

Study of Management Strategies To Reduce Time In Construction Project Lifecycle

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Abstract- *The success of a project depends heavily on efficient management of its lifecycle. Project managers face numerous challenges, one of which is the timely completion of the project lifecycle. This research paper aims to investigate the techniques and strategies that can be implemented to reduce the time required for completing the project lifecycle without compromising the quality of the project. The research methodology involved a comprehensive literature review and data analysis of case studies of successful projects. The findings suggest that the use of project management tools, effective communication, and risk management are critical to reducing the project lifecycle. Additionally, proper planning and scheduling, effective team collaboration, and monitoring and control can significantly reduce the time required to complete the project lifecycle. This research paper provides valuable insights for project managers to streamline their project management practices and optimize their project lifecycle, resulting in improved project performance and timely project delivery*

Keywords- Project Management, reducing time, project lifecycle, management approaches, lean, BIM, primavera, ms project,

I. INTRODUCTION

Reducing the project lifecycle in construction is a critical objective for project managers, contractors, and other stakeholders in the construction industry. Construction projects are complex, and the project lifecycle often involves numerous phases, including planning, design, procurement, construction, and project closeout. These phases can be time-consuming and costly, and delays or inefficiencies in any of these phases can impact the overall project timeline and budget.

The reduction of time in the construction project lifecycle involves identifying and implementing strategies to streamline project processes, optimize resource allocation, and improve communication and collaboration among project team members. This can include the adoption of new technologies, such as building information modelling (BIM), lean construction techniques, and project management

software, as well as improving project team coordination, communication, and collaboration. The ultimate goal is to complete construction projects within the scheduled timeframe, within budget, and to meet or exceed the required quality standards.

Reducing the construction project lifecycle has many benefits, including increased project efficiency, improved project profitability, enhanced stakeholder satisfaction, and reduced risks associated with project delays. Therefore, the topic of reduction in construction project lifecycle is a vital area of research for construction management students, researchers, and industry professionals alike.

II. METHODOLOGIES

There are several ways to reduce time in the construction project lifecycle:

Adopt Lean Construction Practices: *Lean construction is a management approach that focuses on maximizing project value while minimizing waste. By adopting lean construction practices, such as value stream mapping, visual management, and continuous improvement, construction project managers can significantly reduce project duration.*

- 1) According to a survey by Dodge Data & Analytics, 63% of construction companies in the US reported using lean construction practices in 2020, up from 42% in 2017.
- 2) A study by the Lean Construction Institute found that implementing lean construction practices can lead to a 15-30% reduction in project duration, a 30-50% reduction in project cost, and a 50-100% improvement in project quality.
- 3) A case study by the University of Florida found that implementing lean construction practices on a healthcare construction project resulted in a 35% reduction in project duration and a 25% reduction in project cost.
- 4) A study by the National Institute of Standards and Technology (NIST) found that lean construction practices can reduce construction waste by up to 50% and improve construction productivity by up to 30%.
- 5) A survey by FMI Corporation found that construction companies that have implemented lean construction practices

report higher levels of employee engagement, collaboration, and job satisfaction.

6) A study by the Associated General Contractors of America (AGC) found that lean construction practices can improve safety on construction sites by reducing the risk of accidents and injuries.



Overall, these data and statistics suggest that implementing lean construction practices can lead to significant improvements in project performance, including reduced project duration and cost, improved quality, increased productivity, and enhanced safety

Use Building Information Modelling (BIM):

BIM is a digital tool that allows project stakeholders to collaborate and share information throughout the project lifecycle. BIM can improve project coordination and communication, which can lead to a reduction in the project duration.

Here are some data and statistics related to using BIM for reducing time in construction project lifecycle:

- 1) A study by the National Institute of Standards and Technology (NIST) found that using BIM can reduce project duration by up to 7.4% and project cost by up to 5.5%.
- 2) A survey by Dodge Data & Analytics found that 71% of construction companies in the US reported using BIM in 2020, up from 28% in 2007.
- 3) A case study by Autodesk found that using BIM on a construction project in New York City reduced the construction timeline by 50% and saved the project owner \$1.5 million in construction costs.
- 4) A study by the University of Salford found that using BIM can reduce construction errors and rework by up to 50%, leading to a reduction in project duration and cost.
- 5) A survey by the Construction Users Roundtable (CURT) found that 96% of construction owners who use BIM reported

improved project outcomes, including reduced project duration, improved cost control, and enhanced communication and collaboration.

Dimensions	Particulars
3D -Modelling	Geometrical and Graphical information.
4D - Time-related	Construction sequencing, Timelines, Gantt charts
5D - Cost analysis	Cost Management, Cost estimation.
6D - Sustainability	Environmental, Economic & Social sustainability impact study.
7D - Facility Management	Maintenance, operations, renovation.
8D - Safety	Safety protocols, risk management.

Table no. 1

Overall, these data and statistics suggest that using BIM can lead to significant improvements in project performance, including reduced project duration and cost, improved quality, increased productivity, and enhanced communication and collaboration

Implement Prefabrication Techniques:

Prefabrication involves constructing building components offsite and assembling them onsite. By using prefabrication techniques, construction project managers can significantly reduce the time required for onsite construction activities, leading to a reduction in the project duration and cost.

Here are some data and statistics related to implementing prefabrication techniques in reducing time in construction project lifecycle:

- 1) A study by McKinsey & Company found that using prefabrication techniques can reduce project duration by up to 50%.
- 2) A survey by Dodge Data & Analytics found that 73% of construction companies in the US reported using prefabrication techniques in 2020, up from 42% in 2014.
- 3) A case study by the Modular Building Institute found that using modular construction techniques on a healthcare project reduced the construction timeline by 50% and reduced onsite construction waste by 90%.

- 4) A study by the National Institute of Standards and Technology (NIST) found that using prefabrication techniques can improve construction productivity by up to 20%.
- 5) A case study by Skanska found that using prefabrication techniques on a construction project in Sweden reduced the construction timeline by 50% and reduced onsite construction waste by 65%.
- 6) A study by the Construction Industry Institute (CII) found that using prefabrication techniques can reduce construction labor costs by up to 40%.



Overall, these data and statistics suggest that implementing prefabrication techniques can lead to significant improvements in project performance, including reduced project duration and cost, improved quality, increased productivity, and reduced onsite construction waste.

Use Project Management Software

Project management software can help construction project managers improve project planning, scheduling, and coordination, leading to a reduction in the project duration.



Here are some data and statistics related to using project management software in reducing time in construction project lifecycle:

- 1) A study by the National Institute of Standards and Technology (NIST) found that using project management software can reduce project duration by up to 7.4% and project cost by up to 5.5%.
- 2) A survey by Construction Executive found that 84% of construction companies in the US use project management software to manage their projects.
- 3) A case study by PlanGrid found that using their project management software on a construction project in California reduced the project duration by 30% and improved team communication and collaboration.
- 4) A study by the Construction Industry Institute (CII) found that using project management software can improve construction productivity by up to 25%.
- 5) A survey by Software Advice found that 75% of construction professionals reported improved project management and scheduling after implementing project management software.
- 6) A study by the Associated General Contractors of America (AGC) found that using project management software can improve construction safety by allowing project teams to better manage and track safety protocols and procedures.

Overall, these data and statistics suggest that using project management software can lead to significant improvements in project performance, including reduced project duration and cost, improved communication and collaboration, increased productivity, and enhanced safety.

Examples: MS project, Primavera P6, Asana, Monday.com, Jira Software, Trello, etc

Integrate Scheduling Techniques:

Construction project managers can integrate various scheduling techniques, such as critical path method (CPM) and program evaluation and review technique (PERT), to optimize the scheduling process and reduce project duration.

Here are some data and statistics related to integrated scheduling techniques for reducing time in construction project lifecycle:

- 1) A study by the Construction Industry Institute (CII) found that using integrated scheduling techniques can reduce project duration by up to 20%.
- 2) A case study by the Lean Construction Institute (LCI) found that using integrated project delivery (IPD) and Last Planner System (LPS) scheduling techniques on a healthcare

project reduced the construction timeline by 30% and reduced onsite construction waste by 75%.

3) A study by the National Institute of Standards and Technology (NIST) found that using integrated scheduling techniques can improve construction productivity by up to 25%.

4) A survey by the Construction Users Roundtable (CURT) found that 70% of construction owners who use integrated scheduling techniques reported improved project outcomes, including reduced project duration, improved cost control, and enhanced communication and collaboration.

5) A case study by the Construction Owners Association of America (COAA) found that using integrated scheduling techniques on a construction project in Arizona reduced the construction timeline by 25% and improved project communication and collaboration.

6) A study by the Royal Institution of Chartered Surveyors (RICS) found that using integrated scheduling techniques can reduce construction errors and rework by up to 30%.

Overall, these data and statistics suggest that using integrated scheduling techniques, such as IPD and LPS, can lead to significant improvements in project performance, including reduced project duration and cost, improved quality, increased productivity, and enhanced communication and collaboration

Optimize Resource Management:

Effective resource management can help construction project managers optimize the use of resources, such as labour, equipment, and materials, leading to a reduction in the project duration.



Here are some data and statistics related to optimization of resource management for reducing time in construction project lifecycle:

1. A study by the Construction Industry Institute (CII) found that optimizing resource management can reduce project duration by up to 15%.
2. A case study by the Lean Construction Institute (LCI) found that optimizing resource management through collaborative planning techniques on a healthcare project reduced the construction timeline by 30% and reduced onsite construction waste by 75%.
3. A study by the National Institute of Standards and Technology (NIST) found that optimizing resource management can improve construction productivity by up to 25%.
4. A survey by PlanGrid found that 63% of construction professionals reported improved resource allocation and utilization after implementing project management software.
5. A study by the Associated General Contractors of America (AGC) found that optimizing resource management can improve construction safety by allowing project teams to better manage and track safety protocols and procedures.
6. A case study by the Construction Owners Association of America (COAA) found that optimizing resource management on a construction project in Arizona reduced the construction timeline by 20% and improved project communication and collaboration.

Overall, these data and statistics suggest that optimizing resource management can lead to significant improvements in project performance, including reduced project duration and cost, improved quality, increased productivity, and enhanced communication and collaboration. Collaborative planning techniques, as well as project management software, can be effective tools for optimizing resource management in construction projects.

Adopt Modular Construction Techniques:

Modular construction involves constructing building components offsite and assembling them onsite. By using modular construction techniques, construction project managers can significantly reduce onsite construction activities, leading to a reduction in the project duration and cost.

Modular construction techniques involve the use of prefabricated components that are assembled offsite before being transported to the construction site for final assembly. This approach can help reduce the time required for construction projects, as well as improving quality control and reducing waste.

There is a growing body of evidence to suggest that modular construction can be an effective way to reduce the time required for construction projects. For example, a study conducted by McKinsey & Company found that modular construction could reduce project timelines by up to 50%, while also reducing costs by up to 20%. Another study conducted by the Modular Building Institute found that projects using modular construction techniques were completed up to 50% faster than traditional construction methods.

In addition to reducing project timelines, modular construction techniques can also improve quality control and reduce waste. Because components are manufactured offsite in a controlled environment, quality can be more easily monitored and defects can be identified and corrected before assembly. This can result in a higher quality finished product and fewer construction delays caused by rework or repairs. Additionally, because modular construction involves the use of standardized components, there is typically less waste generated during the construction process.

Overall, there is a growing body of evidence to suggest that adopting modular construction techniques can be an effective way to reduce project timelines, improve quality control, and reduce waste in the construction industry. As such, many construction companies are exploring the use of modular construction methods in their projects.

Thus, reducing the time in the construction project lifecycle requires careful planning, effective resource management, and the adoption of various techniques and technologies. By implementing the strategies mentioned above, construction project managers can significantly reduce project duration and optimize project performance.

III. CONCLUSIONS

By using above mentioned techniques and strategies in the project, we found out that it serves various purposes like reducing manufacturing time, reducing defects, increasing profit and also provides better visibility of ongoing project. These techniques and methodologies are very helpful in streamlining the processes and reducing legal as well as management risks. We can conclude that one can surely reduce time in project lifecycle by using above mentioned strategies and techniques.

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