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Using Risk Analysis To Model Construction Schedule Delays: A Bayesian Belief Networks Approach

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Abstract : Delays in construction projects are inevitable and could be attributed to the inherently inaccurate nature of construction schedules. Currently, no mechanisms exist to capture the uncertainty in a schedule, except experience, historical data, and professional judgment. This paper presents a new risk analysis model, based on Bayesian Belief Networks (BBN), to estimate the likelihood of schedule delay resulting from different risk factors. A web based survey was developed, based on literature, to collect data on 41 different risk factors. Construction experts in Facility Management department of North American universities were asked to complete the survey based on their perceptions of the frequencies and magnitude of delay risk factors and provide project specific data regarding schedule delays. A complete data set of 54 projects was used to develop the proposed model. The model validation was done using two case studies. The developed model provides project managers with a modeling tool for estimating the likelihood of project delay and understanding the effects of different risk factors that might be present in a construction project. The results demonstrate the benefits of BBN as a modeling tool for schedule delays and its potential application for other construction domains.

Keywords : Construction Schedule Delays, Risk Analysis, Bayesian Belief Networks

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Abstract: This paper presents major factors that determine ways to choose energy saving methods. These factors are examined in three categories which include cost related factors, operation maintenance related factors and policy related factors. The data used for analysis is collected from a comprehensive questionnaire survey of construction practices in Chongqing of China, which represents second-tier advancement areas in China. It is found that the cost implication is the major factor affecting the implementation of energy saving methods, including initial investment cost and daily maintenance cost. The results of the study provide valuable references which would be useful in decision-making on improving energy saving practices in urban residential buildings.

Keywords: Residential Building, Energy-Saving, Energy-Saving Measures, Factor Analysis, Chongqing

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Abstract: Earned Value Method is a well-known project management tool that uses information on cost, schedule and work performance to establish the current status of the project. EVM metrics include three primary concepts i.e. planned, accomplished and actual work, which are integrated measures of time and costs. A number of researchers have found that the time metrics didn't judiciously refer to the scheduled performance of a project. One of the recent improvements in the EVM is the application of new time metrics (Schedule Variance (time) \((SV(t))\) and Schedule Performance Index (time) \((SPI(t))\), which are based on time units instead of monetary units. A case study was undertaken in this context to clarify the application of common time EVM metrics and compare them with the new set of time metrics i.e., Earned Schedule metrics to interpret the schedule performance of a project. The results can potentially provide early warning of a schedule delay during the construction stage while the ES that describes schedule performance in units of time is more understandable than the units of currency in the EVM method.

The Earned Schedule idea is simple i.e. identify the time at which the amount of earned value (EV) accrued should have been earned. By determining this time, time-based indicators can be formed to provide schedule variance and performance efficiency information. The ability to make schedule forecasts without performing a complete bottoms-up schedule analysis of the work remaining has been long desired by EVM practitioners. With ES, for the first time, project managers and customers have the ability to cross-check the bottoms-up estimate of the completion date in the same way the final cost estimates are validated using the Independent Estimate at Completion (IEAC) calculations.

Keywords: Project Management, Earned Value Management, Earned Schedule method, Project Performance Evaluation, Monitoring, Project Control, Performance Index.
A Case Of Airport Cities In India: An Economic Development Perspective

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Abstract: An Airport City is one of the newest forms of urban infrastructure comprising aviation intensive business and related enterprises extending upto 25 kms. away from a major airport. It can also be referred as an aerotropolis or the aviation city. In its purest form, the airport city, is an economic hub that extends out from a large airport to a surrounding area that mainly consists of the distribution centers, office buildings, light manufacturing firms, convention centers and hotels, all linked to the airports via roads, expressways (aero links) and rail lines (aero trains).

The paper presents an economic perspective of airport city development and describes India's first declared airport city Bengal Aerotropolis Projects Ltd. (BAPL), as a case to illustrate the potential of such projects to bring about economic development opportunities in their surrounding areas.

Keywords: Infrastructure, Airport city Development, Global Accessibility, Logistics

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Significance Of Construction Method Statement: A Case Study

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Abstract: Majority of construction projects suffer time, cost and quality related issues and these have been attributed to inadequate knowledge and understanding of the project sequence in advance. The paper highlights this issue and expresses the need for proper preparedness on a project by choosing the right methodology and detailing the same in advance. The methodology chosen should be such that it represents a "best fit" in any given ground conditions and makes it easier for implementation, so that even a skilled worker could execute the same without the continuous involvement of a supervisor/in-charge. The issue is elaborated by cases wherein on account of a method statement formulated before the bidding stage, a construction company could not only have an edge on timeline but could also increase its probability of winning the bid.

Keywords: Method Statement, Project Execution, Bottom-up Technology, Top-down Technology

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