

RiskTopics

Importance of a Project Schedule on Construction Projects

Zurich Resilience Solutions - Risk Engineering

Construction schedules are important for providing a road map on how the project is to be built. They are also important to assist with identifying schedule delays, how the delays affect the critical path and how to expedite the project.

Introduction

Construction schedules are developed to ensure that all necessary activities for completing the work are identified with corresponding durations and dependencies defined. Schedules are also used to ensure that the work is being done in accordance with the contract documents. When there are delays or the project is behind schedule, a good schedule can identify the cause of the delay, provide insight into how to overcome the delay and may be used to document a claim.

Discussion

The typical construction schedule is developed using a Critical Path Method (CPM). The CPM calculates the longest path of the schedule in accordance with the activity durations and dependencies which have been defined. This type of schedule will determine which activities are critical path and which have float. The critical path is the sequence of activities which add up to the longest overall duration. The activities with float are activities that can be delayed without delaying the overall project.

Complex CPM schedules can be set up to generate individual subcontractor task lists and provide what-if scenarios such as two or three week look ahead schedules. CPM schedules may also be cost or manpower loaded which may be tied to a payment application.

Construction schedules represent a combination of as-built progress and projections to complete the work. It is necessary to understand both progress delays and projection delays to accurately interpret the results of a schedule, and to accurately determine the reason for any delay.

Typically, a schedule update should be a part of any monthly update to the owner. This update could include a copy of the schedule, along with a narrative which discusses the current schedule status, any delays and the reason for the delays along with a recovery schedule if the delays were caused by the contractor.

An accurate schedule is important when trying to obtain time extensions from the Owner, document a claim, explain the impact of project issues, and to help to recover from a major project issue or avoid a project issue all together. It will also enable the contractor to identify delays that are solely and exclusively the responsibility of entities involved in the project (for example, the owner or a defaulted subcontractor).

Advantages of an accurate schedule

- Allows the contractor to effectively manage the progress of the project
- Helps ensure that all subcontractors and vendors are staying on schedule
- Allows materials to be delivered when they are needed as opposed to too early or too late. Materials that are delivered too early will be in the way and run higher risk of being damaged.
- Helps maximize profitability
- Documents delays

Guidance

Baseline Schedule

The first step in generating a construction project schedule is to create the CPM baseline schedule. The schedule should include an activity ID, activity description, original duration, remaining duration, percent complete, early start date, early finish date and total float. The following steps should be used:

- Identify all the activities.
 - Include material submittals and approvals
 - Fabrication Dates
 - Testing requirements
 - Delivery time Activities
- Assign a responsibility to all the activities.
- Assign a cost to each activity if using a cost loaded schedule.
- Assign number of labor hours to each activity, if using a manpower loaded schedule.
- Determine the duration of the activities.
- Determine the sequence of the activities – predecessors and successors.
- Typical weather issues should be considered (seasonal storm periods, droughts and other natural hazards)
- A reasonable amount of float based on the project should be built into the schedule as delays can occur on any project.

Schedule Updates

The schedule should be updated monthly, at a minimum. On large projects, a schedule consultant should be considered. The schedule update should reflect as-built conditions and then the critical path should be updated. The schedule needs to be thoroughly reviewed to determine if there have been delays and how any delays have affected the schedule. A new critical path may be revealed, and alternative solutions may be presented in lieu of a schedule delay.

CPM Schedule updates should include the following:

- As-built conditions
- Changes in the work
- Re-sequencing of the work
- Delays
- Schedule comparison (baseline to current)
- Any changes in the completion date

The narrative accompanying the update should include the following:

- An executive summary of the status of the project schedule
- Discussion of major activities and their current status

- Description of activities that will start in the coming month
- Changes to interim schedule milestones
- Added or modified activities
- Discussion of any delays or impacts to the project schedule and possible solutions to mitigate any potential delays
- Changes in the work
- Changes to the project completion date with an explanation
- Changes in the critical path with a description as to why it changed

Delays

There are two types of delays – excusable which are schedule delays that are not the responsibility of the contractor and non-excusable which are schedule delays that are the responsibility of the contractor. If an excusable delay occurs, the contract will dictate the remedy for compensation. The compensation may include a time extension and financial compensation. It is important to understand what the contract documents allow. Some contracts may include a “no damage for delay” clause which means that the contractor cannot recover monetary damages for any delay, including those caused by the owner or owner’s representatives – the architect, for example.

Effects of construction delays:

- Increased costs
- Required schedule acceleration
- Schedule change / inefficiencies
- Delays in project completion
- Overtime costs
- Decreased productivity
- Liquidated damages
- Consequential damages

Causes of excusable construction delays:

- Unusually severe weather
- Plan errors
- Change orders and extra work
- Differing site conditions
- Permanent utility delays
- Labor strikes which occur after bid
- Unforeseeable circumstances such as fires, floods and natural disasters
- Third party delay
- Force majeure event

Causes of non-excusable construction delays:

- Subcontractor default
- Material delays
- Poor scheduling
- Inadequate manpower
- Equipment problems
- Accidents

- Construction defects

Costs of construction delays:

- Acceleration / overtime
- Direct costs
- Indirect costs
- Liquidated damages
- Consequential damages

The contract will determine if a delay will be financially compensated or if only a time extension can be granted. The burden of proof for delay damages is on the contractor. Therefore, a delay must be addressed and documented immediately. The CPM schedule is a principal tool for documenting delays. For project delays or subcontractor defaults, add fragnets (fragmentary network analysis) into the schedule. Identify fragnet activities with a special code, activity ID's and activity description. Test the fragnet for reliability. Edit the fragnet as default related efforts evolve. A fragnet should not have activities of greater than 5 days' duration, when feasible.

Conclusion

An accurate CPM schedule plays a critical role in helping to ensure project success. It will keep the project on track, document progress and document delays. Subcontractors and material deliveries can be kept on track. Developing and updating a well thought out CPM schedule can help to eliminate delays before they occur. If a delay occurs, the CPM schedule is a critical component in successful documentation of the delay.

For more information on Zurich's extensive Risk Engineering and Sustainability services, please contact your Risk Engineer or visit us at [Risk Engineering and Sustainability Services | Zurich Resilience Solutions](#).

August 2023

The Zurich Services Corporation
Zurich Resilience Solutions | Risk Engineering
1299 Zurich Way, Schaumburg, IL 60196-1056
800.982.5964 www.zurichna.com

This is a general description of (insurance) services such as risk engineering or risk management services by Zurich Resilience Solutions which is part of the Commercial Insurance business of Zurich Insurance Group, and does not represent or alter any insurance policy or service agreement. Such (insurance) services are provided to qualified customers by affiliated companies of Zurich Insurance Company Ltd, including but not limited to Zurich American Insurance Company, 1299 Zurich Way, Schaumburg, IL 60196, USA, The Zurich Services Corporation, 1299 Zurich Way, Schaumburg, IL 60196, USA, Zurich Insurance plc, Zurich House, Ballsbridge Park, Dublin 4, Ireland, Zurich Commercial Services (Europe) GmbH, Platz der Einheit, 2, 60327 Germany, Zurich Management Services Limited, The Zurich Centre, 3000b Parkway, Whiteley, Fareham, Hampshire, PO15 7JZ, UK, Zurich Insurance Company Ltd, Mythenquai 2, 8002 Zurich, Switzerland, Zurich Australian Insurance Limited, ABN 13 000 296 640, Australia.

The opinions expressed herein are those of Zurich Resilience Solutions as of the date of the release and are subject to change without notice. This document has been produced solely for informational purposes. All information contained in this document has been compiled and obtained from sources believed to be reliable and credible but no representation or warranty, express or implied, is made by Zurich Insurance Company Ltd or any of its affiliated companies (Zurich Insurance Group) as to their accuracy or completeness. This document is not intended to be legal, underwriting, financial, investment or any other type of professional advice. Zurich Insurance Group disclaims any and all liability whatsoever resulting from the use of or reliance upon this document. Nothing express or implied in this document is intended to create legal relations between the reader and any member of Zurich Insurance Group.

Certain statements in this document are forward-looking statements, including, but not limited to, statements that are predictions of or indicate future events, trends, plans, developments or objectives. Undue reliance should not be placed on such statements because, by their nature, they are subject to known and unknown risks and uncertainties and can be affected by numerous unforeseeable factors. The subject matter of this document is also not tied to any specific service offering or an insurance product nor will it ensure coverage under any insurance policy.

This document may not be distributed or reproduced either in whole, or in part, without prior written permission of Zurich Insurance Company Ltd, Mythenquai 2, 8002 Zurich, Switzerland. No member of Zurich Insurance Group accept any liability for any loss arising from the use or distribution of this document. This document does not constitute an offer or an invitation for the sale or purchase of securities in any jurisdiction.

In the United States, Risk Engineering services are provided by The Zurich Services Corporation.

Zurich Resilience Solutions

©2023 The Zurich Services Corporation. All rights reserved.

