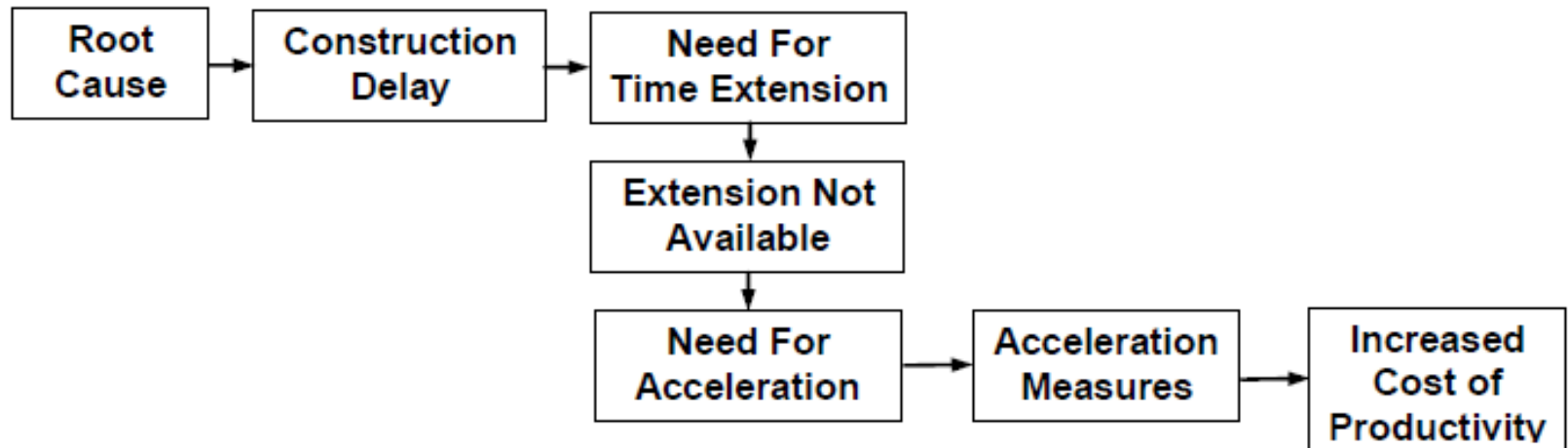
❑ **Constructive Acceleration:**

2) Constructive acceleration generally occurs when **five criteria are met**:

- a) the contractor is entitled to an **excusable delay**;
- b) the contractor **requests** and **establishes** entitlement to a time extension;
- c) the **owner fails** to grant a timely time extension;
- d) the **owner or its agent** specifically **orders or clearly implies** completion within a **shorter time period** than is associated with the **requested time extension**; and,
- e) the **contractor provides** notice to the owner or its agent that the **contractor considers** this action an acceleration order.

The Project Scheduler and Schedule Impacts

- ❑ Constructive acceleration generally occurs when a **contractor is entitled** to and requests a **time extension** which the owner
1. declines to grant, or
 2. grants in an untimely manner, and
- the **contractor reasonably believes** that he **must accelerate** in order to comply with his contract.





The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ **Disruption:**

- 1) An **interference** (action or event) to the **orderly progress** of a project or activity(ies). Disruption has been described as the **effect** of change on unchanged work which manifests itself primarily as **adverse labor productivity impacts**.
- 2) **Schedule disruption** is any unfavorable change to the **schedule** that may, but does **not necessarily**, involve delays to the critical path or delayed project completion. **Disruption** may include, but is not limited to,
 - i. duration compression,
 - ii. out-of-sequence work,
 - iii. concurrent operations,
 - iv. stacking of trades, and
 - v. other acceleration measures.



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ **Delay Mitigation:**

❖ A contractor's or owner's **efforts** to **reduce** the **effect** of delays

1. already incurred or
2. anticipated to occur

to activities or groups of activities.

❖ **Mitigation** often includes **revising** the project's scope, budget, schedule, or quality, preferably **without** material impact on the project's objectives, in order to reduce possible delay.

*Mitigation usually has **no or very minimal** associated costs.*



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ Recovery Schedule:

- ❖ A **special schedule** showing **special efforts** planned to **recover** time lost for delays
 1. already incurred or
 2. anticipated to occurwhen compared to a previous schedule.
- ❖ Often a **recovery schedule** is a contract requirement when the **projected finish date** **no longer** indicates timely completion.
- ❖ **Recovery schedules** are usually proposals that **must be accepted** by the owner **prior to implementation**.

*“Recovery” does not necessarily imply owner or contractor fault;
it just indicates recovering lost time.*



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ *Differences between Directed Acceleration, Constructive Acceleration, and Delay Mitigation*

- ❖ In practice, there are subtle distinctions between directed acceleration, constructive acceleration, and delay mitigation.



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ *Differences between Directed Acceleration, Constructive Acceleration, and Delay Mitigation*

❖ For example, **directed acceleration** cost implies additional expenditure or money for

1. **recovery** of either incurred or projected delay, as well as

2. efforts to complete **early**

all at the **direction** of the **owner**.



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ *Differences between Directed Acceleration, Constructive Acceleration, and Delay Mitigation*

- ❖ The term **constructive acceleration** applies to expenditure of money for
 1. **efforts** to **recover** either incurred or projected delay **caused** by the owner and
 2. **without** specific direction to do so.



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ *Differences between Directed Acceleration, Constructive Acceleration, and Delay Mitigation*

- ❖ **Delay mitigation** generally refers to **no-cost recovery** efforts for incurred or projected delay.



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ *Differences between Directed Acceleration, Constructive Acceleration, and Delay Mitigation*

❖ In the case of acceleration, constructive acceleration, and delay mitigation,

affected activities are usually on the projected critical path;

thus, the **objective** of most acceleration or mitigation is to **recover** from **anticipated delay** to project completion.



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ *Differences between Directed Acceleration, Constructive Acceleration, and Delay Mitigation*

- ❖ However, acceleration, constructive acceleration, and mitigation **can occur** with regard to activities that are not on the critical path.
 - ✓ For example, an **owner** might insist that a **certain portion of the work** be made **available prior** to the **scheduled date** for completion of that activity.
 - ✓ The **contractor** may **mitigate** non-critical delay by resequencing a series of non-critical activities to **increase** the **available float**.



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ *Differences between Directed Acceleration, Constructive Acceleration, and Delay Mitigation*

- ❖ There are **circumstances** in which **acceleration measures** are used in an attempt to **complete** the project earlier than planned.



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ *Differences between Directed Acceleration, Constructive Acceleration, and Delay Mitigation*

❖ Those circumstances are usually classified as:

- a) directed acceleration where the **owner directs** such acceleration and usually **pays** for the associated **additional cost**; or
- b) voluntary acceleration in which the contractor implements the plan on **its own initiative** in the hope of **earning an early completion bonus**.



The Project Scheduler and Schedule Impacts

AACE 29R-03

❑ *Differences between Directed Acceleration, Constructive Acceleration, and Delay Mitigation*

- ❖ **Contractor efforts** undertaken during the course of the project to **recover from its own delays** to activities are generally not considered acceleration, **even if** the contractor incurs **cost** as a result.



The Project Scheduler and Schedule Impacts

❑ FIDIC-2017

- ❖ Programme (8.3) 1.1.66 **"Programme"** means a detailed time programme prepared and submitted by the Contractor to which the Engineer has given (or is deemed to have given) a Notice of No-objection under Sub-Clause 8.3 [Programme].

The Contractor shall submit an initial programme for the execution of the Works to the Engineer within 28 days after receiving the Notice under Sub-Clause 8.1 [Commencement of Works]. This programme shall be prepared using programming software stated in the Specification (if not stated, the programming software acceptable to the Engineer). The Contractor shall also submit a revised programme which accurately reflects the actual progress of the Works, whenever any programme ceases to reflect actual progress or is otherwise inconsistent with the Contractor's obligations.

فرق initial و revised با خود programme

چه زمانی مشاور حق دارد؟

The Project Scheduler and Schedule Impacts

❑ FIDIC-2017

❖ Rate of progress (8.7)

آیا حتی با وجود انحراف این حق برای
مشاور ایجاد شده است؟

If, at any time:

در صورتی که برنامه
programme وجود
نداشته باشد؟

- (a) actual progress is too slow to complete the Works or a Section (if any) within the relevant Time for Completion; and/or
- (b) progress has fallen (or will fall) behind the Programme (or the initial programme if it has not yet become the Programme) under Sub-Clause 8.3 [Programme],

other than as a result of a cause listed in Sub-Clause 8.5 [Extension of Time for Completion], then the Engineer may instruct the Contractor to submit, under Sub-Clause 8.3 [Programme], a revised programme describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete the Works or a Section (if any) within the relevant Time for Completion.

اگر هزینه اضافه بر کارفرما ناشی از این
بازنگری تحمیل شود تکلیف چیست؟

The Project Scheduler and Schedule Impacts

❑ FIDIC-2017

❖ Rate of progress (8.7)

اگر هزینه اضافه بر کارفرما ناشی از این
بازنگری تحمیل شود تکلیف چیست؟

Unless the Engineer gives a Notice to the Contractor stating otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or the Goods, at the Contractor's risk and cost. If these revised methods cause the Employer to incur additional costs, the Employer shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to payment of these costs by the Contractor, in addition to Delay Damages (if any).

اگر کارفرما بدون وجود تاخیر غیرمجاز
درخواست بازنگری نماید؟



The Project Scheduler and Schedule Impacts

❑ FIDIC-2017

❖ Rate of progress (8.7)

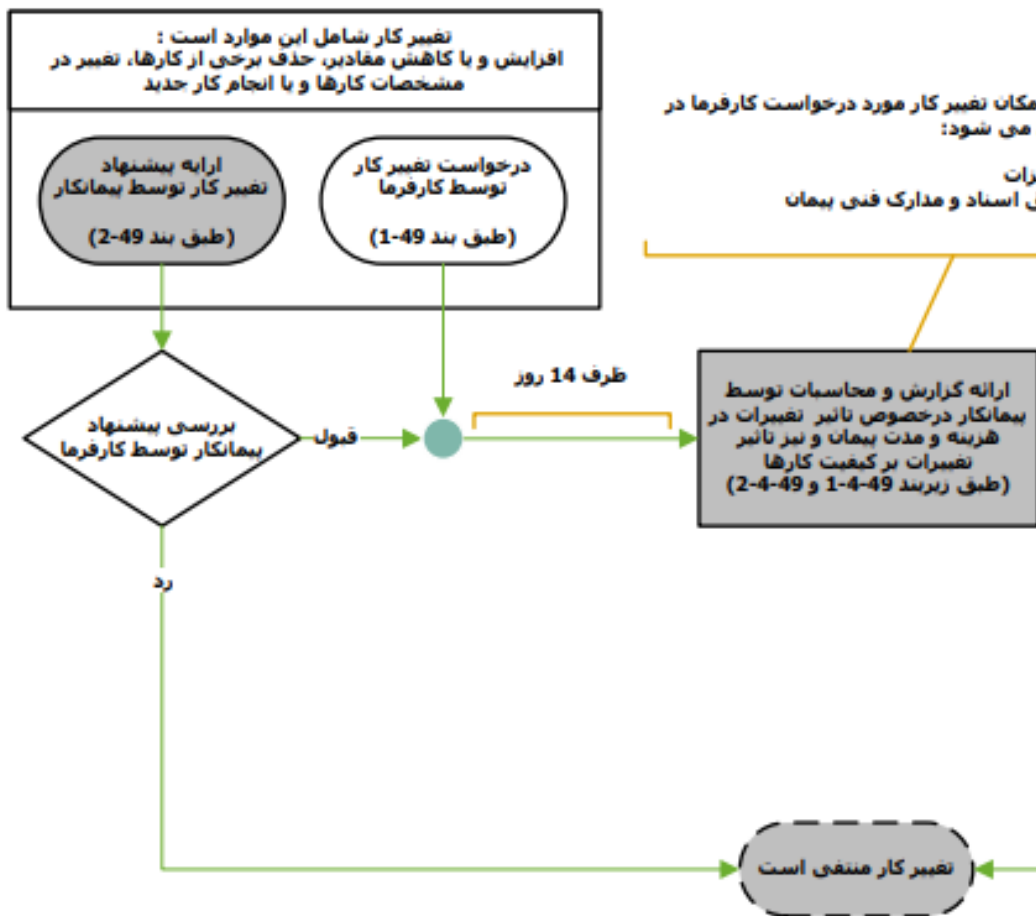
اگر کارفرما بدون وجود تاخیر غیرمجاز
درخواست بازنگری نماید؟

Sub-Clause 13.3.1 [*Variation by Instruction*] shall apply to revised methods, including acceleration measures, instructed by the Engineer to reduce delays resulting from causes listed under Sub-Clause 8.5 [Extension of Time for Completion].

پس باید قبل از برنامه بازنگری تکلیف تاخیرات
مجاز و غیرمجاز و تمدید زمانی مشخص شود!

در EPC صنعتی جدید؟

The Project Scheduler and Schedule Impacts



در EPC صنعتی جدید علی‌رغم تغییرات خوب، درک صحیحی از فرایند تغییرات رخ نداده

اجازه ادعا یا بردن اختلاف در زمان ارائه پیشنهاد از سوی پیمانکار وجود ندارد چرا؟

دوره EPC توضیح میدهم!



The Project Scheduler and Schedule Impacts

- ❑ These terms **may have slightly different definitions** in the contract from these defined in the AACE International Recommended Practice **10S-90 Cost Engineering Terminology**.



The Project Scheduler and Schedule Impacts

Chris Carson

- ❑ There are **two terms** that define how to account for a delay to a project schedule, depending on who is at fault for the delay.
 1. If the contractor or one of his subcontractors is at fault, the schedule to account for the delay is a **recovery schedule**.
 - ❖ This term is **not definitive**, in that the **industry does not recognize the term “recovery”** to indicate **contractor fault**.
 2. If, on the other hand, the owner of the project is found to be at fault for the delay, the schedule to recover time is called an **“acceleration” or “mitigation schedule.”**



The Project Scheduler and Schedule Impacts

1. Extension of Time Claims
2. Disruption Claims
3. Acceleration Claims



The Project Scheduler and Schedule Impacts

- ❑ The project contract agreement and scheduling specifications are the **primary source** of guidance regarding schedule development, schedule management, and schedule control.
- ❑ **Additional sources** for guidance could be found in the **contractor's corporate procedures** related to schedule management.
- ❑ Beyond the above, then **project level procedures and directives** will guide the majority of appropriate actions for the schedulers to properly perform their work.

Recommended Practice

(Schedule Development Preventive Methods)



Schedule Development Preventive Methods

- ❑ During the **schedule development phase** of a project there are **several contract items** that should be **considered** regarding the schedule.

Schedule Development Preventive Methods

- ❑ The **contract terms and conditions** often
 1. contain **specific information** concerning the appropriate level of detail and durations for the activities, and
 2. will outline the complete scope of work required for the project schedule.



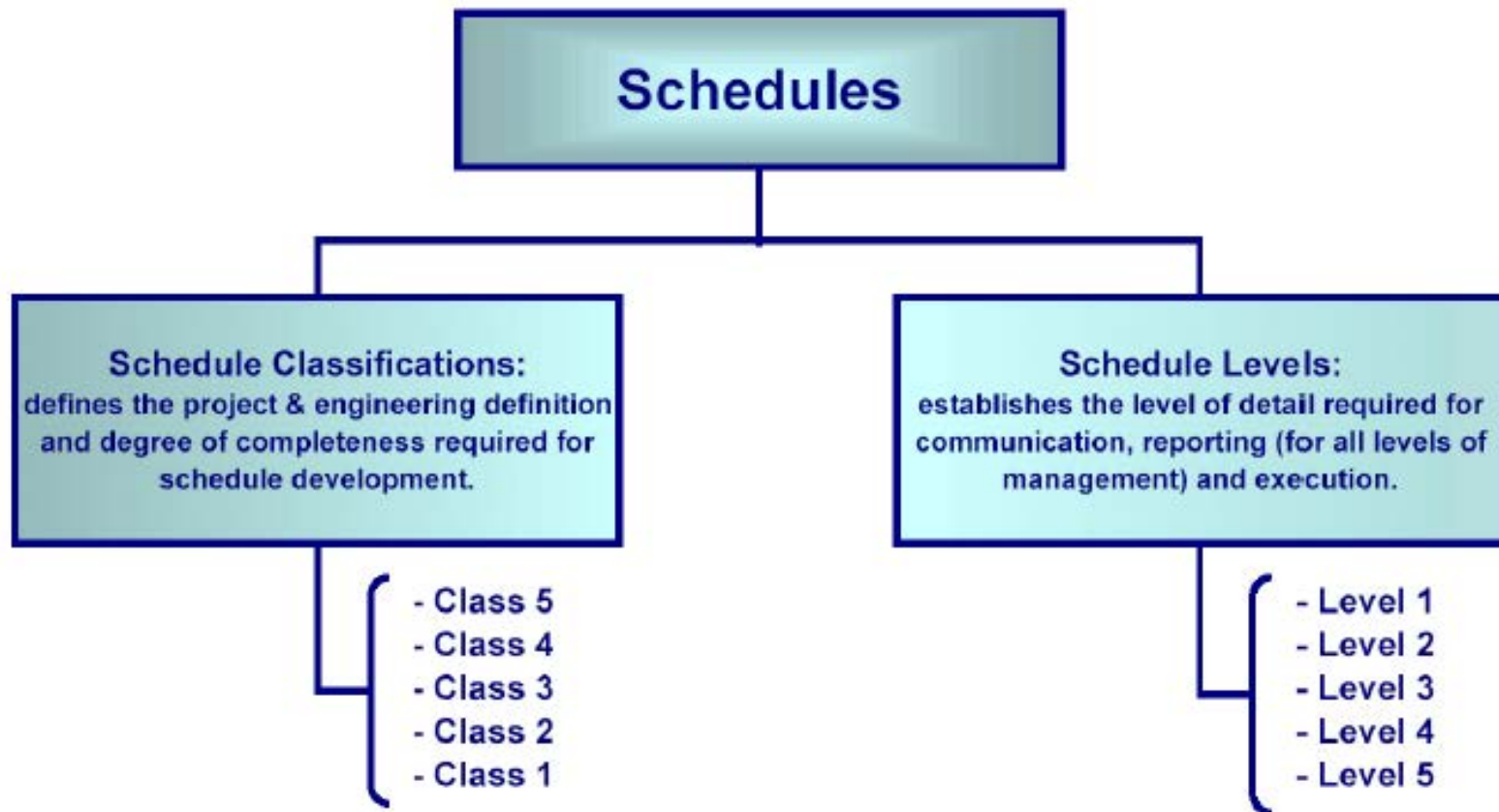


Schedule Development Preventive Methods

❑ Additionally, the **project scheduler** needs to consider **how** to handle the **integration** of

1. engineering, procurements and equipment deliveries,
2. owner furnished fixtures or equipment (FFE), or
3. commissioning “by others”.

Schedule Development Preventive Methods



Schedule Development Preventive Methods

❑ Generic schedule classification matrix

	<i>Primary Characteristic</i>	<i>Secondary Characteristic</i>	
SCHEDULE CLASS	DEGREE OF PROJECT DEFINITION (Expressed as % of complete definition) ^[1]	END USAGE	SCHEDULING METHODS USED
Class 5	0% to 2%	Concept screening	Top down planning using high level milestones and key project events.
Class 4	1% to 15%	Feasibility study	Top down planning using high level milestones and key project events. Semi-detailed.
Class 3	10% to 40%	Budget, authorization, or control	"Package" top down planning using key events. Semi-detailed.
Class 2	30% to 75%	Control or bid/tender	Bottom up planning. Detailed.
Class 1	65% to 100%	Bid/tender	Bottom up planning. Detailed.



Schedule Development Preventive Methods

- ❑ **Schedule levels** defined as Level 1 through Level 5 are recognized by **several industry sources**, such as AACE and the Chartered Institute of Building (CIOB).
- ❑ These different industry sources tend to agree on the following definitions for **Schedule Levels 1–5:**



Schedule Development Preventive Methods

❑ Level 1—Executive Schedule.

- ❖ Establishes **contractual milestones**, includes
 - ✓ summary level activities,
 - ✓ key procurement and commissioning sequences,
often **one page**.



Schedule Development Preventive Methods

❑ Level 2—Management Schedule.

❖ Based on **project manager** input,

1. establishes critical path and key target dates, and
2. includes constructability and **some** resource dependencies,
often broken down by **CSI divisions**,
mostly finish-to-start logic.



Schedule Development Preventive Methods

❑ Level 3—Progress Schedule.

❖ Based on **site superintendent** or **construction manager** input;

1. integrates vendor design, fabrication and delivery;
2. may be resource and cost-loaded;
3. often CSI divisions are further subdivided into areas, elevations or systems;
4. this schedule drives the updating process.



Schedule Development Preventive Methods

❑ Level 4—Working Schedule.

- ❖ Based on input from **contractor field supervision**,
 1. including subcontractors;
 2. often resource-loaded to detail crew movement, means and methods;
 3. grouped by CSI sections, as well as areas or elevations, detailed procurement and commissioning;
 4. developed before the start of a given phase or area (may be done on a rolling wave basis).



Schedule Development Preventive Methods

❑ Level 5—Look-Ahead Schedule.

❖ Based on input from **crew foremen**,

1. subdivides upcoming Level 3 or Level 4 activities into tasks for a two- to three-week look-ahead period;
2. resource-loaded and reviewed on-site in progress meetings.

Schedule Development Preventive Methods

❑ Table provides a guide to suggested typical activity durations for each **schedule level**, for

1. mega projects (>\$US500M) and
2. major projects (<\$US500M):

Level	Activity Duration (Mega)	Activity Duration (Major)
1	6 to 18 months	3 to 12 months
2	3 to 9 months	2 to 6 months
3	3 to 12 weeks	2 to 6 weeks
4	2 to 6 weeks	2 to 4 weeks
5	Days to 3 weeks	Days to 3 weeks

Schedule Development Preventive Methods

- ❑ Table below provides a summary of the general intent, target end user, and scheduling objective of each schedule level:

Level	End User	General Intent	Scheduling Objective
1	Executives Senior managers	Snapshot of summary activities and logic	Conform to contract and key milestones
2	Senior managers Project managers	Establish critical path and key milestones	Show compliance with on-time performance and completion
3	CM, on-site staff	Detail for site management, staging deliveries	To execute, monitor, and control the work
4	Area supervisors	Working schedule for area or phase, for next 3 months	Trade coordination, crew movement, means/methods
5	Crew foremen	Detailed look-ahead schedule, for next 3 weeks	Assign work to crews, ensure proper workflow

Schedule Development Preventive Methods

- ❑ It is important to establish the **acceptable** scheduling techniques and types of software to be used on the project.
- ❑ The project schedule should be both structured and flexible for **efficient use** by all of the project participants.

❑ FIDIC-2017

❖ Programme (8.3)

1.1.66 "Programme" means a detailed time programme prepared and submitted by the Contractor to which the Engineer has given (or is deemed to have given) a Notice of No-objection under Sub-Clause 8.3 [Programme].

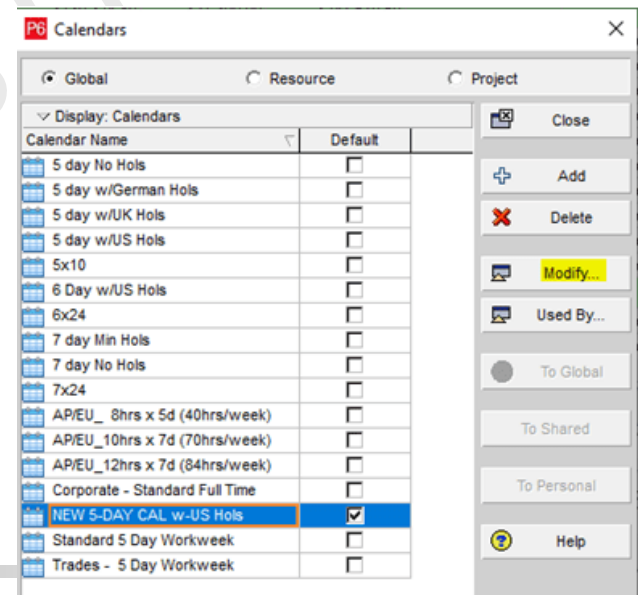
The Contractor shall submit an initial programme for the execution of the Works to the Engineer within 28 days after receiving the Notice under Sub-Clause 8.1 [Commencement of Works]. This programme shall be prepared using programming software stated in the Specification (if not stated, the programming software acceptable to the Engineer). The Contractor shall also submit a revised programme which accurately reflects the actual progress of the Works, whenever any programme ceases to reflect actual progress or is otherwise inconsistent with the Contractor's obligations.

فرق initial و revised با خود programme

چه زمانی مشاور حق دارد؟

Schedule Development Preventive Methods

- ❑ Schedule software **compatibility** should be required so that there is **no data lost** in conversion or interpretation of the **subcontractor's** or **vendor's** time phase plan.
- ❑ The **definitions** have to be **established** for
 1. multiple project calendars and
 2. planning units (work days, calendar days or hours)
 used in the schedule.



Schedule Development Preventive Methods

❑ Something that **may seem easy** such as **establishing** conventions for

1. developing activity IDs and
2. the activity coding structure/dictionary

can become a very complex planning task.

Layout: Baseline Layout Filter: All Activities

Activity ID	Activity Name	Original Duration	Start	Finish
How to Change Activity ID		24	27-Nov-23	20-Dec-23
General Requirements		5	27-Nov-23	01-Dec-23
Engineering		4	27-Nov-23	30-Nov-23
Construction		24	27-Nov-23	20-Dec-23
Clusters A & B		24	27-Nov-23	20-Dec-23
Cluster A		24	27-Nov-23	20-Dec-23
Building 1		24	27-Nov-23	20-Dec-23
Substructure		24	27-Nov-23	20-Dec-23
A1100	Excavation	4	27-Nov-23	30-Nov-23
A1230	Backfilling	4	17-Dec-23	20-Dec-23
A1210	PC for Foundation	4	09-Dec-23	12-Dec-23
A1220	RC for Foundation	4	13-Dec-23	16-Dec-23
A1190	Anti-Termite Treatment	4	01-Dec-23	04-Dec-23
A1200	Damp Proofing	4	05-Dec-23	08-Dec-23
Super Structure		8	27-Nov-23	04-Dec-23
Ground Floor		8	27-Nov-23	04-Dec-23
A1650	RC for Columns and Beams	4	27-Nov-23	30-Nov-23
A1660	RC for Slabs	4	01-Dec-23	04-Dec-23
First Floor		8	27-Nov-23	04-Dec-23
A1670	RC for Columns and Beams	4	27-Nov-23	30-Nov-23
A1680	RC for Slabs	4	01-Dec-23	04-Dec-23
Second Floor		8	27-Nov-23	04-Dec-23
A1690	RC for Columns and Beams	4	27-Nov-23	30-Nov-23
A1700	RC for Slabs	4	01-Dec-23	04-Dec-23
Third Floor		8	27-Nov-23	04-Dec-23
A1710	RC for Columns and Beams	4	27-Nov-23	30-Nov-23

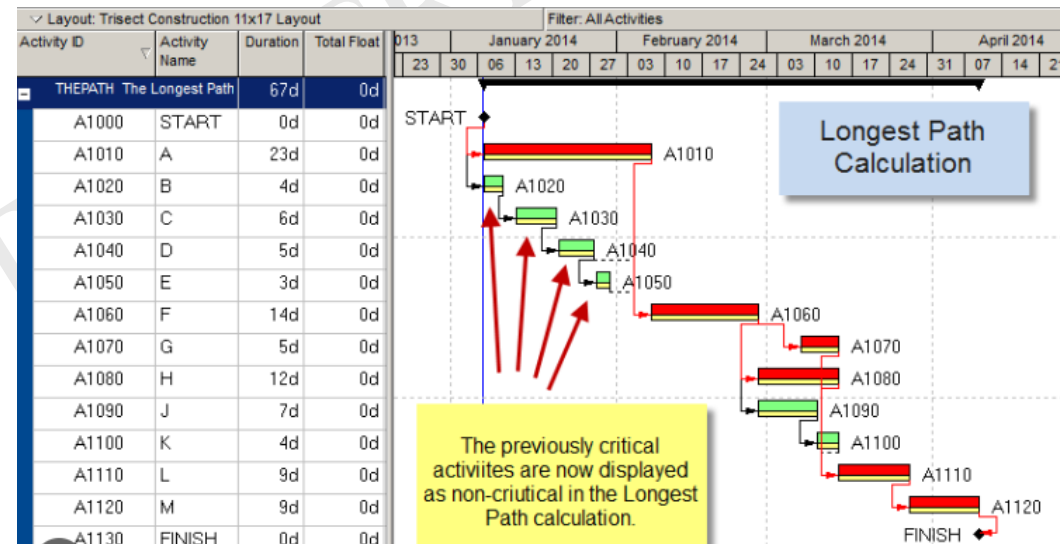
Schedule Development Preventive Methods

- ❑ The **project participants** should be in **agreement** and **compliance** with the contract scheduling specifications for the routine scheduling tasks such as:
1. accepted logical relationships;
 2. use of “mechanical” constraints;
 3. Use “leads/ lags”;
 4. preferential logic; and the definition of the critical path.



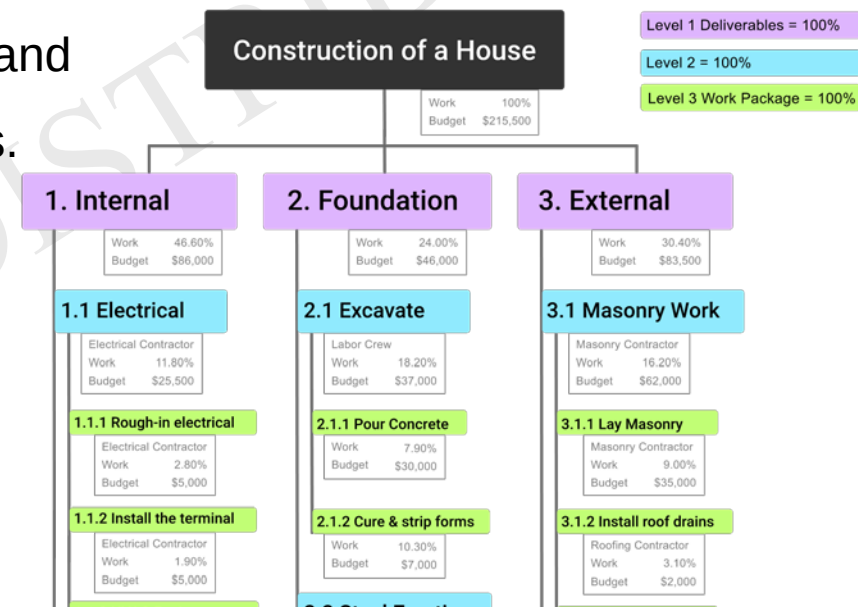
Schedule Development Preventive Methods

- ❑ Unless the contract requires a different definition, it is recommended that the **longest path criteria** (if available) be the **accepted definition** for the **project critical path** in order to **minimize future conflicting terms**.



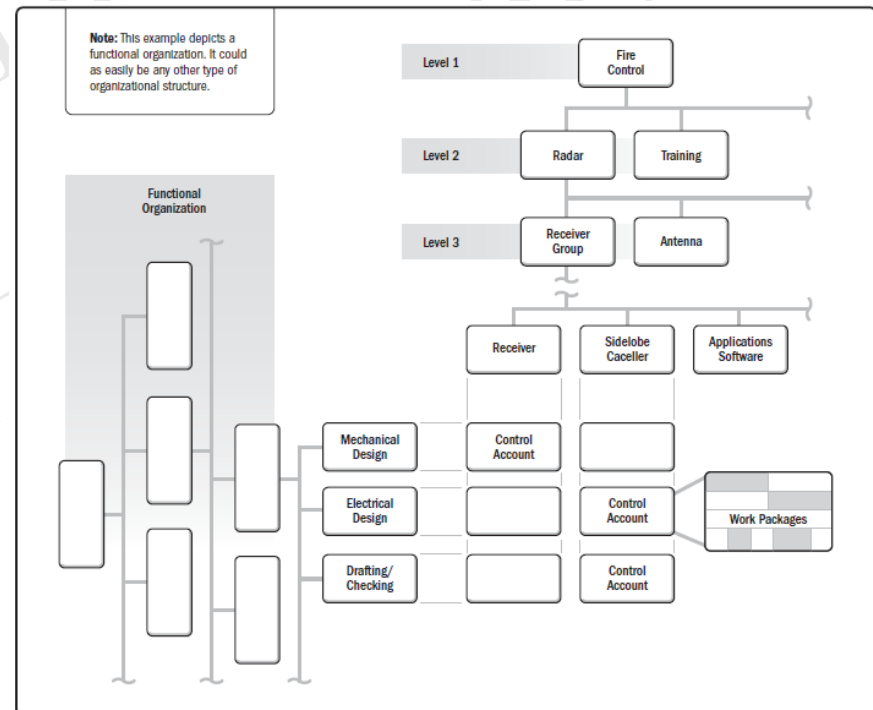
Schedule Development Preventive Methods

- ❑ The **project lead scheduler** is normally involved in
1. establishing the work **breakdown structure (WBS)** as well as
 2. taking the responsibility to **develop the mechanics** (rules of the road) for
 - i. the schedule change order process;
 - ii. periodic schedule integration; and
 - iii. the progress reporting process.



Schedule Development Preventive Methods

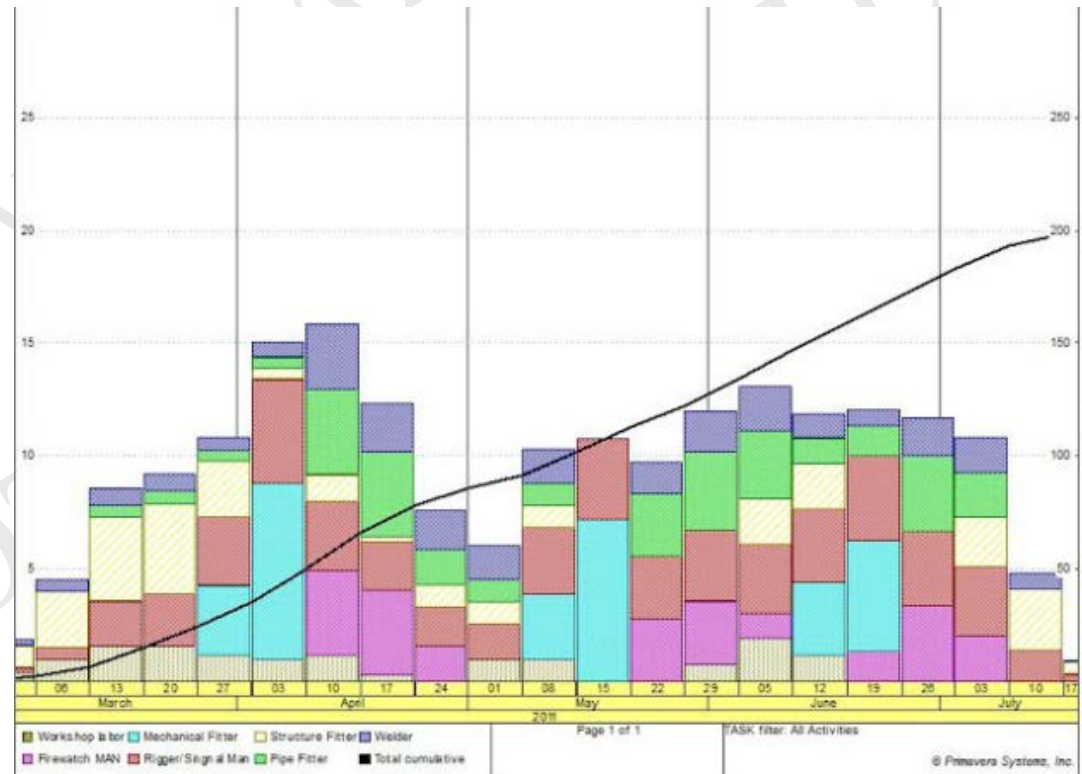
- ❑ In addition, the **organization breakdown structure (OBS)** should be integrated in the schedule structure to facilitate the assignment of **primary responsibility** for **each** of the schedule activities.





Schedule Development Preventive Methods

- ❑ If the schedule is to be **resource loaded** with labor hours or crews, there should be a **standard resource codes dictionary** to avoid confusion.



Schedule Development Preventive Methods

- ❑ Each project **schedule participant** (subcontractor, vendor, design consultant) should **document** the basis of their schedule.
- ❑ By exercising a **graded approach** based upon their **level of participation**, the subcontractors and vendors **schedule narrative** should address the following:

- ❖ Scope of work
- ❖ Work breakdown structure
- ❖ Key assumptions and constraints
- ❖ Issues and impacts (risk)
- ❖ Inclusions and specific exclusions
- ❖ Key procurements and submittals



Recommended Practice

(Schedule Management and Control Procedures)



Schedule Management and Control Procedures

- ❑ The **scheduling management and control** phase **includes** **implementing** the schedule procedures and processes **required to maintain** the project schedule during the project execution phase, to accomplish
1. progress updates,
 2. critical path and near critical activity analysis,
 3. schedule change management,
 4. forecasts and recovery planning,
 5. progress reporting, and
 6. providing timely output and deliverables to the project team.



Schedule Management and Control Procedures

☐ During the **schedule management phase**

1. actual progress is tracked,
2. critical and near critical path activities are monitored; and
3. variances or trends analyzed and reported to the project participants.

What is the problem here?



Schedule Management and Control Procedures

- ❑ There should be an **understanding** between the **owner** and the **contractor(s)** concerning
 1. the schedule updating and
 2. progress reporting process andthis should be **clarified** in the contract scheduling specification.

Schedule Management and Control Procedures

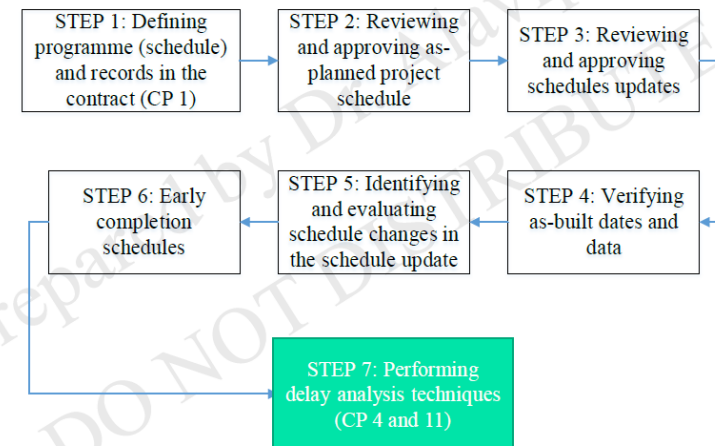
- ❑ This process can be **much more powerful** in minimizing claims if there is a mechanism to resolve **all outstanding issues** during each schedule update.



Delay analysis procedure

فرآیند جامع آنالیز تاخیرات در پروژه
آنالیز زمانی تاخیرات: فرآیند جامع و مدارک و مستندات لازم برای پیش بینی و آنالیز تاخیرات

- ❑ The following Steps needed to be taken for contemporaneous analysis:



By: Alavipour, PhD, PMP, CMIT

www.dralavipour.com ذکر مطالب فوق تنها در صورت ذکر منبع بلامانع است.

3

When claims get more complicated?

Schedule Management and Control Procedures

- ❑ A **major cause** of unresolved and complicated claims is allowing individual issues that have caused delay to **accumulate** without resolution **until** the intertwining and interaction of individual issues become **almost impossible** to resolve fairly and clearly.



How the scheduler helps here?



Schedule Management and Control Procedures

- ❑ The **scheduler** should be **involved** with the **establishment** of these processes and methods for the integration and coordination of the vendor or subcontractors' schedules.
 - ❖ A **very clear division of responsibilities (DOR)** is suggested when there is a master project schedule.

Use uniform contracts!

Schedule Management and Control Procedures

❑ **Who will be responsible** for the maintenance and configuration control:

- ❖ the owner's representative?;
- ❖ the general contractor?; or
- ❖ a construction manager?

❖ The schedule revision process is very important and

often can be the **focus of contention**

when a **project ends** up with time impact claims.



How the contract helps here?

Schedule Management and Control Procedures

❑ FIDIC-2017

❖ Programme (8.3)

The initial programme and each revised programme shall be submitted to the Engineer in one paper copy, one electronic copy and additional paper copies (if any) as stated in the Contract Data, and shall include:

- (a) the Commencement Date and the Time for Completion, of the Works and of each Section (if any);
- (b) the date right of access to and possession of (each part of) the Site is to be given to the Contractor in accordance with the time (or times) stated in the Contract Data. If not so stated, the dates the Contractor requires the Employer to give right of access to and possession of (each part of) the Site;
- (c) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage of design (if any), preparation and submission of Contractor's Documents, procurement, manufacture, inspection, delivery to Site, construction, erection, installation, work to be undertaken by any nominated Subcontractor (as defined in Sub-Clause 5.2 [Nominated Subcontractors]) and testing;
- (d) the Review periods for any submissions stated in the Specification or required under these Conditions;
- (e) the sequence and timing of inspections and tests specified in, or required by, the Contract;

Schedule Management and Control Procedures

❑ FIDIC-2017

❖ Programme (8.3)

آیا مشاور باید با زمان و
اولویت اجرای کارهای اصلاحی
موافقت کند؟

منظور از logically linked
چیست؟
این عبارت در پروتکل SCL
نیز به وفور استفاده شده

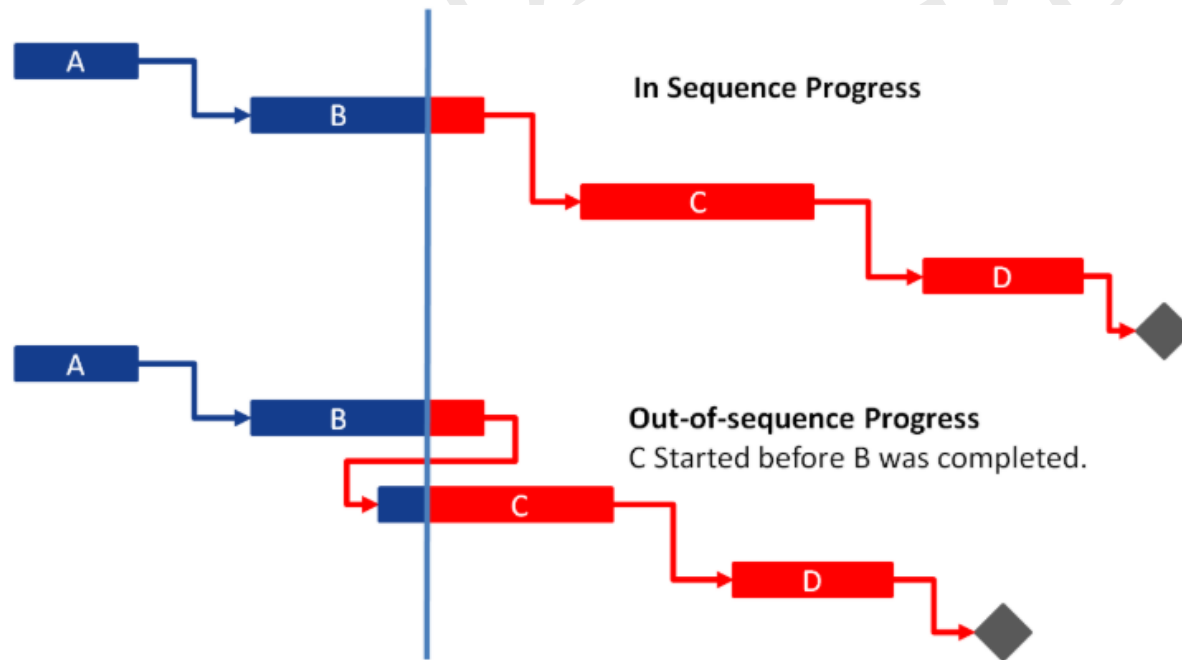
آیا قبل از ارائه برنامه بازنگری
باید تحلیل تاخیرات انجام شود؟

- (f) for a revised programme: the sequence and timing of the remedial work (if any) to which the Engineer has given a Notice of No-objection under Sub-Clause 7.5 [Defects and Rejection] and/or the remedial work (if any) instructed under Sub-Clause 7.6 [Remedial Work];
- (g) all activities (to the level of detail stated in the Specification), logically linked and showing the earliest and latest start and finish dates for each activity, the float (if any), and the critical path(s);
- (h) the dates of all locally recognised days of rest and holiday periods (if any);
- (i) all key delivery dates of Plant and Materials;
- (j) for a revised programme and for each activity: the actual progress to date, any delay to such progress and the effects of such delay on other activities (if any); and
- (k) a supporting report which includes:
 - (i) a description of all the major stages of the execution of the Works;
 - (ii) a general description of the methods which the Contractor intends to adopt in the execution of the Works;
 - (iii) details showing the Contractor's reasonable estimate of the number of each class of Contractor's Personnel, and of each type of Contractor's Equipment, required on the Site, for each major stage of the execution of the Works;
 - (iv) if a revised programme, identification of any significant change(s) to the previous programme submitted by the Contractor; and
 - (v) the Contractor's proposals to overcome the effects of any delay(s) on progress of the Works.

Schedule Management and Control Procedures

❑ Clarification about

1. what constitutes “revising” the schedule logic and
2. how the project “manages” out of sequence progress are important to resolve.



Schedule Management and Control Procedures

❑ Key items to **resolve** in schedule management and control include:

- ❖ Frequency of progress status updates
- ❖ Level of detail to be reported upward to owner
- ❖ Method of reporting impacts and/or delays
- ❖ Incorporation of change orders
- ❖ Method of highlighting schedule “issues”
- ❖ Float ownership and use

مالکیت شناوری در پروژه؛ چالش‌ها، تبعات مالی و قراردادی آن



۱۴۰۴ فروردین

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سید محمدرضا علوی پور
ایمان مرادمند

<https://dralavipour.com/blog/view/float-ownership>



Schedule Management and Control Procedures

The **parties** should **discuss how** they will **handle** **potential** schedule risks and impacts such as:



Schedule Management and Control Procedures

❑ Weather days

- ❖ Adjustments for seasonal averages?
- ❖ Defining severe or adverse weather?
- ❖ There are **various options** to consider when including **potential adverse weather days** in the project schedule.
 1. One option is to **allow** for these **potential days** in the month or season **when** that adverse weather normally **occurs**.
 2. Another option is to **add** the total potential number of adverse weather days at the **end of the project** as weather contingency and **make adjustments** as time progresses and the adverse weather day is “**consumed**”.



Schedule Management and Control Procedures

❑ Acceleration

- ❖ Options to **improve schedule** with a “**time versus cost**” comparison within the project budget.
- ❖ If the project **anticipates** risks in the performance of the project and has factored in **additional cost contingency**,
then a **potential amount** of schedule contingency should also be considered and included.
- ❖ The **contingency** should be **clearly identified** and “**bounded**” so that adjustments are appropriately made if the **risk events occur**.
- ❖ If the risk events are **mitigated** or do **not occur** and that portion of the schedule contingency is **unused**, then the project should **remove** that unused portion from the schedule.



Schedule Management and Control Procedures

❑ The schedule update process

when **several subcontractors** are **involved** can become very **confusing** and can **consume** valuable project **resources**.

❖ It is important to **establish** and **implement** an **agreement** about

1. how,
2. when, and
3. where

to **obtain**

- i. schedule progress and status, as well as
- ii. the accepted sources of input

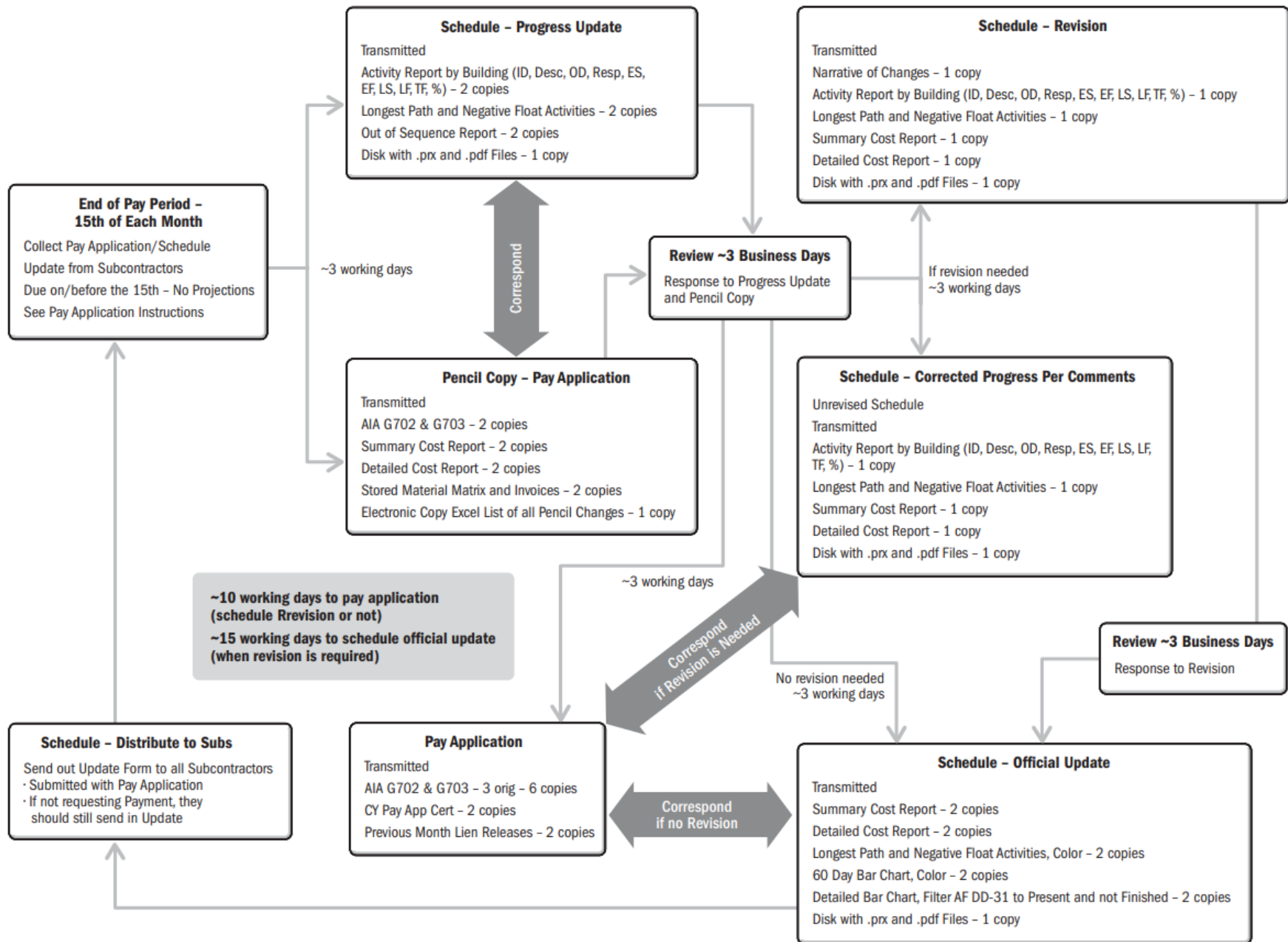
for **validating** schedule **updates** regarding changes, delays, and impacts.



Schedule Management and Control Procedures

❑ Another important consideration involves maintaining records of **as-built facts** that can be **verified** through **contemporaneous** project documents such as:

- ❖ Daily reports/weather reports
- ❖ Procurement expediting and submittal log
- ❖ Production logs
- ❖ Request for information (RFI) log
- ❖ Deficiency logs or reports
- ❖ Trends and potential change order log
- ❖ Change directives
- ❖ Meeting minutes/project correspondence
- ❖ Photographs or videotapes - at critical times



Based on a cost loaded project that uses the CPM schedule to create the contract schedule of values.

Recommended Practice

(Schedule Reviews)



Schedule Reviews

- ❑ It is the **owner's responsibility** to **review** and **accept** (or approve) the project schedules;
both the baseline schedule and the periodic schedule progress **updates** submittals.
- ❑ The **processes** for baseline and progress update schedule **reviews** are **significantly different**, and
require an **experienced scheduler** to perform these tasks.



Schedule Reviews

❑ The Schedule Baseline:

Review of the baseline schedule includes among other things:

- ✓ **Verify** that the baseline matches the **contract bid assumptions**
- ✓ **Ensure** that the baseline is **incorporated** into the appropriate subcontracts
- ✓ **Clarify** the activity scope, details, and assigned responsibilities
- ✓ **Identify** possible claims situations
- ✓ **Review** the predecessor/successor logic



Schedule Reviews

- ❑ The **development phase** for the baseline schedule is
 - ❖ a **dynamic** period of time and
 - ❖ often accomplished **simultaneously** with the contract award and execution of work on the project.

- ❑ Every reasonable effort should be made to
 1. **maintain** only one project schedule and
 2. **working** jointly toward **agreement** on the project schedule with **all** participants.



Schedule Reviews

☐ The Schedule Update Submittal:

❖ The **periodic** schedule update **submittal** should be reviewed for

1. **accuracy** of reported progress and
2. **verification** that there have **not** been any **previously unreported** changes.



Schedule Reviews

❑ The Schedule Update Submittal:

❖ **Schedule narratives** included with the submittal **need to address**

1. **key resource assumptions** underlying the schedule as well as
2. **changes** that affect **critical path work** such as revised logic links, or activity durations;
3. **change** to activity descriptions, or previously reported progress should be **clearly explained** to the owner.

❖ Providing **careful** resource logic review will help **minimize** resource-related claims
when the **project conditions change**.



Schedule Reviews

- ❑ Any changes in previously reported actual dates should include **justification** for the change.
 - ❖ This should be accomplished by providing a written schedule narrative with **each update submittal** to **clarify** the content and reasons for all **significant** schedule changes.



Schedule Reviews

- ❑ There are **mixed opinions** about whether there should be **both** electronic and printed copies of the schedule included in the **schedule submittal** and that should be resolved at the **project coordination** and **kickoff meeting**.



Schedule Reviews

- ❑ There are also a **variety of opinions** about **whether or not** to **designate** a sum of money in the contract for **prompt** and **accurate submittal** of the schedule for review and acceptance.



تدوین و تصویب برنامه جبرانی (Recovery)
Schedule؛ فرآیند اصولی + چکلیست‌ها +
سند AACE + مطالعه موردی



تدوین و تایید برنامه زمان‌بندی به‌روز شده
(Update Schedule)؛ اصول + نکات حیاتی +
چکلیست + سند AACE



تدوین و تصویب برنامه زمان‌بندی اولیه
(Baseline Schedule)؛ اصول + نکات حیاتی
+ چکلیست + سند AACE

<https://dralavipour.com/educational-courses/cm>



<https://dralavipour.com/publications/scheduling-package>

Recommended Practice

(Schedule Impact Analysis)



Schedule Impact Analysis

❑ When the project **experiences** or **anticipates** an **impact** to the planned completion date,

it is important to

1. **perform** a time impact analysis (TIA) **prior** to the **impact** of the delay event and
2. **resolve** the schedule issues as **quickly** and as **contemporaneously** as possible.



Schedule Impact Analysis

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it is important to

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What to do regarding cost impacts?



Schedule Impact Analysis

- ☐ The **resolution** of the cost impacts to the project
 1. should be **kept separate** and
 2. can be **negotiated** and **resolved** at some future date.

Schedule Impact Analysis



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فرمول جامع برای تدوین لایحه تاخیرات (دوره
پیشرفته تاخیرات) (بر اساس دو قرارداد FIDIC
و AIA)

<https://dralavipour.com/video-course/delay2>

<https://dralavipour.com/video-course/delay-analysis-framework>

Recommended Practice

(Schedule Change Management)



Schedule Change Management

- ❑ **Schedule change management** refers to the process of **managing any change** to
 - ❖ the scope of work and/or any deviation,
 - ❖ performance trend, or
 - ❖ change to an approved or baseline project control plan.
- ❑ It is important to recognize that **change management** is **necessary** in **every project** due to a variety of **conditions or events**.
- ❑ The scheduler's change management responsibilities are to **revise** the **approved** baseline schedule **only when** an approved change order **indicates** a change in scope or duration.



Schedule Change Management

- ❑ The **scheduler** should be able to **differentiate** between
 1. schedule variances,
 2. trends, and
 3. changes, andshould be able to **make** timely recommendations to the **project management team** for **corrective actions**.
- ❑ The **scheduler** should be **capable** of providing schedule-related recommendations to the **project management team** on strategies to **recover** from **project delays**.



Schedule Change Management

- ❑ If the project has **established** a schedule contingency, the **use of that contingency** should be in **strict compliance** with the change management process.
- ❑ The schedule change management procedure should **address**
 1. the **contract time limits** for
 - i. notification,
 - ii. submittal, and
 - iii. approval
 2. the **format** for the schedule change **submittal** such as a fragnet and a TIA narrative, if required.

Schedule Change Management



<https://dralavipour.com/video-course/contract-change-management>

Recommended Practice

(As-Built Schedule)



As-Built Schedule

- ❑ The **most important** schedule for the project execution phase is the **baseline schedule**.
- ❖ However, the **second** most important schedule is the **“as-built” schedule** when related to the **successful resolution** of delay claims.
 - ✓ The **scheduler** is **responsible** to provide an as-built schedule that can be **validated** to the **project records** to be used as an effective tool to **facilitate** the preparation for and/or defense of a **schedule related claim**.



As-Built Schedule

- ❑ The **contract terms and conditions** should **address** this requirement for both
 1. the prime- and
 2. sub-contracts
 to **improve opportunities** for **timely** delay resolution and settlement.
- ❑ The **procedure** for **maintaining** records of as-built facts that are **verified** through **contemporaneous project documents** is also important.



STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Records

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- ❑ The **“Records”** recommended here **divided** into the following **six categories**:
 1. Programme records
 2. Progress records
 3. Resource records
 4. Costs records
 5. Correspondence and administration records
 6. Contract and tender documents

We talked about this in Document Management Course

Do you remember?

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دفتر آموزش



تهران، بلوار فردوس شرق، مجتمع آبگینه، طبقه سوم اداری، واحد C42



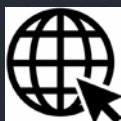
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+۹۸ ۲۱ ۴۶ ۱۰۰ ۴۵۰



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