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A Review on Need of Effective Construction Management for Box Girder Segment Erection Techniques by Under Slung

Mr. Md. Badruddin[1]*, Prof. Dr. D. B. Jasutkar[2]

[1] PG Student, Dept of Civil Engg, PVPIT, Pune, Maharashtra, India

Email: badruddincivil786@gmail.com

[2] HOD, Dept of Civil Engg, PVPIT, Pune, Maharashtra, India

Abstract - India is creating nation due to which foundation development massively expanding day by day. As result of advancement keen arrangement required for cites infrastructural development, all of which require to be coordinates with open transport. Different inquires about and improvement are held by analysts to discover financial and time sparing technic of developments. Precast concrete is one of those investigates. The support of precast strategy in development has expanded around the world within the final few decades. This strategy of superstructure casting in urban ventures proposal numerous points of interest like diminished costs, decreased development time, decreased natural impacts, and diminished support of activity. The beneath thrown strategy for propelling box support sections stands as an inventive and effective procedure in advanced bridge development. This strategy includes suspending pre-cast box support sections from transitory underpins underneath the completed parcels of the bridge and incrementally advancing these sections to make the superstructure. The ponder will investigates the complexities and points of interest of this procedure, centering on its execution .To study the part of the transitory pre-stressing framework within the cantilever gathering prepare of the precast section box support bridge, . It is additionally critical the amid the development stage of appropriate usage of administration framework to realize the security quality and opportune completion of ventures, In this paper the need of need of effective construction management is analyzed also the effective construction management is helpful for box segment erection techniques under slag will review from various research papers and literature

Keywords: Construction Management, Infrastructure, Box Girder, Erection Techniques

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INTRODUCTION

Prefabricated segments are methodically lifted, positioned, and linked to form the bridge superstructure during the pre-cast box girder segment erection process, which is a crucial step in the construction of sophisticated bridges. This approach is an example of a well-informed engineering move that maximizes structural integrity, safety, and construction efficiency. Pre-cast box girder segments must be assembled with meticulous attention to detail and strict adherence to safety regulations. The complex dance of engineering and logistics that characterizes the pre-cast box girder segment erection process in bridge construction is summarized in this introduction.

Many benefits come with this method: less overhead labor means more safety; less interference from overhead traffic or other structures; and better view from below means more accuracy when aligning segments. Furthermore, the underslung approach frequently enables effective construction progress, particularly in confined locations or regions with restricted access from above.

Adherence to strict safety regulations, careful planning, and cooperation are necessary for the successful implementation of the underslung approach. Its use in the construction of bridges and viaducts has shown to be successful in a number of projects, allowing the prompt and accurate assembly of segments to produce strong, useful, and aesthetically pleasing structures.

Significance of Construction Management in Infrastructure Development :

Construction Management: Project owners can use construction project management, a professional service, to handle all aspects of their construction projects, including planning, scheduling, budget estimation, and execution.

By employing efficient control mechanisms and reporting techniques, construction project

management is used to maximize best industry practices, closely monitor progress, make wise decisions, and increase visibility.

Primarily concentrates on tasks that must be completed on-site, including as scheduling, quality assurance, resource management, and safety compliance. Daily operations are supervised by construction managers to guarantee that tasks are completed effectively and in accordance with project specifications.

Significance of Construction Management

- **Reduce Delays by Improving efficiency**

It is challenging to oversee the many stages of a construction project, from planning to implementation, due to their inherent complexity. Additionally, each phase involves varying workforce levels within several teams, which necessitates efficient coordination to prevent communication gaps from delaying the project.

The complex nature of construction projects necessitates the use of the most effective project management techniques in order to oversee every facet with ease. Even a small delay in any project activity can build up and result in significant delays near the end of the project.

With adequate construction project management techniques, you can schedule every aspect of the project in a coordinated manner to achieve maximum efficiency. This in turn allows employees to work efficiently and coordinate, which reduces the chances of delays marginally.

Keep a check on the cost by tracking expenses

Budgets for construction projects are typically tight because of the many variables involved in their execution. You must monitor your spending by keeping an eye on your budget if you want your construction company to endure for extended periods of time without experiencing financial hardship. The only way to do this is to use efficient construction management strategies that allow you to update the daily costs.

Construction project management might involve more than just keeping track of costs; it can also involve planning and organizing the various stages of execution and calculating budgets in accordance with vendor and contractor requirements. It assists you in creating budget estimates based on deliverable criteria so that you may maximize output for every rupee spent and prevent material waste.

Enhance Coordination and Communication

For construction projects to be completed on schedule and under budget, teams must effectively coordinate and communicate with one another. Information flows slowly and slowly throughout the project team when there isn't a suitable channel. One of the primary causes of project delays and expense overruns is this communication barrier.

Construction management strategies have the potential to address this issue by establishing appropriate channels of communication and coordinating methodologies. Teams that communicate quickly and maintain perfect synchronization can collaborate more effectively.

Better Quality Control

Without appropriate quality control procedures, a building project can never be effectively finished. Every owner or customer wants the project structure to be built in accordance with all quality and safety requirements that are mandated by the authorities or design code. Contractors may disregard quality checks since it can be exhausting and demotivating to monitor if the quality is being maintained in accordance with the original plan. It is easy to maintain quality control when construction project management procedures are integrated into the execution process. Authorities can monitor the quality of construction and the materials being utilized throughout execution with the aid of the management process.

Tracking Accountability

In construction, tracking responsibility is similar to trying to find a single thread among a tangle of threads. The process never ends when you try to identify the person or group accountable for a specific problem.
You can identify the person or people in charge of any problem that arises during construction by using construction management. It lets you monitor problems encountered when employees are assigned jobs and other workers assist with the same. Confusion-related arguments can be readily avoided by being aware of the responsible team or individual.

Avoid Material Wastage

Every brick, beam, and nail counts while developing a construction project. Waste of materials not only affects profits but also jeopardizes sustainability initiatives. By optimising onsite usage, inventory control, and procurement, efficient construction management contributes significantly to waste reduction. Through careful planning and monitoring of material usage across the project's lifecycle, construction managers can detect potential waste areas and put mitigation techniques in place. By ensuring that resources are used effectively, proactive management lowers costs and has a positive influence on the environment.

LITERATURE REVIEW

Piyush Rathod1, Jayesh Pitroda2, J.J.Bhavsar," The analysis of the bridge erection sequence, according to the paper's conclusion, demonstrates how building

bridges in the right order facilitates efficient labor without causing delays and benefits all parties involved in the process. The author claimed that individuals profit from bridge construction in every way. By reducing the distance individuals must travel, bridge construction benefits society and conserves fuel. Thus, in this day and age of modernity and technology, they are saving money and possibly time.

P.Vigneshwaran., M. Arunpandiyan, C.Ashwinkumar., M.Balaji., R.Chandrasekaran : Conceptual design is typically the first phase in a multi-part design process. Any design starts with gathering the specifications for the new bridge and any significant features of the proposed location. Up until a workable design is completed, there will be numerous drafts and adjustments in the subsequent design process. In order to guarantee that the bridge can be constructed in a safe and cost-effective manner, constructability concerns must be taken into consideration from the very beginning. The designer's experience will be largely used to determine the structural member dimensions at first. Later on, engineering software is used to evaluate options and optimize member dimensions.

Finally, complete analytical calculations for all important construction stages and detailed shop drawings will be produced. As mentioned above, aesthetics is considered one of the four main functions of bridges. Several so-called aesthetic values of bridge structures are identified. These are character and function, proportions and harmony, complexity and order, color and texture, and environmental scale. It is the composition of all of these values together that makes a bridge become accepted by the general public as an appealing structure. With respect to the bridge site itself, several influencing factors are identified. Soil conditions, topography, the river crossing, protection of the environment, and the local climate are the main environmental influences. Furthermore, technical factors such as bridge type and erection method, labor-related factors, and the particular needs of the owner need to be considered by the designer.

P Bujnakova: Paper finds that during the first several years of operation, prestressed box girder bridges usually show minor deflections. Using a computer analysis software, designers may estimate the long-term effects of creep as well as the global stresses and deformations of segmental box-girder bridges caused by post-tensioning and dead load. The actual numbers are mostly reliant on the way the building was built, how old the post-tensioned segments are, and how long additional loads are applied for. The only way to identify truer, more accurate behavior is through field measurements, particularly for significant structures. Bridge behavior can be better understood by using monitoring systems, particularly when it comes to early structural alterations in service condition.

Pungky Dharma Saputra*, Yusuf Latief Six stages make up the development of a standardized work breakdown structure (WBS) for the building of precast bridges: the project name at level 1, work sections at level 2, sub-work sections at level 3, work packages (alternative methods / design) at level 4, activities at level 5, and resources at level 6. Experts in bridge building have validated the standardized WBS classification level, which is determined after gathering and evaluating data and archives based on prior study. identifying a number of possible hazards that could arise from work-related activities and figuring out risk controls or solutions to lower the likelihood and significant impact. Creating safety plans through the use of risk-based standard work breakdown structures (WBS) that are established and compiled based on safety planning documents and Regulation Permen PU No. 05/2014 Determining safety cost components based on the safety plan that has been developed, then safety cost components are categorized according to Permen PUPR No. 28/2016 and SE No. 11/2019

Piyun Zhang, Xinwen Jiang, Huilian Gan, The lowest edge of the steel box girder section on the temporary pier experiences the largest positive stress under all operating conditions; in other words, the negative bending moment at the top of the pier controls the steel box girder's safety state. The load share of the bottom plate reduces as the elastic cushion's stiffness increases, distributing the vertical load more evenly across the web. The bottom plate's tension is now lessened, but the web's stress is still more adverse. The analysis of the elastic cushion's supporting response force indicates that as the cushion's stiffness increases, the unequal phenomena of the supporting reaction force gets more pronounced;

SUMMARY OF LITERATURE REVIEW

- **Economically Efficient Construction Management**

Enhancing Resource Efficiency and Economic Viability In bridge projects, effective construction management is crucial to achieving financial sustainability. In this context, the efficient use of resources, the reduction of waste, and budgetary adherence are important factors. Economically sound construction techniques not only ensure financial sustainability but also lessen environmental effect and accelerate project completion.

Lean Construction Principles: Increasing Efficiencies Adopting lean construction concepts has shown to be a game-changing strategy for increasing bridge construction efficiency. Throughout the course of a project, these concepts support cutting out non-value-added tasks, cutting waste, and pursuing continual improvement. Lean construction aims to reduce delays, optimize processes, and optimize resource use through the implementation of strategies like collaborative planning, just-in-time material delivery, and work sequencing optimization.

Implementing Lean Concepts in Bridge Building Lean construction techniques are successfully implemented at different phases of the project. Lean is best demonstrated by prefabrication and modular construction, which enable off-site component manufacture, lower on-site labor requirements, and improved quality control. Moreover, integrated project delivery models promote stakeholder participation, facilitating instantaneous decision-making and enhanced risk management. Building information modeling (BIM) integration provides a digital platform for collaborative planning, design optimization, and clash detection, which further boosts productivity.

CONCLUSION

Large-scale projects typically use construction project management. Because authorities must constantly oversee a large number of variables and project deliverables over the course of the project. Integration of construction management techniques with small-scale projects that are sufficiently valuable is also necessary to prevent delays and ensuing cost overruns.

RECAPITULATION OF MAIN POINTS AND CONTRIBUTIONS

This article set out to provide a thorough investigation of the various aspects of sustainable bridge projects. It started off by stressing the importance of bridges in relation to urbanization and improving transportation. Discussions on the difficulties of sustainable development prepared the ground for a research that emphasized community acceptance, cost-effective building, and ecologically appropriate design.

The literature review clarified how sustainable development principles can be integrated with bridge engineering, providing examples from around the world that highlight how innovation, affordability, and community involvement can all be integrated. The details were covered in more detail in the following sections, which emphasized the value of community involvement, lean construction techniques, and environmentally conscious design. While a comparison research revealed characteristics that contribute to good sustainability results, case studies illustrated real-world triumphs.

Holistic Approach to Bridge Design and Construction

The idea that sustainable bridge design and construction management are inextricably linked to the larger framework of urban development has been reaffirmed by this article. Bridges are not solitary constructions, but rather symbols of societal advancement and aspirations. A comprehensive strategy is essential to creating bridges that are consistent with this philosophy. Economic viability and environmental concerns must coexist, and community desires and innovative design must coincide. The study emphasizes that these dimensions must be harmoniously integrated in order for sustainability to truly exist.

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Corresponding Author

Mr. Md. Badruddin*

PG Student, Dept of Civil Engg, PVPIT, Pune, Maharashtra, India

Email: badruddincivil786@gmail.com