



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 7, July 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.118



9940 572 462



6381 907 438



ijirset@gmail.com



www.ijirset.com

Design and Development of Emergency Services in Covid-19 (Jumbo Covid Centre, Shivajinagar)

¹Mr. Sumit Dongare, ¹Mr. Shubham Chavan, ¹Mr. Jaydeep Ahire, ¹Mr. Anand Bhagat,
²Prof. Avinash Shingan

¹U.G. Student, Dept. Civil Engineering Sinhgad Institute of Technology & Science, Narhe, Pune, India

²Asst. Professor, Dept. Civil Engineering Sinhgad Institute of Technology & Science, Narhe, Pune, India

ABSTRACT: This paper has been prepared to identify the major causes of delays on construction projects in India during Covid-19. The major causes of delays from this research study were investigated following data collection carried out through a questionnaire survey with a wide range of construction professionals based in India. The findings from this research determined the major causes of delays based on an importance index, and the main conclusions from output of the data could help the construction sector to better assess not only the major causes of delays on construction projects but also how to minimize them by proper planning. There may, however, be opportunities for safer working practice arising from new awareness of health, hygiene, and safety risk. The role of safety leadership is overlooked in guidance yet is vital to ensure safe application of COVID-19 working practices.

KEYWORDS: Construction industry, COVID-19, effects, impact, pandemic, causes of delay, effects of delay.

I. INTRODUCTION

- This project is looking for fundraising partners as one of the source of information, helping to raise awareness on COVID- 19.
- This type of data collection may increase the quantity of data available on the pandemic and offer critical spatial information for decision making among public health authorities.
- To organize the preparation of the national overall emergency plan
- To guide all departments in all regions to deal with emergencies
- To promote the construction of the contingency plan system.
- To coordinate the construction of emergency forces and material warehouses and relief dispatching
- To organize the construction of disaster relief system
- To undertake the work of the national response headquarters for major disaster`

ADVANCE CONSTRUCTION TECHNOLOGY

- The construction industry is repeatedly criticized for being inefficient and slow to innovate.
- The term 'advanced construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies.
- Incorporating advanced construction technology into practice can increase levels of quality, efficiency, safety, sustainability and value for money.

Five key points for advance construction techniques

- Improved job-site efficiency through more effective interfacing of people, Process, Materials, Equipment, and information
- Greater use of prefabrication, preassembly, modularization, and off-site fabrication techniques and process



- Widespread deployment and use of interoperable technology application
- Innovative, widespread use of demonstration installations
- Effective performance measurement to drive efficiency and support innovation

FAST-TRACK CONSTRUCTION

- It is project delivery strategy to start construction before the design is complete.
- The purpose is to shorten the time to completion
- The final cost of the project is uncertain when construction begins because design is not complete.
- Fast-Track is more difficult to manage than the traditional design bid build process. It requires detailed knowledge of the process, effective planning, integrity and close coordination among the organizations executing the work.

II. LITERATURE REVIEW

Bailey et al. (2020) highlighted the impact of COVID-19 pandemic and how it is being managed. This pandemic is having a substantial effect on construction projects; however, the legal implication varies from contract to contract, nations to nations. Much focus was being given to a standard form of contract wordings, the likes of NEC and FIDIC. Although, the pandemic was not rendering projects to incomplete, but was slowing processes causing disruption and delay. Some of the projects have stopped completely to commence work at a later date. Health and safety risk assessments need to be considered to be consistent with scientific, medical and government guidelines; for instance, people working in an enclosed environment are at higher risk than people working outside. COVID19 being an unforeseeable circumstance can be considered to be a force majeure occurrence. Force majeure under any standard form of contract, be it FIDIC, will usually afford contract extension of time for the delay during the pandemic and not compensation for cost. Nevertheless, any new regulations given by the public authorities may have legal effect and override any contractual position/obligation initially laid down before the commencement of the projects. Given this restriction to movement during the pandemics 'locked down' is a modification of law which may attract extension of time compensation for the inevitable costs either way- "Sub-clause 13.7 of the 1999" and 2017 FIDIC Forms. Attention to the behaviour of parties is required in future to ensure symmetry of liability along the supply chain for projects.

Hook (2020) also declared that the impact of this pandemic might force some of the Engineering and Construction companies to streamline debt, consider means of funding or risk bankruptcy. Looking ahead, Engineering and Construction companies will encounter a new dispensation which will include a change in the marketplace, investment in infrastructure by some of the "national government" to kick-start their recovery. In contrast, others may encounter limitations of resources. A survey conducted by on 45 projects completed during the pandemic, revealed the productivity losses of about 7% as a result of labour shortage and impact from social distancing (Construction Manager, 2020b). Poor transfer of design information while working remotely also accounted for 1% lost in productivity while material unavailability and delivery led to 7%. In response to extraordinary government power on movement restrictions and total "lockdown globally," Australia also restricted travel both within and without to limit the spread of the virus. Due to this unexpected situation, Indonesia and China remained lockdown and inaccessible as well for export of equipment, goods and plants required by the infrastructure and construction sector. This will inevitably cripple the delivery of projects. All in all, good relationships among the parties of the projects with instance resolution of the dispute will enable a smooth transition to pass the immediate crises.

Van der Molen HSE, 2019 et al., 2018, It is a sector where safety has reached a plateau that still accounts for a significant number of injuries, lost working days, and a fatality injury rate in Great Britain 1.31 per 100,000 workers that is three times all industry rate and where evidence of effective safety interventions is scarce.

Peñaloza et al., 2020; Wilson et al., 2009 construction-related risks include more than the work performed on site. There is movement to and from site, including travel for people to get to work, possibly to and from communal lodgings. At the site, there needs to be facilities for eating, for toilets and rest areas, for storage of materials, and for storage of tools. There is variability in the type of tasks performed while much civil engineering work may be outside, building or refurbishment plastering, electrical work may be performed inside. Construction is also a sector where the risks of safety must be balanced within the context of production and the need to deliver. Perfection in safety needs to be traded off against factors such as cost, capacity, efficiency, and quality.



McClure et al., 2020, additionally, work with hazardous materials and exposure to potentially harmful conditions that impact the respiratory function may also mean greater risk of underlying health problems linked to COVID-19. While data are limited and direct causal pathways are still not well understood, these factors may explain why this sector has experienced higher incidence of COVID-19.

Woolley et al., 2020 an implication of the PDO is that it can make more complex the communication and management of safety. Typically, safety is managed down the hierarchy, but feedback up the hierarchy is often restricted.

Briscoe & Dainty, 2005; Briscoe et al., 2020; Projects and priorities change during their execution, with contractors leaving and joining, hampering clear management and communication of safety. Where there is a lack of Typical structure of a Project Delivery Organization Typical medium-sized Project Delivery Organization Project scope Civil/rail from the supply chain it is very difficult for the principal contractor to implement effective interventions due to the mixed messages received by the workforce regarding priorities It is therefore a relevant question as to whether the influencing factors for general safety within the PDO will also have a bearing on the implementation of COVID-guidance.

Fennelly, Domingo, Setti et al., Kenyon 2020; it is important to consider the mechanisms of transmission of COVID-19. Transmission is primarily airborne as droplets from person to person through face to face contact, though recent evidence also indicates that the virus may be suspended in the air as aerosols for appreciable periods of time Carriers may be symptomatic or asymptomatic and transmission is significantly greater in enclosed spaces.

Stiles et al., 2018a, 2018; while the principal contractor has the primary responsibility for co-ordination of site safety, the employer also has statutory duties for their employees. Differences in safety culture and safety practice across the PDO may inhibit how safety leadership from the principal contractor influences the supply chain.

Stiles et al., 2018; One of the key elements of leadership is a presence on site and leaders being able to exhibit and reinforce safety behavior However, the restriction of people on site means that this is challenging during COVID-19. It is too early to understand whether it shows commitment to safety by leaders staying away or weakens leadership and promotes a perception that they are not involved or fearful of coming to site.

Findings from Literature Survey

As a result of the pandemic, the owner and the contractor should identify future risks, assign ownership and determine a mitigation plan to address the risk components for successful completion of the project. Occurred as an unknown risk without having the control measures in place to mitigate such risk; now that has landed, the responsible party has visibility on the current situation and can outline a mitigation plan for recourse for related risks in order to complete the project. Some key risks to consider include:

- ✓ Material and labor inflation
- ✓ Availability of resources and social distancing guidelines
- ✓ Number of cases rising due to lack of vaccine
- ✓ Limited productivity
- ✓ Additional PPE and sanitizing requirements
- ✓ Shifts and breaks work travel, communications, and training
- ✓ Who should go to work consider whether needed on site; plan for minimum people; keep in-touch with off-site workers
- ✓ Changing tasks to reduce risk; work from home if possible; if cannot work at home, protection, hand washing, minimum number of people.
- ✓ Embed COVID-19 controls within pre-existing safety controls wherever possible
- ✓ Participatory input on task redesign
- ✓ New roles and competencies for COVID-19 compliance
- ✓ Apply best practice from other sectors on use of communication technology
- ✓ Determine responsibilities, communication, and collaboration
- ✓ Determining effective safety leadership practices when leaders working remote from site



- ✓ Survey of front-line staff to understand changing leadership needs
- ✓ Development of leadership competence to meet future needs

III. AIM

“To recommend process for speedy construction using Fast Track Technique in case of Emergency”

IV. Objectives

- ✓ To have a Case Study on Fast Track & Emergency Covid-19 Facility Centre.
- ✓ To Study the Guidelines for Fast Track & Emergency Facility Centre.
- ✓ Evaluate the impact of advance technology to improve construction activities that relate to time
- ✓ To find the factor that delays in construction activity in case of emergency and to overcome these factors with advance construction technology.

V. PROBLEM STATEMENT

- ✓ To decrease the time required for completing construction activity by proper decision-making throughout the construction process.
- ✓ To find the factor of delays in construction of emergency services and to overcome with advance construction technology.

VI. RESEARCH METHODOLOGY

The literature review or the primary data of this study was carried out to identify the factors that contribute. This research used qualitative method. A questionnaire survey method has been selected to identify the major factor of role of construction that occurs in construction industry.

This research aims to explore the positive and the negative effect of the COVID-19 pandemic in the construction industry. The questionnaire comprises close-ended and open-ended questions with multiple-choice options.

The survey questionnaire is designed online, hosted in Google drive and shared in a Google form. Link to the Google form is shared on professional platforms such as LinkedIn and construction professionals' forums, as well as direct emails sent to the key players in the built environment. The survey questionnaire was structured under the following subheadings: demography, project status due to COVID-19, impacts of COVID-19, and other comments.

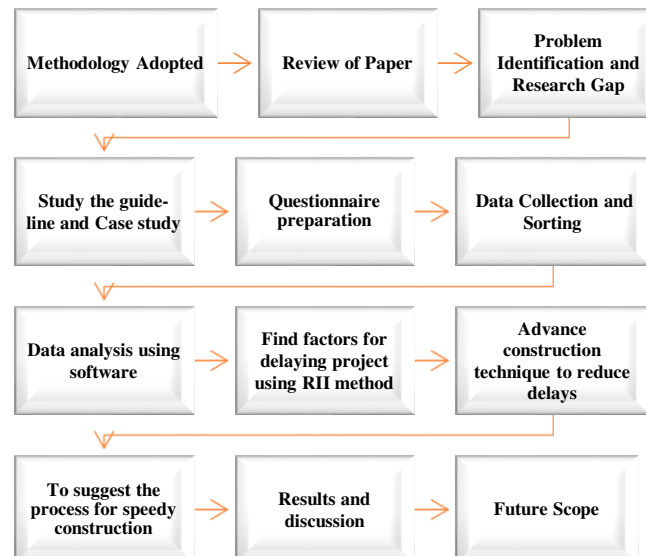


Fig.1: flow of methodology

VII. DATA COLLECTION & ANALYSIS

Reviving the construction sector post COVID-19 Point of View

What has transpired since last few weeks?

- ✓ **Project status:** In advance stages of construction
- ✓ **Capital expenditure:** INR60 billion (approximately)
- ✓ **Labour deployment:** Over 4,500 labourers with over 100 pieces of plant and machinery.
- ✓ **Labour status:** 60-65 per cent are in reverse migration mode with 30-35 per cent on a lockdown at site in labour camps
- ✓ **Supply chain status:** Some of the critical offshore equipment are being sourced from overseas, which are either in manufacturing or dispatch phase, deliveries of such equipment to the site location will be impacted
- ✓ **Contractual impact:** Some of the vendors may invoke claims due to COVID-19 leading to additional cost to the Project Owner
- ✓ **Schedule impact:** Over-run of at least 2-3 months. Detailed assessments need to be conducted only when the restrictions are lifted, and preliminary conversations indicate timelines could be extended given supply chain and workforce disruptions
- ✓ **Cost impact:** Estimated in the range of 4-5 percent of the total project cost, however more clarity will emerge once detailed assessments are completed. We examine a real, live project to outline the impact that the COVID-19 crisis is having on the construction sector in India.

VIII. DATA ANALYSIS

Questionnaire Survey

- ✓ Among the many available methods in collecting data two methods were adopted; these are literature review and questionnaires.
- ✓ The first step involves general information collection, including both first-hand and second-hand data, in order to identify major themes from the literature.
- ✓ In the second step, with the literature review and unstructured reviews, important factors of safety were identified. With these factors, a questionnaire was formed and Survey was conducted through Google form
- ✓ The Google form questionnaires will distribute through various electronic media platform to a variety of respondent working around the construction projects.

PILOT SURVEY AND QUESTIONNAIRE REVISION

- ✓ To improve the questionnaire section, a pilot study was accompanied. This section contained identification of different causes, collection, and conclusions of data
- ✓ Questionnaires were sent to labourers, contractors, government employee, project managers, valuers and project engineers at jumbo Covid center
- ✓ To get more suitable and consistence meaning some factors should be rearranged.
- ✓ Some factors should be changed to give clearer importance and understanding. Better and accurate questionnaire related to the topic was achieved from the pilot study.
- ✓ The perfections related to the organization of the questionnaire and the response time.

Sr.no.	Question's
1.	Do you believe that poor management system contributed to the jumbo COVID center's late completion?
2.	Is it true that heavy rain causes building activity to slow down?
3.	Do you believe that using advanced construction techniques to build a jumbo COVID center is the best option?
4.	Do you believe that this project's delays are due to government funding and payment issues?
5.	Do you think that project will be delayed as a result of the late release of the site, drawings, and materials?
6.	Is the project team heavily reliant on one another for assistance, intelligence, or enforcement to complete their tasks, causing a delay in the completion of the jumbo COVID center?
7.	Do you believe the errors in layout caused by incorrect data in drawings lead to further work being done?
8.	Do you believe the project team members and staff lack expertise in the construction of an emergency center?
9.	Can you feel there is a lot of uncertainty on the project for the project team members?
10.	Do you believe that if advanced building techniques were used, any of the above factors will be eliminated?
11.	Do you believe that India 's health infrastructure is sufficient to solve the Covid 19 problem?
12.	Do you think that quality of the work would suffer as a result of the fast-track construction?
13.	Do you think the best choice for constructing a jumbo COVID center is to use advanced building techniques?
14.	Do you believe that the task of construction management is required to complete the project on time?
15.	Do you believe that a jumbo COVID center should be built at the start of the COVID to save the lives of many people?

table: questionnaire

IX. CASE STUDY- Jumbo Covid center at Shivaji Nagar

- After 15th May 2020 government on Maharashtra start the process of making two jumbo Covid centre in Pune
- New Delhi based construction and design company begin 800 beds Covid 19 facility's in Pune
- On 23rd august 2020 Maharashtra CM inaugurates jumbo Covid centre by video conferencing
- On 1st January 2021 this centre was closed.
- Expenses to build and operate jumbo facility in that last six-month was Rs 105 cr.

- This centre contained 800 bed, 200 ventilators and other medical facilities.

X. CONSTRUCTION PROCESS

Surface preparation - Due to Heavy rain fall in Pune it was very difficult to work in such condition. Use of maximum number of machines like JCB, pock lane to prepare surface



Fig.2: surface preparation

Steel Framing- As per structural design steel column was embedded in pedestal and Anchor bolting was done at base. Steel columns were hollow rectangular section, 12 mm base plate was used, and 25 mm diameter bolt was used to anchor.



Fig.3: steel framing

Steel Truss- For truss member channel section was used. Truss was directly rested on both side of column. At Center of truss straining beam was used to support the structure. In this truss tie member was not used to reduce the weight of structure. Steel truss placed equally at 5.5m center to center distance.



Fig.4: steel truss

Roofing material- PVC coated sheet was used. These sheets incorporate with many features such as quickly installable, quickly dismantled, whether protected.



Fig.5:site photos

XI. CONCLUSION

- ✓ The case study shows that in such a pandemic situation, inadequate building techniques and poor management lead to project delays.
- ✓ Construction delays are common at sites, but they can be minimized if proper construction methods, such as advanced construction techniques and a fast-track system, are employed.
- ✓ The fast-track construction method is not only cost-effective, but it also contributes to better environmental management.
- ✓ The cost savings from eliminating site rework is projected to be 3-4 percent of the overall project cost. As a result, by applying advanced building techniques on the job site, the construction industry can save money.

XII. ACKNOWLEDGMENT

We express our sincere thanks to Project Guide Prof. Avinash Shinganand Head of Department of Civil Mr. I. M. Jain for his continuous support.

REFERENCES

- [1]. Ahsan, M.K. and Gunawan, I. (2010) Analysis of cost and schedule performance of international development projects. International Journal of Project Management, 28, 68–78.
- [2]. Alaloul, W.S.; Liew, M.S.; Zawawi, N.A.W.A.; Kennedy, I.B. Industrial Revolution 4.0 in the construction industry: Challenges and opportunities for stakeholders. Ain Shams Eng. J. 2020, 11, 225–230.
- [3]. Ballesteros-Pérez PB, González-Cruz MC, Pastor-Ferrando JP, “Analysis of construction projects by means of value curves”, Int.J.Proj.Manag, Vol.28, October, 2010, 719-731.
- [4]. Desai Megha and Dr Bhatt Rajiv, March (2013), “A Methodology for Ranking Of Causes Of Delay For Residential Construction Projects In Indian Context” Associate Professor, Civil Engineering Department, A. D. Patel Institute Of Technology, Gujarat, India Volume 3, Issue 3
- [5]. Dietz, L.; Horve, P.F.; Coil, D.A.; Fretz, M.; Eisen, J.A.; Van Den Wymelenberg, K. 2019 Novel Coronavirus (COVID-19) Pandemic: Built Environment Considerations to Reduce Transmission. mSystems 2020.
- [6]. Djalante, R.; Shaw, R.; De Wit, A. Building resilience against biological hazards and pandemics: COVID-19 and its implications for the Sendai Framework. Prog. Disaster Sci. 2020, 6, 100080.
- [7]. Frank Fugar, and Adwoa Agyakwah-Baah. (2010), “Delays In Building Construction Projects In Ghana ”,



Department Of Building Technology, Kwame Nkrumah UniversityOfScienceAndTechnology, Kumasi,Ghana,10(1/2)103-116

- [8]. HaleThomas,AnnaPetherick,TobyPhillipsandSamuelWebster,“Variationingovernment responses to COVID-19”, Blavatnik school of government working paper,Vol.31, 2020.
- [9]. KPMG and PMI (2012) Study on Drivers for Success in Infrastructure Projects 2010:ManagingforChange,available at<http://bit.ly/Q6y88X> (accessed30 July 2012).
- [10]. Mears, M.; Brindley, P.; Jorgensen, A.; Ersoy, E.; Maheswaran, R. Green space spatial characteristics and human health in an urban environment: An epidemiological study using landscape metrics in Sheffield, UK. Ecol. Indic. 2019, 106, 105464
- [11]. Nicola, M.; Alsafi, Z.; Sohrabi, C.; Kerwan, A.; Al-Jabir, A.; Iosifidis, C.; Agha, M.;Agha, R. The socio-economic implications of the coronavirus pandemic (COVID-19): Areview.Int. J. Surg. 2020, 78, 185–193.
- [12]. Olawale, Y. A., & Sun, M. (2010): "Cost and time control of construction projects:inhibiting factors and mitigating measures in practice. Construction Management andEconomics,28(5), 509-526.
- [13]. Queiroz, M.M.; Ivanov, D.; Dolgui, A.; Fosso Wamba, S. Impacts of epidemic outbreaks on supply chains: Mapping a research agenda amid the COVID-19 pandemic through a structured literature review. 2020
- [14]. Singh, R. (2010) Delays and cost overruns in infrastructure projects: extent, causes andremedies.EconomicandPolitical Weekly, xlv, 43–54.
- [15]. Thomas, E. (2020, April 22). GlobalData forecasts disruption for construction industry in Eastern and Western Europe. World Cement.
- [16]. Vinodh, S. and Joy, D. (2012) Structuralequation modelling of leanmanufacturingpractices.International Journal of ProductionResearch, 50, 1598–607.



INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor: 8.118



ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



www.ijirset.com

Scan to save the contact details