

# Schedule Delay Analysis

## For Project Managers

# Martin Lopez Consulting

## 34 Years in Procurement, Engineering and Construction

- Bachelors of Science in Construction Management
- Licensed Civil Engineer
- Construction Claims Consultant
- Project Controls Manager
- Project Manager
- Project Engineer / Scheduler

## Projects Types

- Marine / Locks
- Airport
- Rail
- Highway & Bridges
- Dams
- Schools and Hospitals
- Training



# Martin Lopez Consulting

## Specific Projects

- Third Set of Locks, **Panama**
- Sky Harbor International Airport, Phoenix Arizona **USA**
- Al Saadiyat Island, Abu Dhabi, **UEA**
- Abu Dhabi International Airport, **UAE**
- Port of Long Beach California, **USA**
- California Department of Transportation, **USA**
- Hyperion Wastewater Treatment Plan, City of Los Angeles, **USA**
- Los Angeles County Department of Public Works, **USA**
- Metro Light Rail, Phoenix Arizona, **USA**



# Schedule Delay Analysis

## For Project Managers

This presentation is prepared for Project Managers, Construction Managers, Employers, Engineers, Architects and Professionals who are not planners, schedulers and or delay analysts. The purpose of the presentation is to provide basic training to resolve project delays, time extensions and time related claims. You will be able to understand different methods of delay analysis, delay analysis terminology and to follow the schedule delay analysis process along with Attorneys and Experts.

Sample exercises are included in the presentation which provide steps in reviewing and assessing types of delays, and schedule delay methods commonly used. You will understand the basics of making determinations of extensions of time for compensable delays and non compensable delays.

# Schedule Delay Analysis

## For Project Managers

### Extra Work

Any work which is required and not covered or included in the existing Contract Documents, could be additional work, altered work, work due to differing site conditions, or otherwise. Extra work may result in a variation order or claim for additional time and cost.

### Main Causes of Construction Claims

- Extra work
- Disruptions, suspensions, work stoppage
- Contract acceleration
- Labor, material, or equipment problems

# Schedule Delay Analysis

## For Project Managers

### Direct Cost

Cost of completing work such as the cost of labor, material, equipment used in construction, installed equipment, and other resources involved in the physical construction of the work. Direct costs are not time related costs.

### Indirect Cost

Indirect costs include field administration, start up costs, insurance, fees, taxes, etc. Costs not directly attributable to the completion of construction work but are typically allocated across all activities. Indirect costs are time related costs spend during the execution of the work from start to finish.

# Schedule Delay Analysis

## For Project Managers

### As-built Schedule

A project schedule showing the historical record of actual start and finish dates of work performed. Shows the actual sequence of construction, activity logic, actual start and finish dates.

### Recovery Schedule

A recovery schedule shows mitigation efforts to recover time lost. Several techniques may be used including activity resequencing, activity logic changes, activity duration changes or other measures. Recovery does not imply owner or contractor fault; it just indicates recovering lost time.

# Schedule Delay Analysis

## For Project Managers

### Liquidated Damages

Contractually defined amount charged to the Contractor for late project completion. Liquidated Damages are stipulated on a daily rate in the Contract. It is a calculated cost to cover the losses of not having the facility completed.

#### Example

Contract stipulated damages \$200 per day

Contractor delay 20 days

Liquidated damages is  $(\$200 \text{ times } 20) = \$4,000$



# Schedule Delay Analysis

## For Project Managers

### Directed Acceleration

Occurs when acceleration by the Contractor is required to recover delays and to complete the work within the contract completion date. Directed acceleration occurs when the Owner formally directs the Contractor to accelerate the remaining works.

### Constructive Acceleration

Occurs when a Contractor is entitled to a time extension which the Owner declines to grant, and the Contractor believes that it must accelerate in order to comply with the contract and avoid liquidated damages. The cost of constructive acceleration can be recovered by the Contractor if it merits a time extension.

# Schedule Delay Analysis

## For Project Managers

### Prospective Analysis

Performed in real-time prior to the delay event and or contemporaneous with the delay event. Provides an estimate of future activity completion dates and or a projected project completion date to determine project delays. Uses the current monthly updated schedule and adds activity delays to calculate a new completion date.

### Retrospective Analysis

Performed after the delay event has occurred and impacts are known as opposed to estimated. The timing may be soon after the delay event or after the completion of the project. Uses past monthly updates to assess delays to the completion date due to impacts activity delays.

# Schedule Delay Analysis For Project Managers

Prospective Analysis – Looking Forward



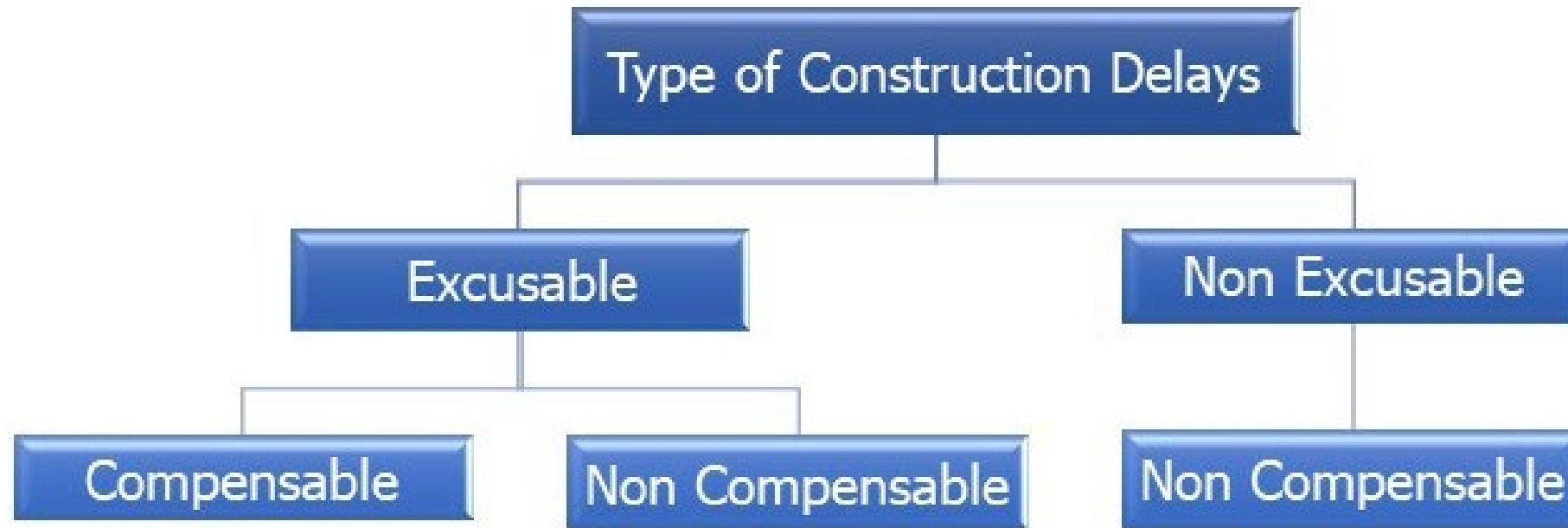
# Schedule Delay Analysis For Project Managers

Retrospective Analysis – Looking Back



# Schedule Delay Analysis

## For Project Managers



# Types of Delays

## Excusable Delay

Exists where there is a contractual justification in a Contractor's request for a contract time extension. Excusable delay provides relief to liquidated damages. Excusable delays are considered Owner delays.

## Non-Excusable Delay

Is a project delay that has no contractual justification in the Contractor's request for a contract time extension. It is subject to liquidated damages to the Contractor from the Owner. Non-excusable delays are considered Contractor's delays.

# Types of Delays

## Concurrent Delay

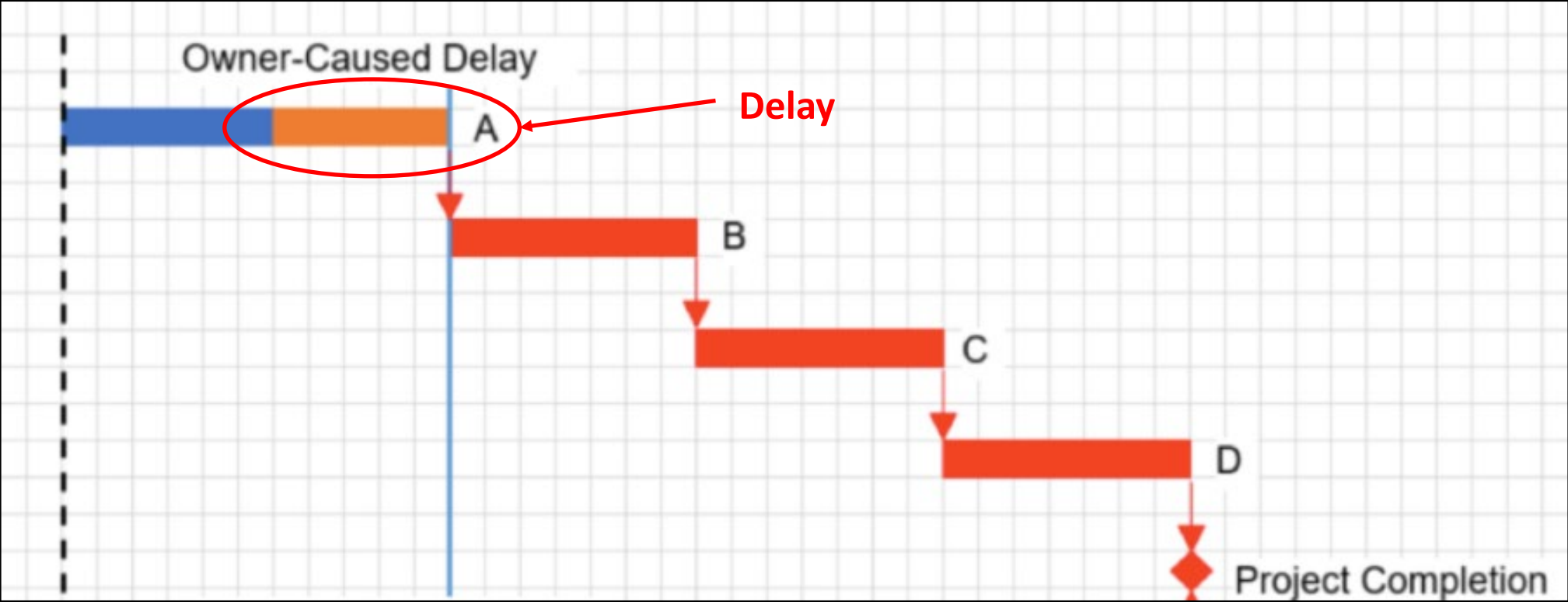
A project delay by two events at the same time and from both parties. One event for which the employer takes responsibility under the contract and the other for which the contractor takes responsibility. A concurrent delays is excusable but not compensable.

## Compensable Delay

The Contractor is entitled to receive a time extension and expenses associated with the prolongation of the duration of work. All compensable delays are also excusable delays.

# Schedule Delay Analysis For Project Managers

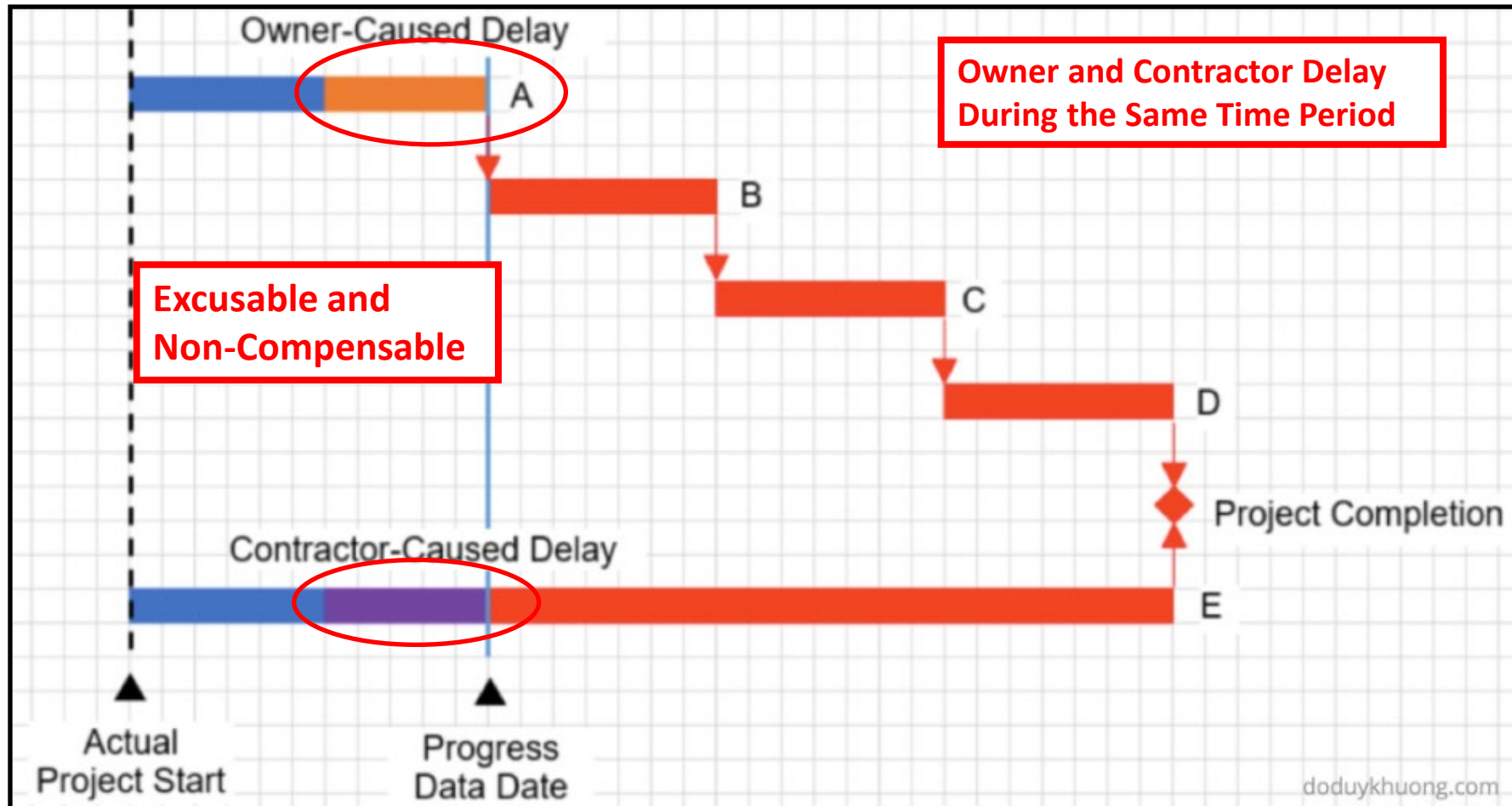
## Compensable Delay





# Schedule Delay Analysis For Project Managers

## Concurrent Delay



# Schedule Delay Analysis

## For Project Managers

### Compensable Delay

- Applies for Owner Delays
- Can not be a concurrent delay
- Time extension must be granted
- Compensate Contractor's daily indirect cost – time related costs

### Example

Contractor daily indirect cost \$300

Compensable delay 20 days

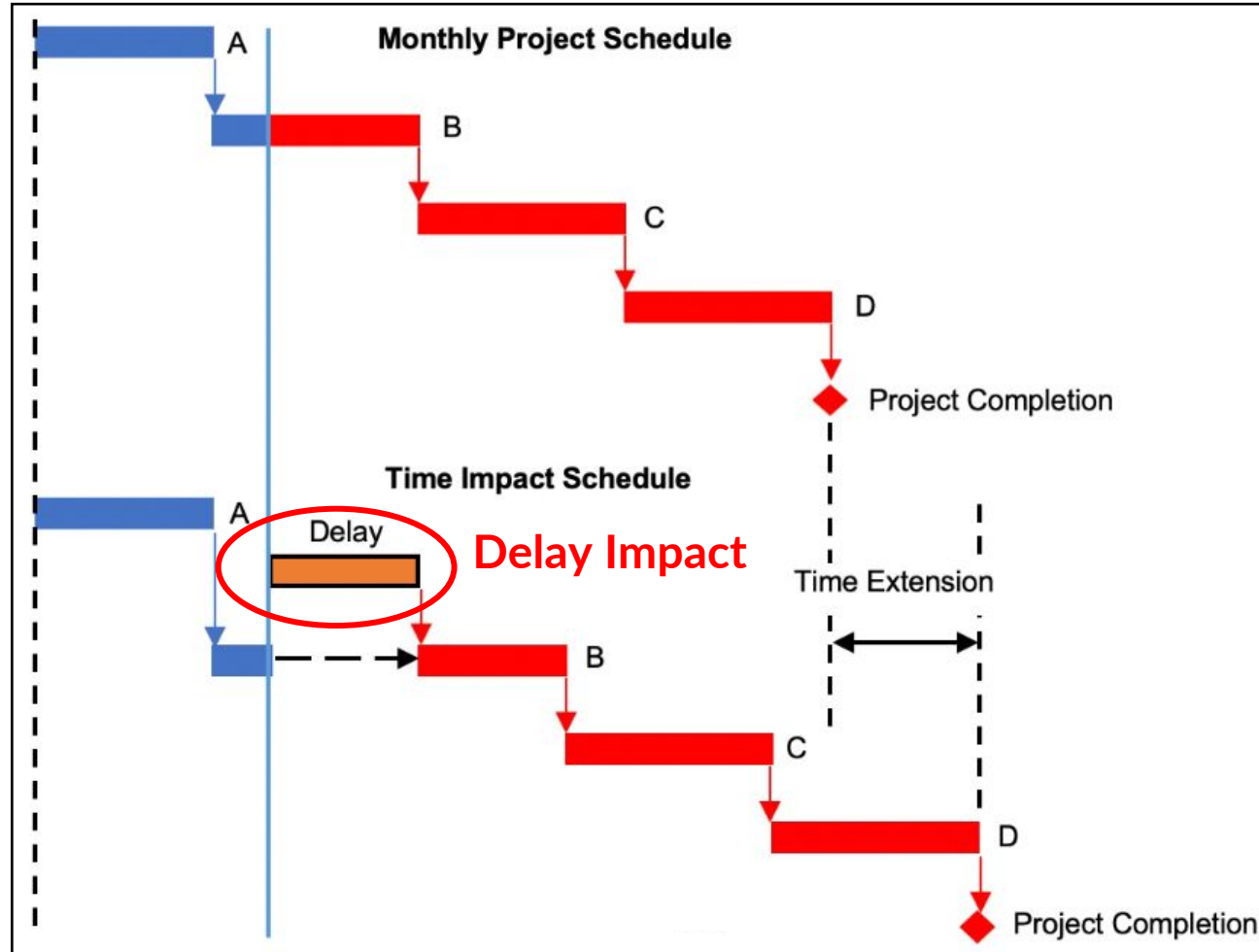
Contractor compensation ( $\$300 \times 20$ ) = \$6,000

# Schedule Delay Analysis

## For Project Managers

- Time Impact Analysis or Contemporaneous Analysis
- Performed before or near the start of a delay event
- Performed before the start of extra work
- Simple to do, provides quick results, quick contemporaneous decisions
- Disadvantage of granting too much time or not enough time
- Less accurate for complex schedule and for longer events
- Less accurate for schedules with much out-of-sequence activities

# Prospective Time Impact Analysis



# Schedule Delay Analysis

## For Project Managers

### Retrospective Delay Analysis

- Time extension granted based on actual impact, not estimated
- Better options for schedules with much out-of-sequence activities
- More accurate for longer events
- More complex than Prospective analysis
- Disadvantage that it can require extensive data gathering and analysis
- Provides results after the event is completed

# Schedule Delay Analysis

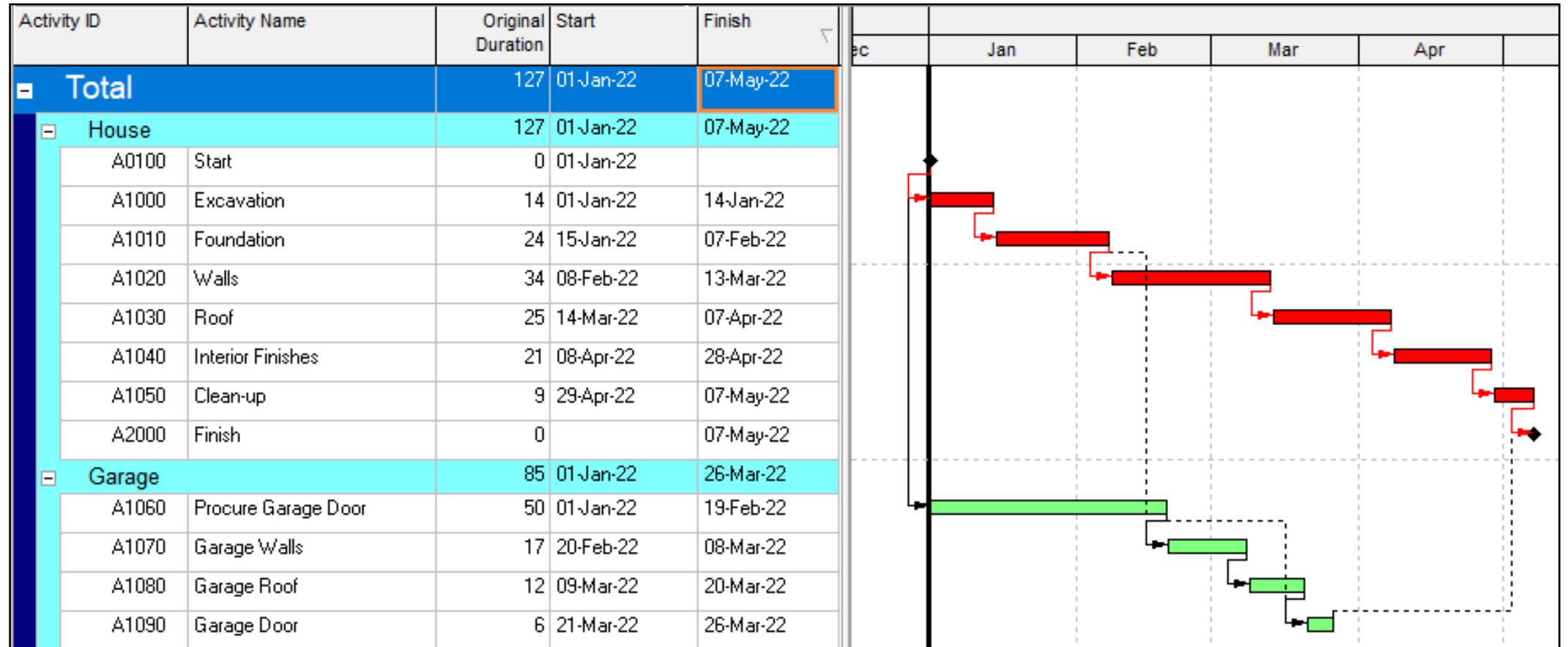
## For Project Managers

### Delay Analysis Exercise

# Schedule Delay Analysis

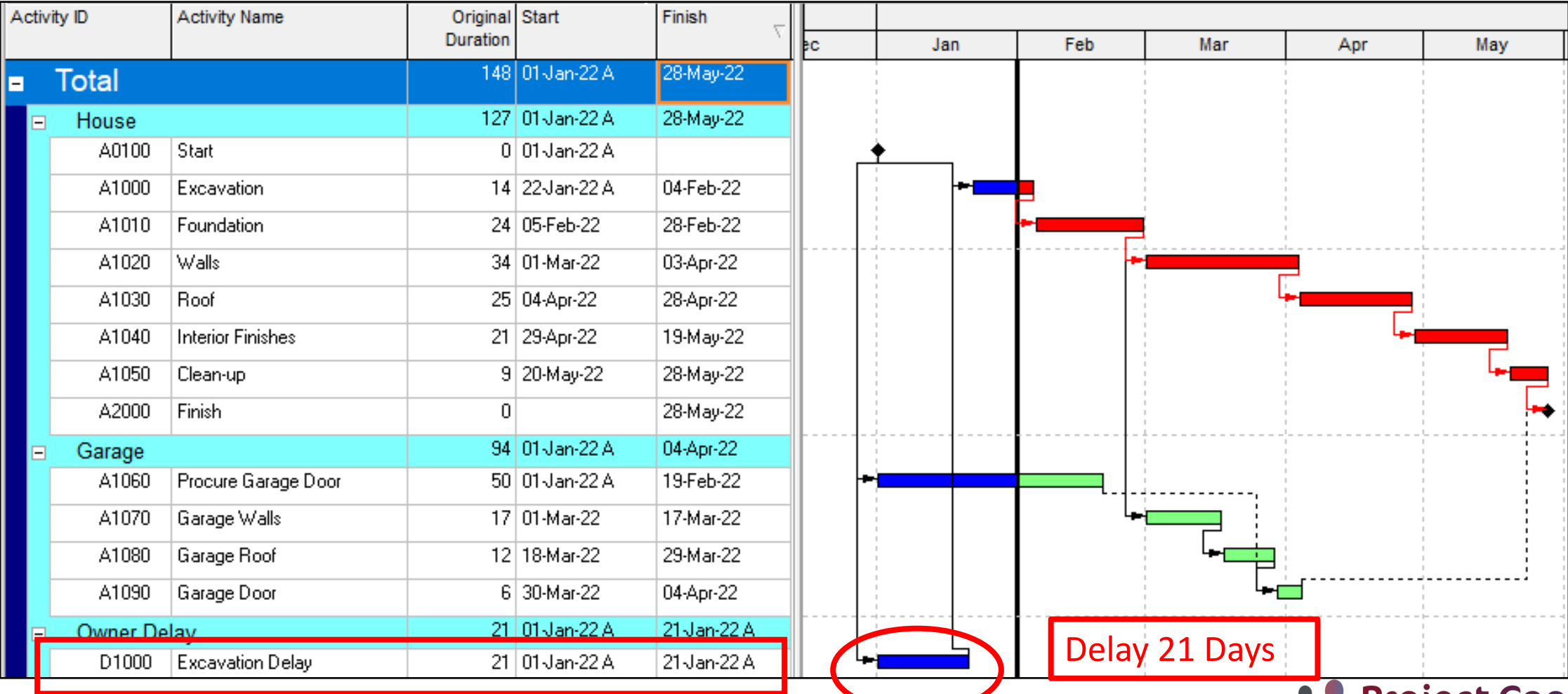
## For Project Managers

### Baseline Schedule



# Exercise – Schedule Delay Analysis

## *Monthly Update 1*





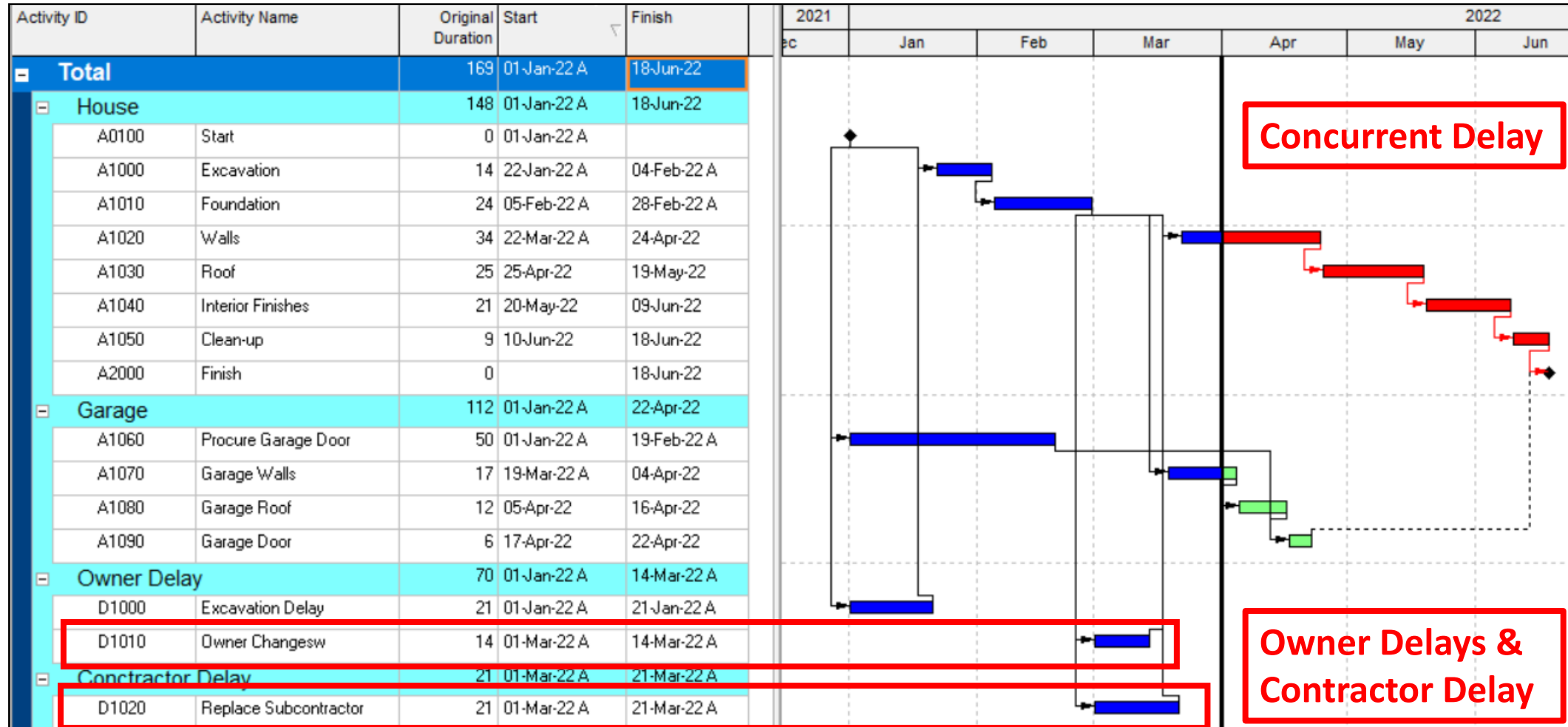
# Schedule Delay Analysis

## For Project Managers

Delays					
Monthly Update	Project Duration	Non Excusable	Excusable Noncompensable	Excusable Compensable	Comments
Baseline	127	-	-	-	
1	148	-	-	21	Unforeseen site conditions

# Exercise – Schedule Delay Analysis

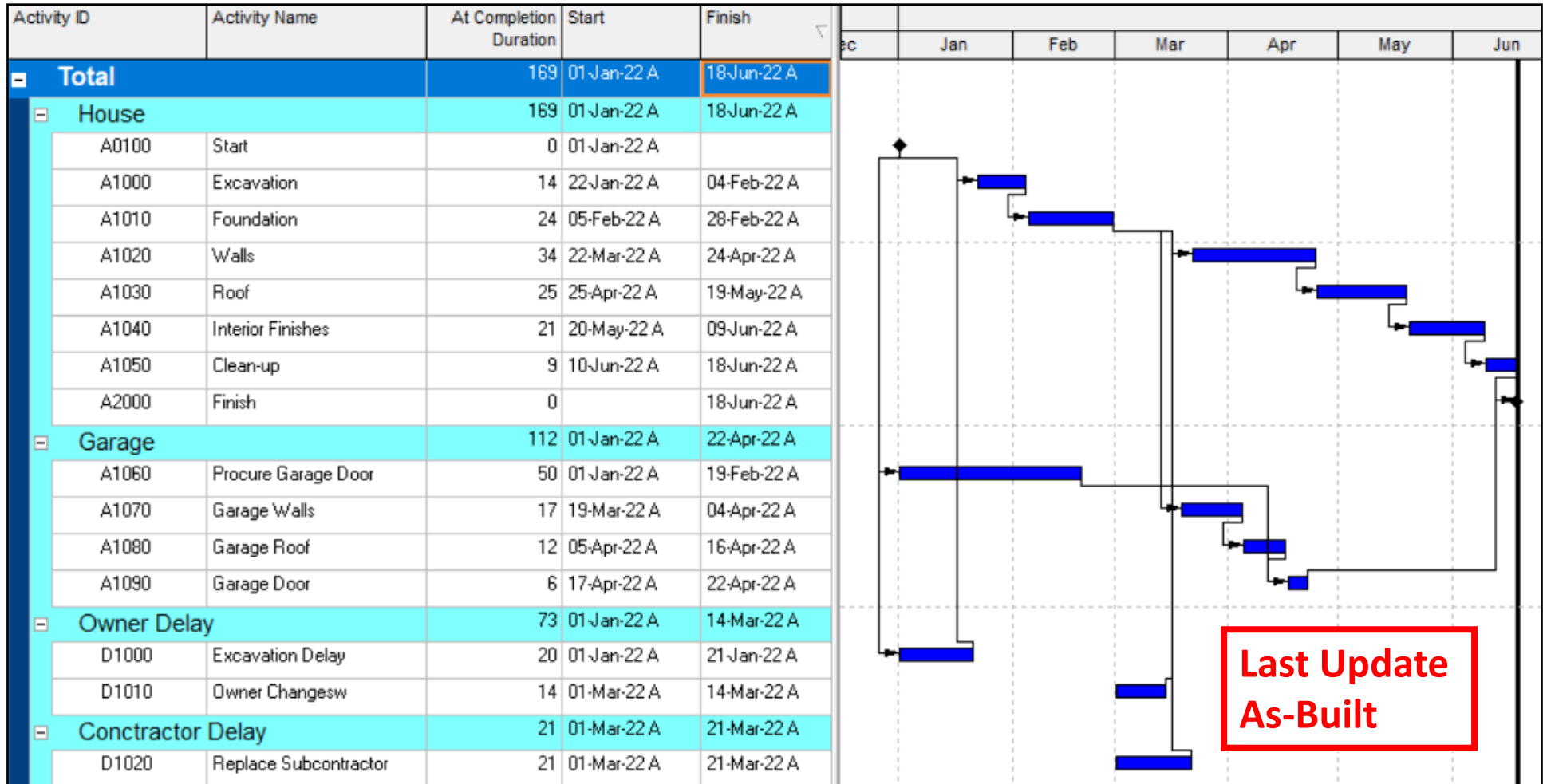
## Monthly Update 3



# Schedule Delay Analysis

## For Project Managers

Delays					
Monthly Update	Project Duration	Non Excusable	Excusable Noncompensable	Excusable Compensable	Comments
Baseline	127	-	-	-	
1	148	-	-	21	Unforeseen site conditions
2	148	-	-	-	No Delays
3	169	7	14		Owner and Contactor Delay



# Schedule Delay Analysis

## For Project Managers

Delays					
Monthly Update	Project Duration	Non Excusable	Excusable Noncompensable	Excusable Compensable	Comments
Baseline	127	-	-	-	
1	148	-	-	21	Unforeseen site conditions
2	148	-	-	-	No Delays
3	169	7	14		Owner and Contactor Delay
4	169	-	-	-	No Delays
		7	14	21	

# Schedule Delay Analysis

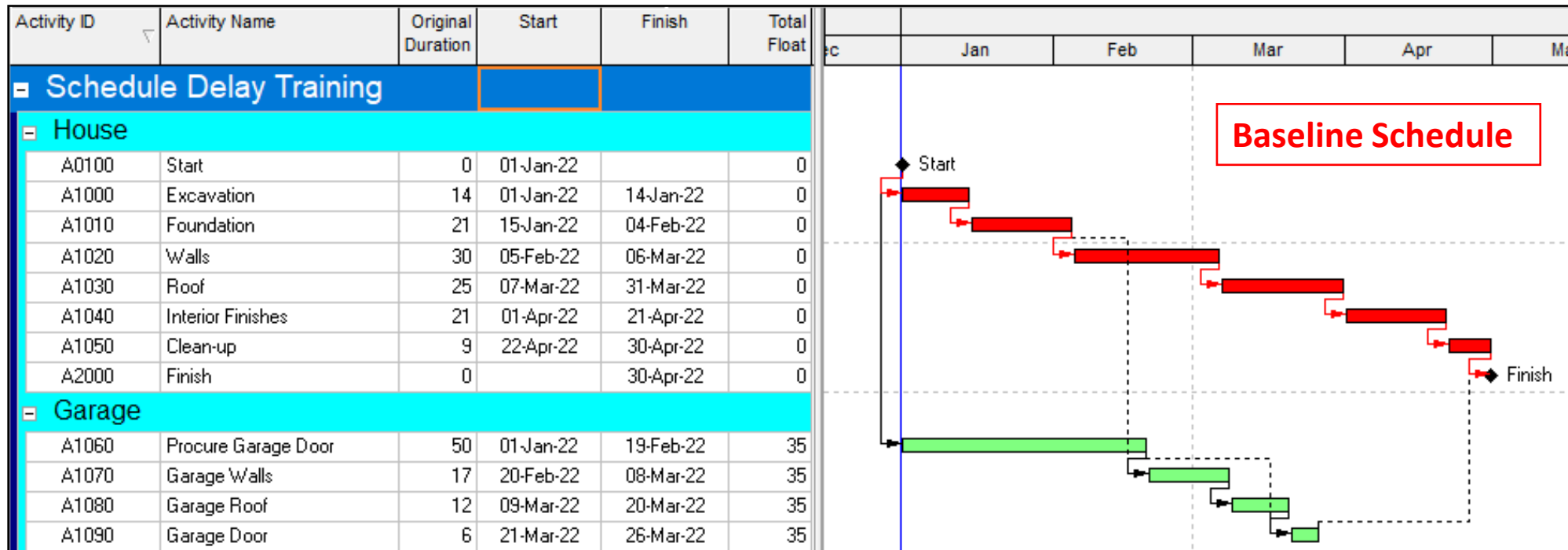
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# Retrospective Delay Analysis

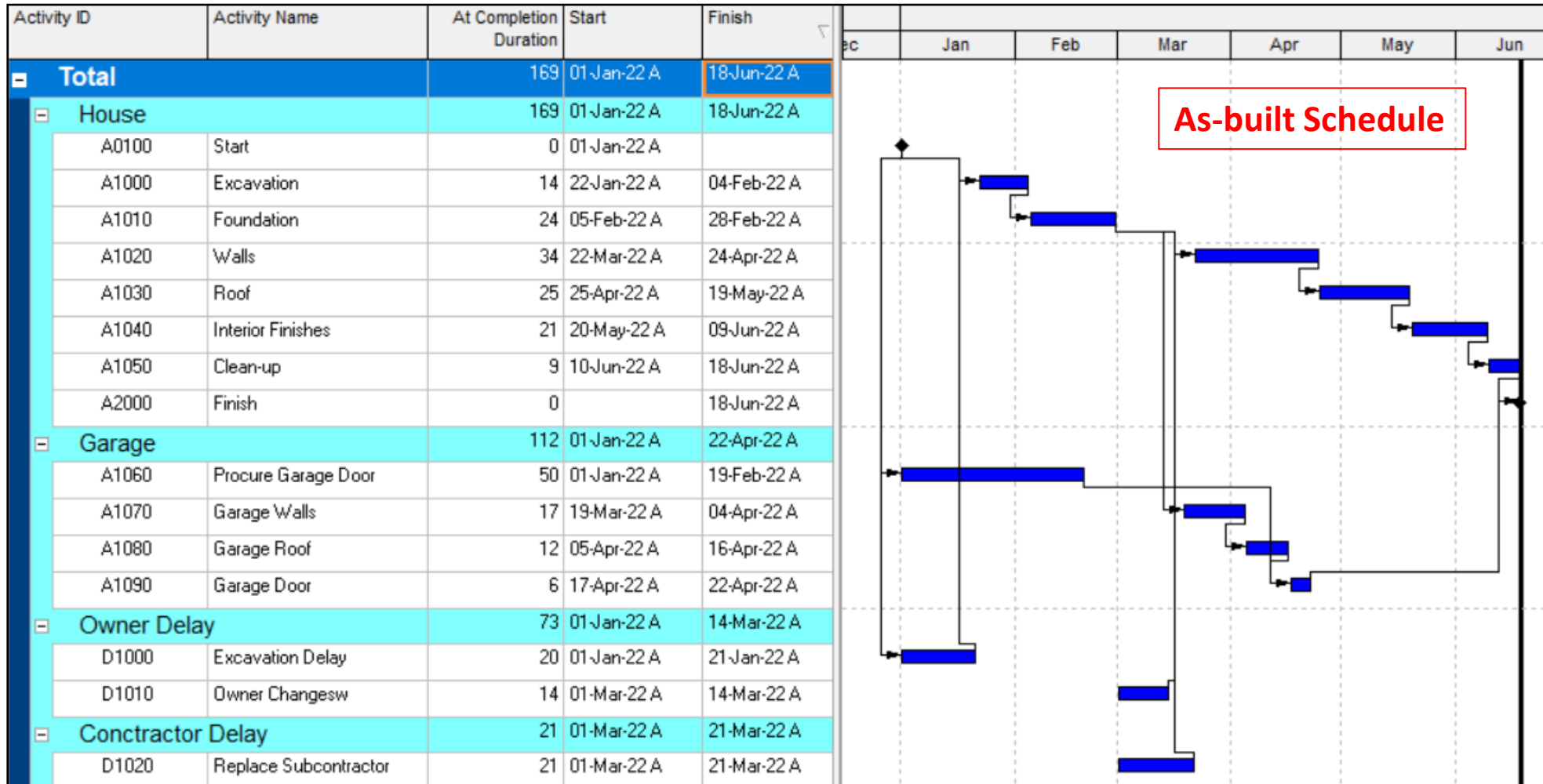
## As-Planned vs. As-Built Schedules

# Schedule Delay Analysis

## For Project Managers



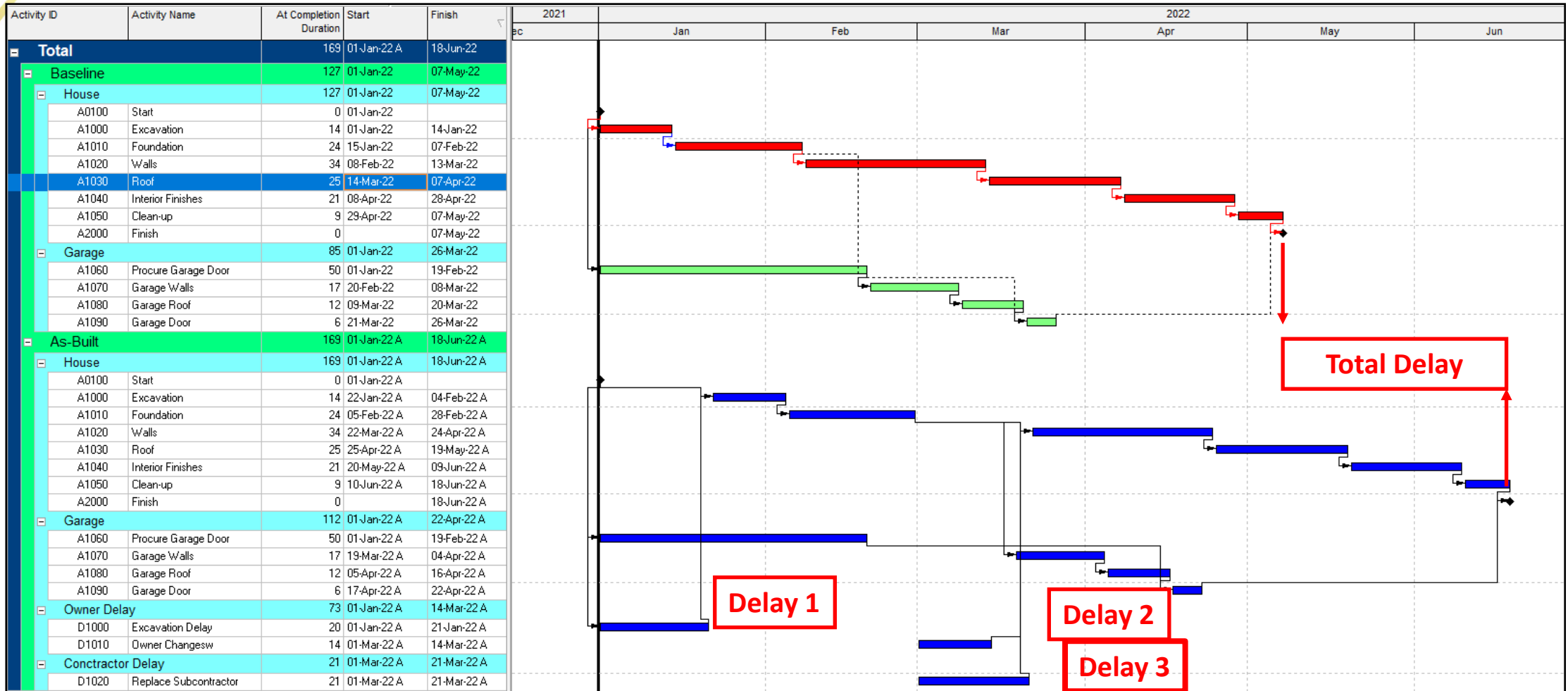
# Schedule Delay Analysis For Project Managers





# Retrospective Schedule Delay Analysis

## As-Planned vs As-Built Schedules



# Schedule Delay Analysis

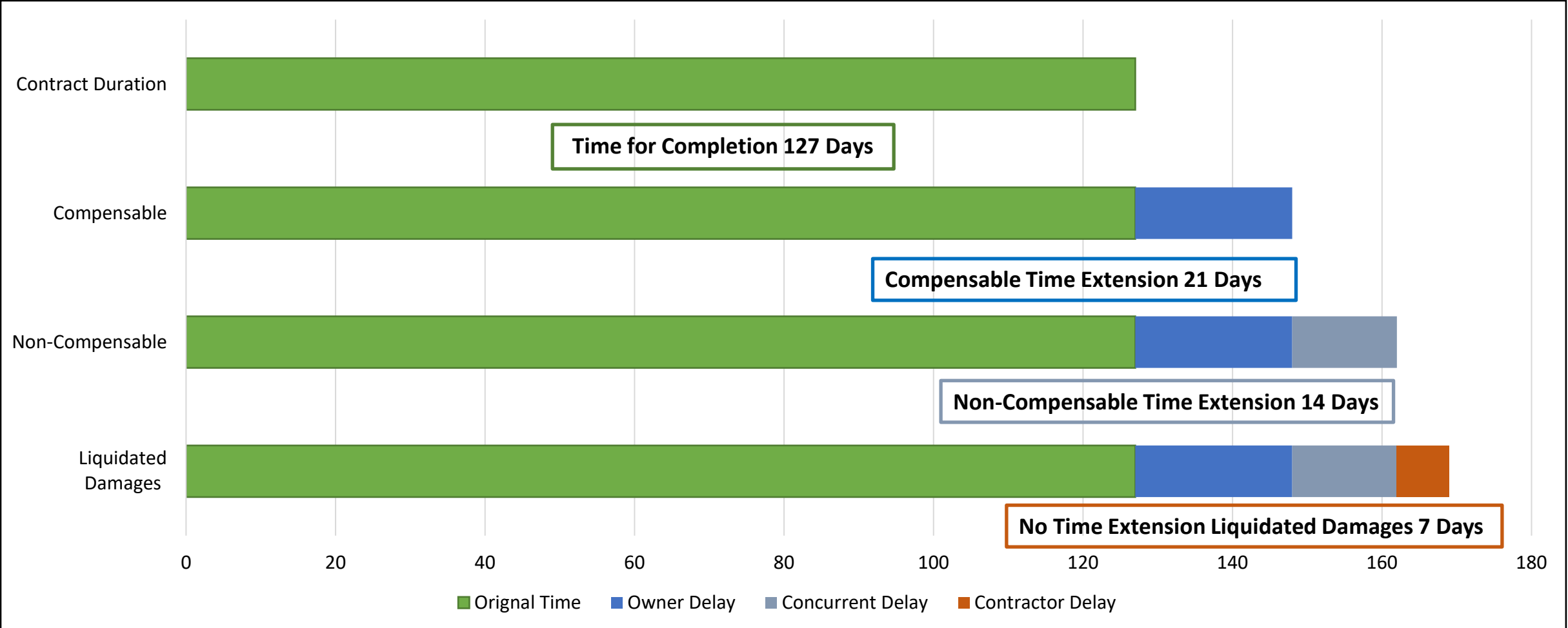
## For Project Managers

### Summary of Project Delays

Contract Duration	127
Compensable EoT	21
Non-compensable EoT	14
Liquidated Damages	7
<b>Actual Duration</b>	<b>169</b>

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### Contact Information

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### International Consulting & Training

Delay Analysis, Extension of Time, Project Delays

Baseline Schedule & Monthly Update Monitoring

Monthly Progress Reporting & Staff Training

Litigation Support, Mediation, Arbitration, Disputes

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# THANK YOU