Petro Tech Sun
International EPCF Group
Thinking the Way Forwards

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Industrial Manufacturing Plant Case Study

Expert analysis and opinions related to construction management execution and claimed financial damages

NGL 3100

As the fifth NGL plant, NGL 3100, is currently under construction by OIEC. The project is defined to reach the optimal recovery of C2+ product associated with gas of North Dezful oilfields. This project includes a high-pressure electrical power grid consisting of transmission lines, stations, feed and product pipelines.

Location	Dehloran (Ilam Province) / Iran
Owner	**Ahdaf Investment Company**
Client	Dehloran Petrochemical Company
OIEC Scope	**- Engineering (basic and detailed design)** **- Procurement (supply of the equipment and bulk items, procurement services)** **- Construction (site preparation, plant construction and erection)** **- Commissioning (pre-commissioning, commissioning and start-up)**
Products	- C2+: 40,000 barrels per day - Condensate: 850 barrels per day - Sweet Gas: 77 MMSFD - Sulfur: 400 tons per day

Approach

CPM Schedule Analysis

A CPM schedule gives each activity an early start date and a late start date. This timetable is visualized in a network diagram or Gantt chart. A critical task has a zero-run-time reserve, which means if the task duration changes, the schedule of the entire project will be affected.

Based on the baseline schedule and periodic schedule updates, PTS Company divided the project into discrete time periods, or “windows.” Within each window, PTS analyzed the project critical path to determine the total delay experienced during the corresponding time period. PTS then analyzed contemporaneous project documents to determine the root causes for each delay and allocated the delay days to the responsible party. Based on this analysis, PTS determined that the subcontractor’s inefficient labor, lag between material procurement and construction, and rework due to poor workmanship were the primary contributors to the critical path delays. PTS also identified delays due to the contractor supplying material and equipment; however, these procurement delays were largely concurrent with the subcontractor-caused delays, which were not assessed against either party.

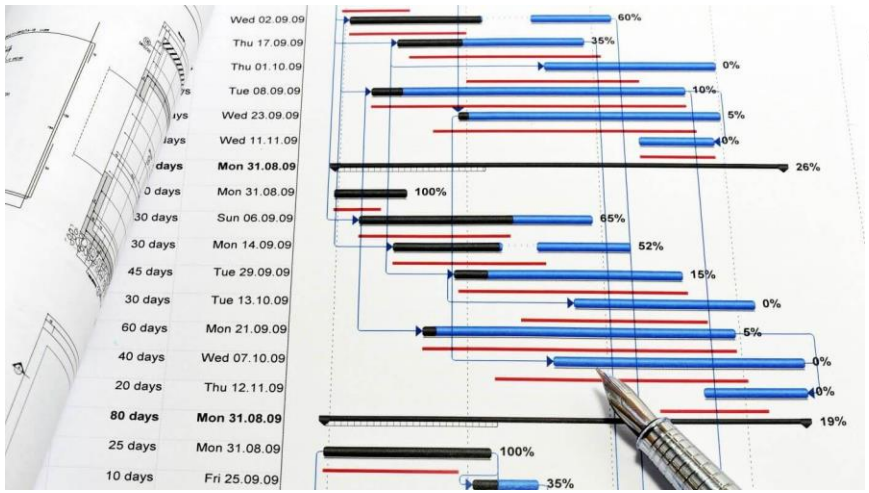
Introduction

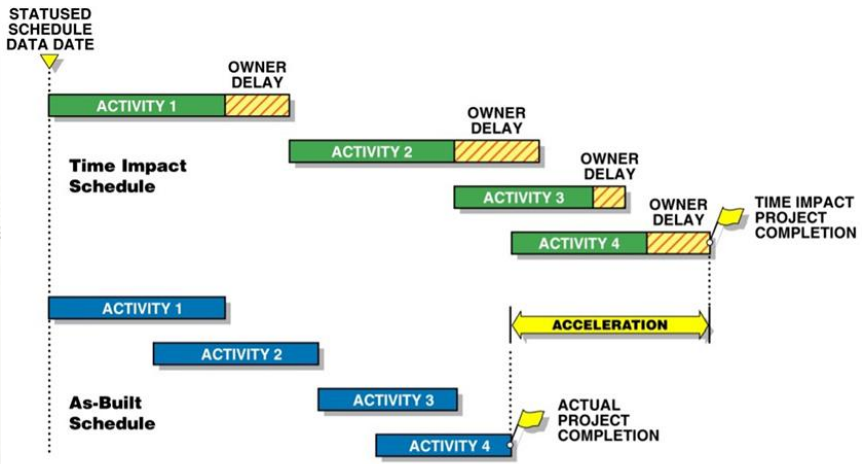
A typical construction project suffers from high risks associated with schedule delays and time-based disputes, since time is of the essence of the construction contract. For example, the unique nature of construction makes the work susceptible to unforeseen site conditions and severe weather changes. In addition, a construction plan created for a project relies on the performance of owners, designers, contractors, subcontractors, and suppliers, as well as the coordination among them. A single event that deviates from the plan, such as a change in the scope of the project, can disturb the overall performance and can create turbulence among the parties. The volume of time-based disputes and litigation grows substantially as construction becomes larger and more complex.

Delay in construction can have a number of consequences in a project, such as late completion, lost productivity, acceleration, consequential damages, increased cost, and contract termination.

The party experiencing damages from delays needs to be able to recognize the delays and the parties responsible for them in order to recover time and cost. However, delay situations are generally complex. A delay in an activity may not result in the same amount of project delay.

A delay caused by a party may or may not affect the project completion date and may or may not cause damage to another party. A delay such as unusually severe weather conditions can be caused by none of the parties. A delay may occur concurrently with other delays, and all of them may jointly impact the project completion date. A delay may sometimes contribute to the formation of other delays.





Identifying delay impacts and allocating responsibility for delay events is more often argumentative because it involves one party's gain and the other party's loss. Delay analysis is one of the important parts of time-based dispute resolution, even though the outcome of a claim may be dependent on a multitude of factors. The analysis establishes the arguments in the entitlement of claims, and the result of the analysis plays a critical part in computing damage compensation. A number of methodologies have been developed to assess delays and their impacts, but courts and administrative boards have not specified any standard method to evaluate delay impacts. The parties may use any method in a level of detail that they see fit to prove the entitlement to compensation. Delay analysis can be conducted in a cursory manner or in such detail as to exceed the value of the underlying dispute. Each delay analysis method adopts a different approach to identify delay impacts and may yield different results. The most sophisticated delay analysis method using the highest level of detail does not guarantee success.

Methodology

The methodology of the study involves the analysis of objective evidence. The data used in the study came from published claim cases decided by courts and administrative boards. The decisions/ opinions of courts and boards are normally disclosed to the public and are generally considered to be remarkably reliable for scholarly research. The claim cases in the study were compiled from the information posted on the Web sites of the United States Court of Federal Claims □USCFC □http://www.uscfc.uscourts. gov/opinions.htm, the Court of Appeals for the Federal Circuit and Federal District Courts □CAFC/FDC □LexisNexis.com, the Armed Services Board of Contract Appeals □ASBCA □http://www.law.gwu.edu/asbca/, the Veterans Affairs Board of Contract Appeals □VABCA □http://www1.va.gov/bca, and the General Services Administration Board of Contract Appeals □GSABCA □http://www.gsbca.gsa.gov/decisns.htm.

Reasons for Filing Time-Based Claims

The frequencies of the reasons why contractors filed time-based claims in the 58 cases can be seen in Fig. 1. The most frequently cited reason was differing site conditions. The nature of construction is closely related to existing site conditions. Contractors frequently encounter hidden conditions, such as underground soil conditions and utilities whose locations are difficult to foresee, before the work starts. Differing site conditions may significantly impact the time and cost of performing work.

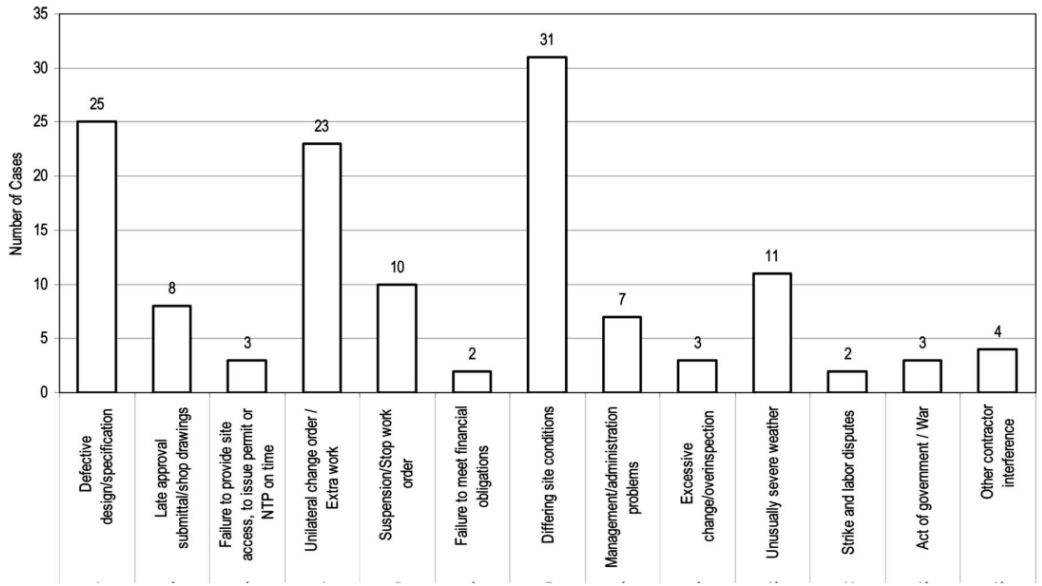


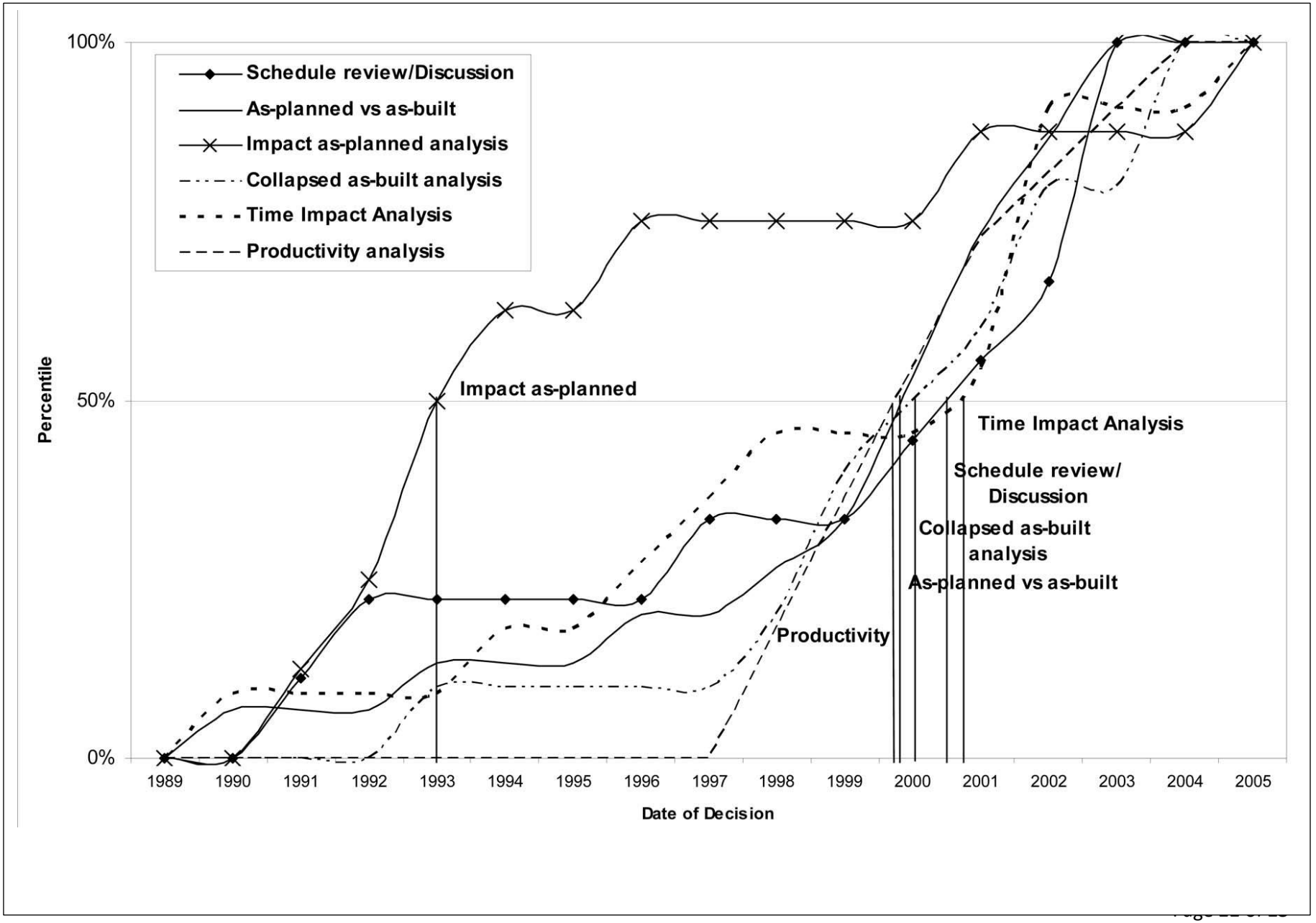
Fig. 1. Reasons for filing claims

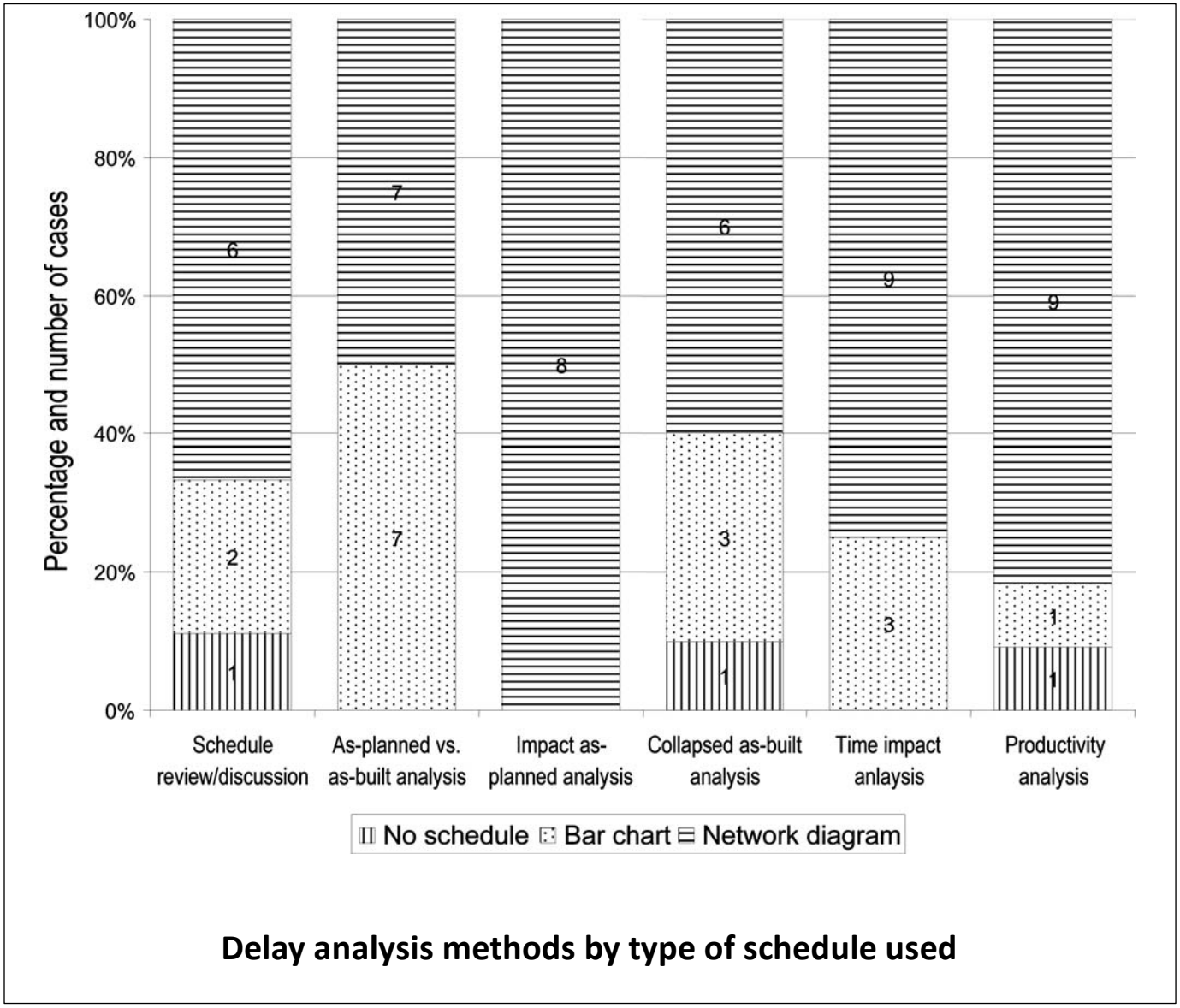
Table 1. Information Categories Used in the Study

Information category		**Description**
Project information	Name of contractor	The name of the contractor who filed the appeal
	Date of decision	The year that the appeals decision is filed to the dockets
	Source of information	The name of the court or board that decides the appeals
	Project description	Brief description of the scope of the project
	Contract price	The price stipulated in the original contract
	Original project duration	Project end date minus project start date specified in the contract
Delay information	Causes of delay	The reasons why time-based claims occurred
	Remedy sought	• Remission of liquidated damages
		• Seeking compensation for consequential damages
		• Appealing termination for default

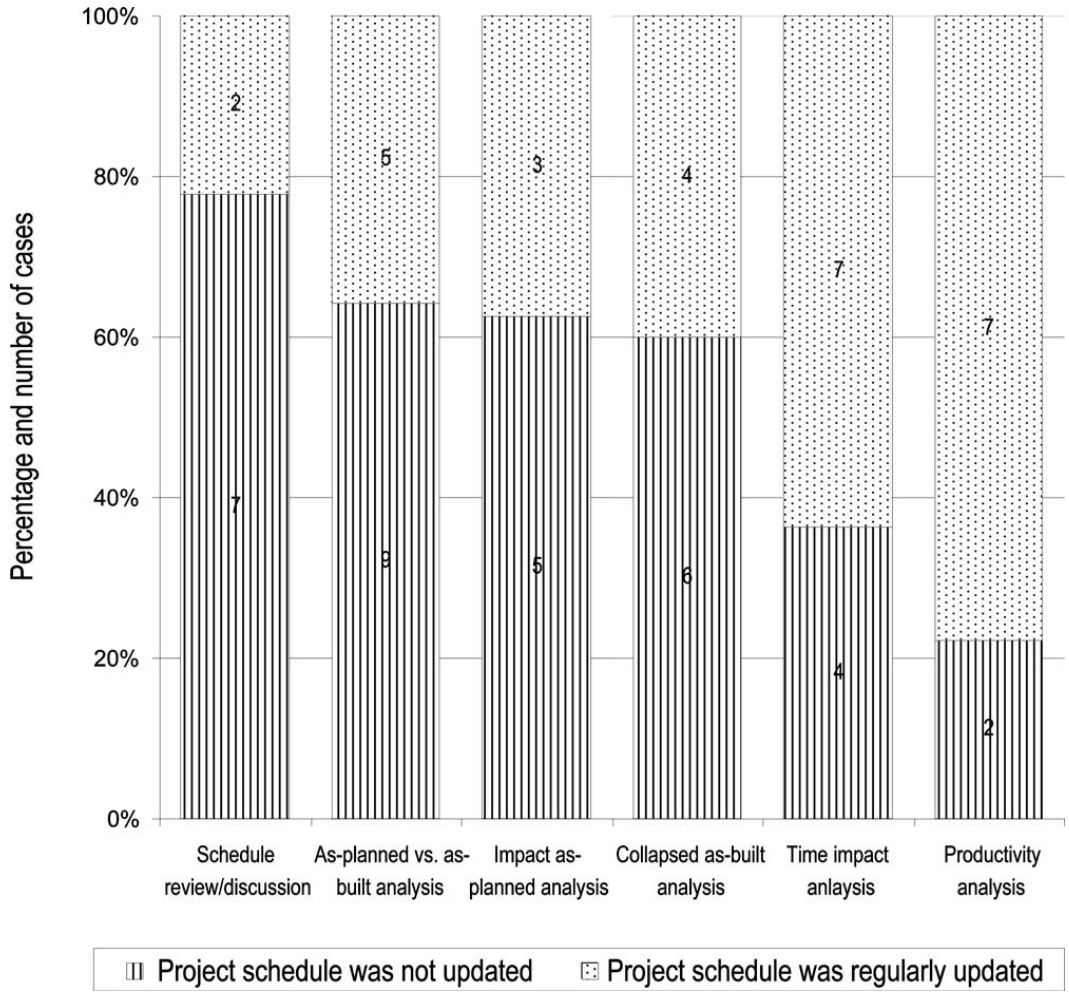
Project monitoring system	Scheduling technique used	• No schedule
		• Bar chart schedule
		• Network schedule
	Updating practice	• Project has no schedule
		• As-planned schedule exists
		• As-built schedule exists, but schedule
		• Project schedule is regularly updated

Delay analysis	Delay analysis method used	• Schedule review/discussion
		• As-planned versus as-built analysis method
		• Impact as-planned analysis method
		• Collapsed as-built analysis method
		• Time impact analysis method
		• Productivity analysis method
	Use of existing or newly created schedules	Existing schedules processed at the time delay occurs
		• Existing schedules used after the fact
		• Newly created schedules
	Use of expert service	• No access to experts
		• Use of in-house staff
		• Use of expert advice

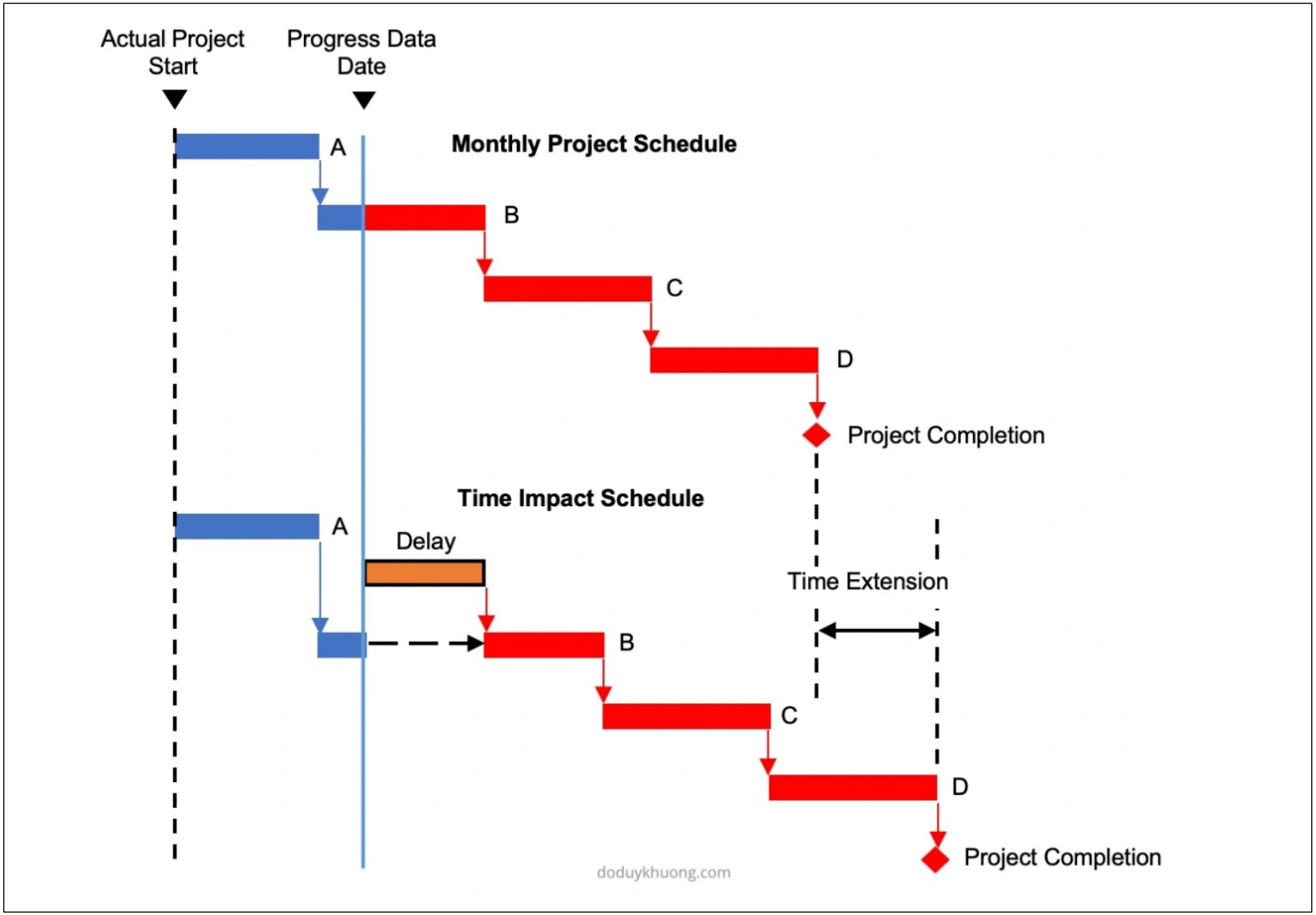

Schedule review/Discussion
As-planned vs as-built
Impact as-planned analysis
Collapsed as-built analysis
Time Impact Analysis
Productivity analysis
100%
50%
0%
Percentile
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Date of Decision
Impact as-planned
Time Impact Analysis
Schedule review/ Discussion
Collapsed as-built analysis
As-planned vs as-built
Productivity

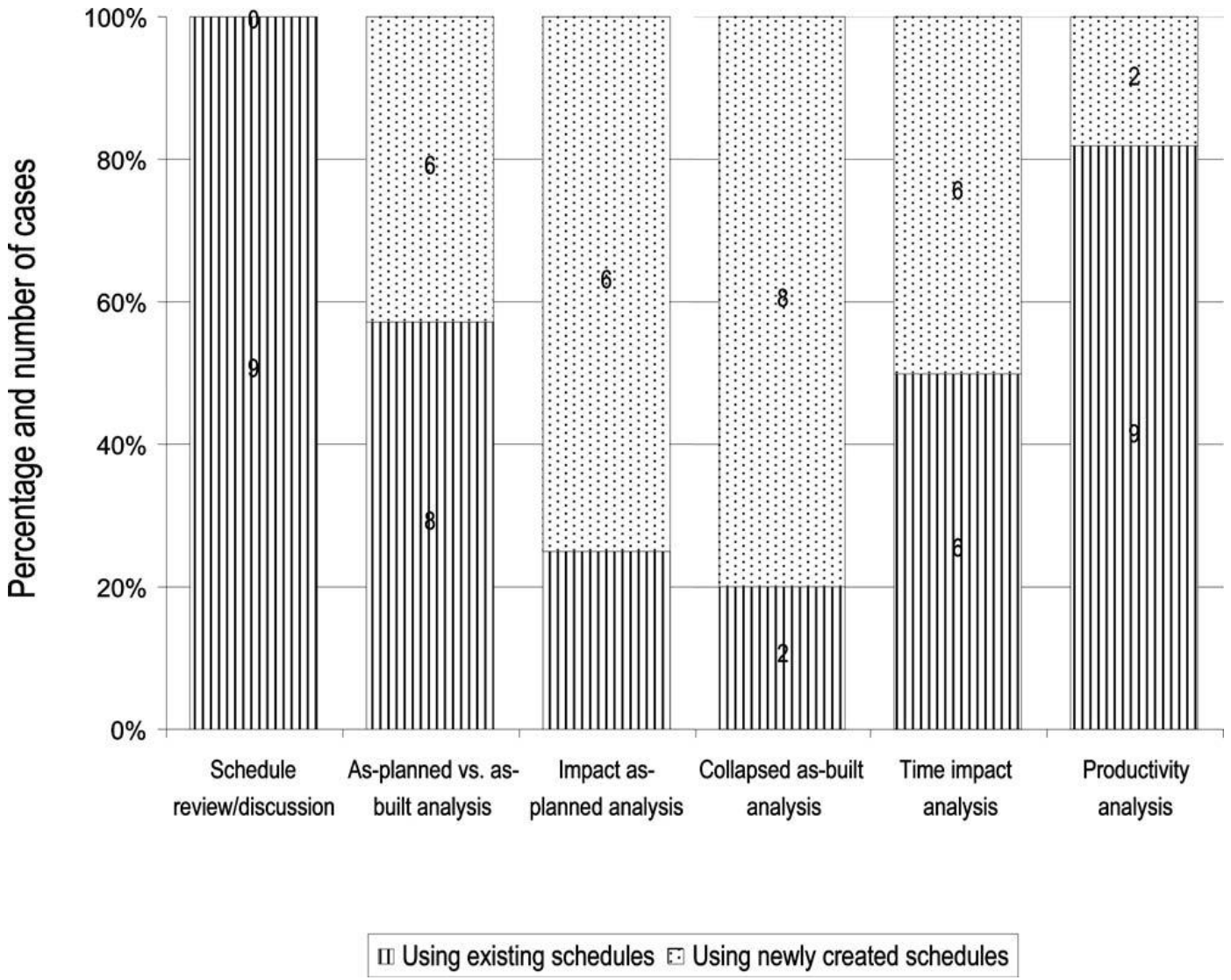


Delay analysis methods by type of schedule used

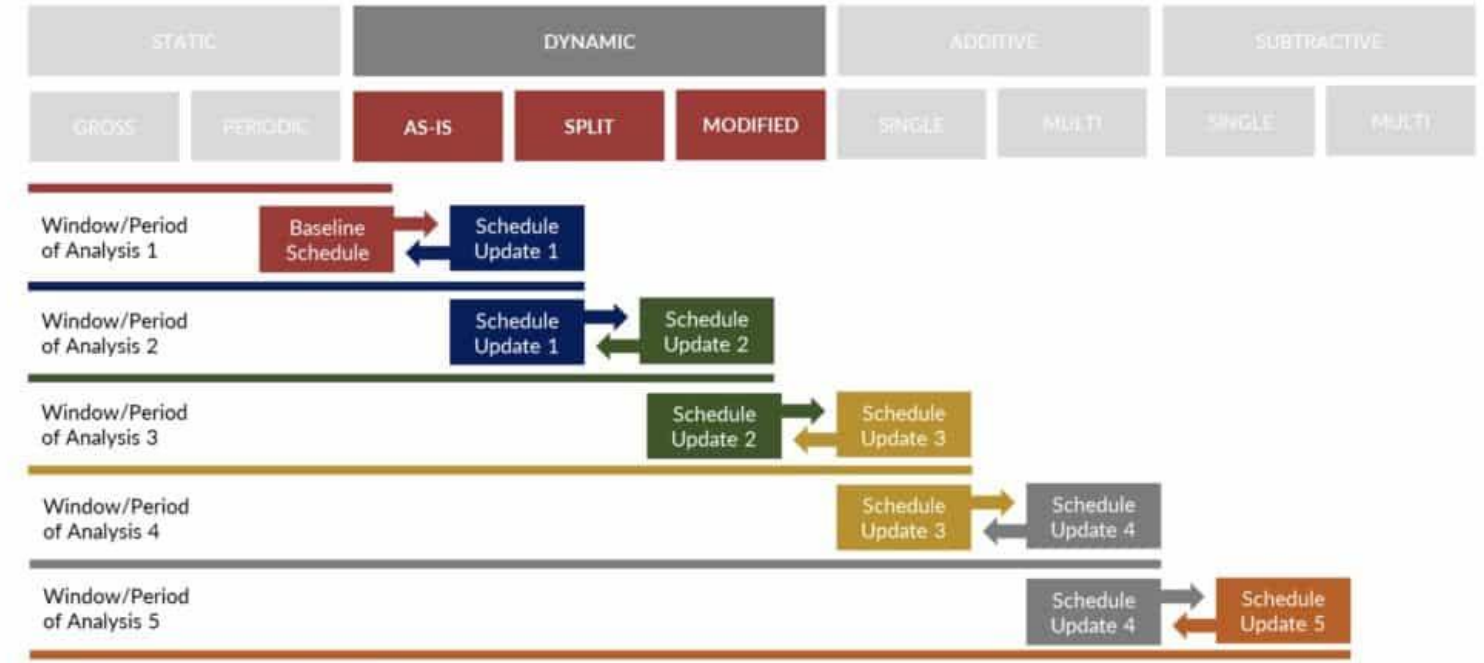


Delay analysis method by updating practice


Actual Project Start
Progress Data Date
Monthly Project Schedule
A
B
C
D
Project Completion
Time Impact Schedule
A
Delay
B
C
D
Time Extension
Project Completion
doduykhuong.com



Delay analysis method by use of existing versus newly created schedules



Source: AACE International, RP 29R-03

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Schaahin Quajar has provided project controls services to projects ranging from civil to industrial to high-rise construction, including Oil & Gas, Refinery, Petrochemical, and Power Plant, high-rise apartment buildings, and commercial projects, utilizing Primavera and MS Project CPM scheduling tools to create and maintain the CPM schedules for his clients.

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