

عنوان البحث

Fast-Track Method for Accelerating Construction Project Scheduling

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Introduction:

Project time management is one of the most significant challenges in construction, where project success is measured by adherence to schedule, cost, and quality constraints. In the current market, meeting aggressive deadlines has become paramount, necessitating the adoption of specialized techniques like the Fast-Track Method (concurrent engineering). This technique involves overlapping sequential activities (primarily design and construction) to execute them in parallel. While highly effective at accelerating schedules, its application inherently increases organizational complexity and project uncertainty, creating a high propensity for rework. The current study seeks to provide empirically tested guidelines for utilizing the Fast-Track method efficiently, contributing new knowledge on managing the critical trade-off between speed and quality-related risks.

Research Problem:

The central problem lies in the fact that the widespread application of the Fast-Track method in construction projects often lacks a formal, quantitative model to determine the optimal level of overlap between design and execution phases. This deficiency in effective overlap management leads to an unacceptable rise in change orders and rework activities, which threatens quality and causes cost overruns, ultimately negating the time advantage the project sought in the first place. The

problem is presented here as a set of research questions related to the studied phenomenon.

أهمية الدراسة:

Research Importance:

- 1. Theoretical Importance: To enrich the academic literature by providing a quantitative model that links schedule compression (Fast-Track) and rework risks in the context of construction projects.**
- 2. Applied Importance: To equip project managers and engineers with an analytical tool for balancing the time benefits of Fast-Track against the resulting costs and risks of rework, thereby enabling informed scheduling decisions.**

أهداف الدراسة:

Research Objectives:

The research questions are rephrased here as objectives that the study seeks to achieve:

- 1. To determine and evaluate the current level of application of the Fast-Track method in construction projects.**
- 2. To identify the most significant risks associated with the overlap of design and execution phases resulting from Fast-Track.**
- 3. To measure the statistical relationship between the degree of overlap in Fast-Track and the volume of rework in projects.**
- 4. To propose a framework or guiding model for project managers aimed at efficiently managing overlap to maximize Fast-Track benefits and minimize its risks.**

Research Questions

- **What is the current level of application of the Fast-Track method in construction project scheduling?**
- **What are the most prominent risks arising from the application of the Fast-Track method?**
- **Is there a statistically significant relationship between the degree of overlap in Fast-Track and the volume of rework?**
- **What is the proposed framework that project managers can adopt to enhance the effectiveness of Fast-Track and control its risks?**

فروض الدراسة:

Research Hypotheses:

- 1. Hypothesis 1 (H1): There is a statistically significant relationship between the application of the Fast-Track method and the reduction of the total project duration.**
- 2. Hypothesis 2 (H2): There is a statistically significant positive correlation between the degree of overlap in Fast-Track and the rate of increase in rework activities.**

الدراسات السابقة:

Literature Review:

This section will explain the theoretical background by presenting a brief overview of recent previous studies to aid in understanding and interpreting the dimensions of the phenomenon. The review will focus on:

- **Studies on schedule compression techniques (Fast-Track vs. Crashing).**
- **Studies on risk management at the design-construction interface.**
- **Empirical studies measuring the impact of phase overlap on rework cost and quality.**

المنطلقات النظرية للدراسة:

Theoretical Foundations of the Study:

- **Critical Path Method (CPM) and Project Management Body of Knowledge (PMBOK® Guide): As the foundational approach to scheduling.**
- **Concurrent Engineering/Overlap Concept (Fast-Track): As the core technique for time management.**
- **Risk Management Methodology: To deal with the uncertainty resulting from phase overlap, particularly scope creep and change risks.**

المنهجية وطرق البحث:

Methodology and Research Methods:

The adopted approach is the Quantitative Descriptive-Analytical method. The research design addresses hypothesis construction, data collection methods, analysis techniques, the statistical population, and the drawn sample.

Research Tools:

The main tool for data collection is the Questionnaire, designed using a Likert Scale, distributed to project managers and planning engineers.

Research Limitations:

The constraints imposed on conducting the research include:

- **Spatial Limits: Construction projects in Saudi Arabia.**
- **Temporal Limits: The period from last ten years.**
- **Subjective Limits: The study focuses on the effect of Fast-Track on scheduling and rework risks, excluding other factors like overall financial performance.**

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