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Delay analysis methods in construction

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Construction delay analysis techniques have been reviewed and compared by numerous studies. Researchers such as Braimah N (2013), Farrow T (2001), Keane PJ, Caletka AF (2008), Palaneeswaran P, Kumaraswamy M (2008), Zack J Jr (2006), Al-Gahtani KS, Mohan SB (2011), and others have contributed to the understanding of delay analysis methodologies. These studies have identified various techniques used in schedule delay analysis, including time impact analysis, linear interpolation, and probabilistic approach. Studies by Arditi D, Pattanakitchamroon T (2006) and Enshassi A, Jubeh AI (2008) have investigated the selection of delay analysis methods. Perera K, Sudeha H (2013) proposed a framework for selecting the most suitable delay analysis technique. Parry A (2015) explored the improvement of delay analysis in the UK construction industry. Recent studies by Abdelhadi Y et al (2018), Magdy M, Georgy M, Osman H, Elsaid M (2019), and Wood H, Gidado K (2008) have also contributed to the understanding of construction delays. One day's delay in a critical project can have significant consequences, including financial losses. To identify the cause and impact of this delay, analysts use forensic delay analysis. This process involves determining how events during the project affected the schedule, as well as identifying the causes and responsible parties. A detailed report typically includes quantifying overall delay, identifying specific activities that caused delays, defining the events or causes behind those impacts, and assessing responsibility for the delays. Contractors may use this analysis to request time extensions or reimbursement for costs due to prolongation of work, while owners may use it to respond to contractors' requests or assess liquidated damages. There are various common causes for construction delays that may require a forensic delay analysis. Some examples include: * Unforeseen site conditions * Contractor issues (inadequate planning, insufficient workers, poor quality workmanship, safety issues) * Owner impacts (frequent changes, constrained access, delayed approvals) * Weather impacts (excessive rain, floods, ice, droughts) * Other reasons outside of control (manufacturers losing funding, labor strikes, labor shortages) Multiple methods can be used to analyze delay, and selecting the right one depends on factors such as contractual requirements, source data availability, dispute size and complexity, and the forum for resolution. Industry groups, including AACE International and the Society of Construction Law, have outlined various methods for performing schedule delay analyses. The choice of methodology depends on factors like contractual requirements, data availability, dispute complexity, and the purpose of the analysis. Here's a summary of five frequently used methods: The impacted as-planned method involves modeling delay events by inserting impact activities into an original baseline (as-planned) schedule. These impact activities represent actual events that occurred during the project, and their relationships to planned activities are developed. By rerunning the schedule using software, you can determine how the events impacted the project completion date. This methodology is straightforward, doesn't require contemporaneous updates or an as-built schedule, but it's hypothetical in nature and ignores shifting critical paths. The collapsed as- built method is the opposite of the impacted as-planned approach. You analyze the as-built schedule to determine what the completion date would have been "but-for" identified impacts. This involves removing impacts from the final as-built schedule and rerunning the schedule using software. The calculated difference between the modeled completion date and actual completion date provides a quantification of the associated delay. The as-planned vs. as-built method is observational in nature, making a sequential comparison between planned and actual activities to identify causes for variances (late starts, extended durations) and quantify associated delay. This method has advantages, being quick to complete and easy to understand, but it can be less accurate when dealing with changing critical paths. The retrospective time impact analysis method is modeled and quantifies each activity's impact on the project schedule. It involves identifying activities that were delayed or accelerated during the project and calculating their respective impacts on the completion date. A schedule update-based approach determines the delay amount by comparing the project completion dates between non-impacted and impacted schedules. This method resembles prospective time impact analysis, but is performed forensically with actual durations of impacts. However, it requires consistent data for each impact and can be overwhelming with numerous delay events. The windows analysis method divides the project duration into shorter periods, quantifying delay within each period by comparing planned work to as-built work. This observational approach considers the dynamic critical path through schedule updates, requiring reliable periodic updates for calculation. While thorough, it can be time-consuming and demands detailed project records. At Spire, our experts take a comprehensive approach to construction delay disputes, analyzing every detail of disruption claims to provide detailed records on lost productivity, time, and money. Our services cover the entire construction project, ensuring coverage at every point. Contact us to learn more about how Spire can help your project.