Post-Covid challenges in Civil Engineering Activities

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Abstract*: *Concerning populations worldwide, COVID-19 has registered more than 2.5 million cases—a figure continuing to rise. And though worldwide policymakers and businesses react quickly, more also needs to be achieved. COVID-19 is not, in general terms, impossible to complete projects at this point. But slow them down, causing delay and damage, although only due to serious disruption of supply chains. Many activities have also ceased, normally with the aim of resuming activity in the future. Measures to overcome or alleviate the impacts of the affecting incidents is or would be taken. Proving that as a result of the COVID-19 case will be a key feature of any allegations made. In accordance with certain rules, parties must continue to use any fairly available means to continue their duties, despite the presence of a force majeure event; the subcontractor's feeling that they are returning to work is good, with all respondents saying their subcontracting staff are eager to engage in the process. Meanwhile, an absence of distribution expertise produces a storm for contractors who accept that the potential sustainability is underpinned by a sustainable supply chain. Most contractors said that they do not have a large supply shortfall due partly to the low workload and supply of goods stockpiling.

***Keywords*: COVID -19, Pandemic, Construction, Projects, Logistical problems, Sustainable supply chain**

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I. INTRODUCTION

The method of designing a building or infrastructure is known as construction. Construction differs from manufacturing in that manufacturing typically requires bulk manufacture of related products without a specified customer, while construction is usually performed on-site with a known client [1, 2]. Construction accounts for about 6% to 9% of the gross domestic product of developing countries. Planning, architecture, and funding are the first steps of the construction process, and it lasts until the building is completed and ready to use [3,4].

Types of Construction

Almost all civil engineering construction projects can be broadly categorized into three types of projects:

- Buildings and houses
- Public Works
- Industrial-type structures

There are several sub-categories for each of these forms of construction. Buildings, for example, may be both private residences and commercial skyscrapers. Renovations of current buildings or new construction are also potential choices for construction programs. Roads, railways, water and irrigation distribution and purification schemes, dams, and bridges are examples of public infrastructure. Refineries, pipelines, electric utilities, processing plants, and telecommunication networks are also exampling of industrial ventures [4, 5].

II. VARIOUS CHALLENGES IN CONSTRUCTION: -

Some of the challenges faced in construction industries are mentioned below [6, 7, 8]:

A. Insufficient Risk Management

Often, project managers put protections in place for long-term risk. Short-term issues, though, usually are left out of the calculation. These problems can mount quickly and start to have a tangible impact on the bottom line. Whether it's subcontractors that turn out to be unreliable, scheduling conflicts, or changing stakeholders' changing tastes, any seemingly minor issue could derail a project. Therefore, it's essential to have contingency plans.

B. Lack of Skilled Workers

Project managers also placed precautions in place to protect against long-term danger. Short-term problems, on the other hand, are often ignored. These problems will easily escalate and have a direct effect on the bottom line. If it's incompetent subcontractors, scheduling issues, or shifting stakeholders' priorities, any relatively minor problem can derail a project. As a result, contingency plans are necessary.

C. Poor Communication

Any career requires communication, but it is often possible to assign work to different parties. Significant projects will fall through the cracks if there isn't transparent and convincing contact, and the team might be unaware of a problem until it's too late to repair it. Therefore, project managers need to enact clear guidelines. At the end of each day, there should be direct contact up a clear ladder

informing the team of any success or challenges. Problems can be overcome ahead of time this way.

D. Unreliable Subcontractors

Often builders have trouble seeking dependable subcontractors for their programs. Check with the usual supply's manufacturers and retailers if you're in a hurry and need to find a replacement. They'll have the inside scoop and will be able to suggest a great sub. It will even solicit offers from other subcontractors for which it already operated. Before employ a sub, double-check their certificates, make sure they have general liability insurance, and add business as an extra insured to their policy.

E. Scheduling

And the most experienced building professional would find scheduling difficult. Construction technology is once again offering a solution to this common problem. It can physically chart out a project timeline using project management software that can navigate from laptop, mobile, or tablet. Many applications have a virtual screen in the form of a "sticky note" that let's see what needs to be accomplished and offers real-time project status alerts.

F. High Insurance Costs

Contractor insurance is a necessary aspect of doing business, so it doesn't have to be expensive. Combining benefits, not making coverage expire, and checking plans each year for enhancements that could save money will all help and also save money on contractor insurance.

G. Changing Minds of Homeowners

When it comes time to pay the bill, homeowners who make improvements in the middle of a project can "forget" about their demands. Be sure it has a signed change order every time to defend at place, about integrity, and bottom line.

H. Document Management

It is expected that currently it has enough paper to fill a whole trailer of file cabinets with contracts, modification orders, materials orders, receipts, invoices, work forms, and insurance certificates. But it's time to ditch the paper. A digital solution will help keep track of records, remain organized on tasks, and make payments on schedule. At the very least, scan all records onto the computer and file/organize digitally.

I. Blame game

The market is riddled with blame games. The below is how it works: "What fault is it?" is usually the first question posed when something goes wrong. It's the builder's fault if the timeline slips and they don't have leverage of their subcontractors. It's the owner's responsibility if the budget balloons due to a lack of scope management. And it's the architect's fault if there are alignment problems in the area when he or she submitted unfinished drawings. As issues like these occur, common instinct is to point the finger at others, and even those who want to learn from the mistakes are vulnerable to doing so. The other man is the problem, and the alternative is to change or get rid of him—or just be mad at him and such kind of blame game weakens the relationship.

J. Stakeholder Indifference

Stakeholder apathy can derail programs, and a lack of stakeholder involvement is a common problem in construction project management. If stakeholders are unconcerned with what is going on at the facility, it may lead to rework and delays. Stakeholders should be interacted with, and suggestions can be encouraged, by project managers. Since achieving attendance may be challenging, contingency measures are necessary in the event of difficulties.

K. Unskilled workers

While the concept of skilled labor is still debatable, the bulk of the population is unskilled or semi-skilled.

L. Cost Factor

Several businesses have implemented new innovations, owing to the cost factor.

M. Quality Control

Construction job quality management is not up to par, and small-scale construction firms have very low-quality control. The attitude of ensuring building efficiency is no longer present.

N. Safety Measures

Safety measures construction sites in countries like India are so minimal. Value of life of construction workers is very less in some construction organizations.

- The use of modern technology (e.g., BIM, LEAN Construction) is not there.
- The Green Building concept, though famous worldwide, not a very renowned practice in India.
- Waste of energy and resources: Loss of energy and money: Constructing a system requires a lot of energy and resources. However, there are instances where they are undervalued and squandered in vast quantities. It may be poor maintenance, resulting in excess of materials such as tiles, concrete blocks, and reinforcements, as well as water and energy used for the purpose.
- Time delay and poor management: Bad management and time delays: It has been found that multiple programs are not finished on time, resulting in a waste of time and money spent. Furthermore, inadequate project scheduling is a major cause of project execution delays.

O. Unstable structure

Low-quality materials were used to save costs, causing the building's architecture to collapse. Eventually, the tower itself crumbles into rubble. One of the most crucial problems of building activities is ensuring that the consistency of the goods is tracked.

P. Pollution

Building development responds not only to air pollution, but also to soil pollution in any way. When using materials that

float in the air pollutes the air, some materials that penetrate deep into the soil pollute the soil.

Q. Use of Recycled Content in Building materials

There is a lot going on in the world of green concrete, but it isn't being used commercially. Steel is also a recyclable commodity, so there is a good possibility that it will be used in building construction in the future. Of course, a variety of factors, such as deterioration and aging, may have an effect on their reusability, so that's where the difficulty lies.

R. Zero or Minimal waste disposal from the building

Paper, synthetic, and biodegradable materials make up the bulk of the building's waste. The most of it should be reused. As a result, the structure should include an integrated recyclable system.

S. Definite earthquake resilient structure

It can't be quantifying that any structure will survive an earthquake of a certain magnitude based on existing codes. It takes a more probabilistic approach to describing it; for example, a system has a 1 in 1000 chance of collapsing during an earthquake over a 50-year period.

T. Age of Concrete

Since concrete is just around 100 years old, any new building would have a hard time lasting longer than a century. Since limestone arrangements have existed for more than five decades, there is a potential study field.

U. Health and Safety issues

There are just so many potential hazards on construction sites, which is why the industry has one of the highest percentages of deaths and lost time injuries! Incidents can cause spots to be immediately shut down and investigated.
Rules are different for different jurisdictions; health and safety are the most significant risk when managing a construction site. As a result, there will be a health and safety plan which must be adhered to at all times
Due to excessive fugitive dust emissions, some serious health concerns may arise for the workforce and people around a construction site. It impacts the workforce's productivity, thus, the cost of construction.

V. Environmental Difficulties

Environmental hazards can also get sites closed down until remedial action is taken. This includes contamination, sediment runoff, natural disasters. These result from the underlying site conditions, weather, natural disasters, and damage to site controls. Fugitive dust emission certainly adds to air pollution, and the chemical used for its elimination isn't also usually environment-friendly. So, with every construction, civil engineers have the challenge to prevent it from becoming hazardous to the environment.

W. Contractual Disagreements

These can arise for several reasons, including variations to work, damage to property onsite, payment claims, defects in artistry, etc. Therefore, everyone needs to understand everything in the contract before signing and undertaking any work. As a civil engineer, you are likely responsible for drafting the contract and making sure work is undertaken accordingly. You will need to approve any variations to the contract and resolve any issues that arise.

III. The Impact of COVID-19 in Global Scenario

A. In the cyclical slowdown, Engineering and Construction (E&C) businesses use the pace and force that COVID-19 has reached unparalleled. There is a break or cancellation of projects. Supply chains are at risk. Employee and employee welfare is a problem and social distance on building sites pose logistical problems. The potential supply and expertise of these staff could be unclear for companies who had to operate. And because many firms are operating without significant capital assets, the effects of lock-downs could require them to reorganize debt, pursue new sources of capital or face insolvency.

B. COVID-19 has had a deep economic impact and does not withstand any of the suppliers and subcontractors. Others will not now be in a position to execute contracts. Suppliers overseas can be highly vulnerable to delays. For many E&C firms, recognition and management of their different supply chains on a site level is an unprecedented obstacle.

C. Many E&C businesses face a financial shock with a particularly substantial effect on their cash flow. A large project-by-project prediction and financial assistance to the government will be conducted in the short term. Additionally, management teams should consider terms and conditions, recovery of claims at site shutdown and the inherent inefficiency generated by the constraints of remote activities and on-site distancing. Many organizations would have to renegotiate lending agreements and collect new equities in the long term.

D. E&C businesses face a different future towards the conclusion of the pandemic. The demand will shift, with many national governments keen to invest in infrastructure to boost their recovery and others facing new resource constraints. Portfolios will also shift, with the focus on efficiency and resilience placed on both public and private project owners. More people operating from home would be expected in cities — potentially contributing to higher investments in telecom and intelligent city initiatives. Among the many potential shifts in the private sector, commercial immobilize can continue to fall, while data centre growth can accelerate further.

E. A 2 m social separation law between citizens was adopted to deter the spread of the virus. For the building industry, this poses a monumental obstacle, where workers perform in close proximity, in particular for works like drainage, where restricted space is typical in trench boxes.

F. Reduced social engagement ensures that site visits are not allowed and this regulation inevitably impacts the interactions between the customer, planner and contractor on project and preparation problems. In addition, there was no availability of site briefing rooms because up to six guests in each room are permitted.

G. Larger locations are now expected as a result of social distancing in order or accommodate canteens, offices, car parks and walkways to name a few. This has resulted in an uptick in prices on live building sites. Reduced production outputs have affected building projects, when work takes

longer to finish due to reduced work closeness and the failure to work intensively in small spaces with many employees on the site. During the lock down, a large number of manufacturers (materials and subcontractors) were required by furling members of staff to shut down and limit their production in tough times, thereby reducing overheads [9;10;11]

IV. KEY CHALLENGES IN THE CONSTRUCTION INDUSTRIES AND ITS SOLUTION

A. Delays in project completion: In the building sector and engineering business, the unparalleled pace at which the coronavirus disease spread across the world has slowed considerably. Building company owners must do their utmost for the assessment and detection of delayed programs. Both the results must be made known to the stakeholders in order to prevent unintended surprises and to reduce the chances for non-compliance. Consider rescheduling or widening jobs to tackle tasks of high priority first. Furthermore, ensure that all labour practices comply with federal directives and legislation.

B. Unreliable supply chain: The Covid-19's latest economic shockwaves revealed global supply chain vulnerability. If your building company depends heavily on foreign vendors, you can face severe delays. You are absolutely aware that not all manufacturers, vendors and dealers have survived or are actually struggling to meet the immense economic effects of the pandemic.

C. Workforce management challenges: Managing the workers is another problem in the present situation. Following the coronavirus crisis, worker wellbeing and participation should be a high priority. SOP and government safety guidance on the workplace will easily transform into a daunting challenge. Some ventures can enable you to oversee hundreds of employees concurrently, at many locations, most probably with a range of various changes. In addition to supplying your employees with appropriate safeguards, use technologies to simplify control of your staff.

D. Stress on your financial position: Thanks to the latest pandemic epidemic, many architecture and manufacturing firms have drastically affected their financial status. It is essential that you carry out a comprehensive financial evaluation of all the programs to know where you are. Try renegotiating loan terms for the reports and, if necessary, even collect new capital. Often, make sure the corporation is willing to receive federal financial assistance. The building industry's ecosystem is likely to improve afterwards and demand is expected to grow again. Governments and developers are looking at new investments in infrastructure.

E. It's an incredibly hard time, however fast, but stable measures will help E&C leaders handle the crisis quickly, stabilize supply chains and improve the financial position of their businesses in order to emerge from the crisis more firmly.

F. In order to remove jobs within 2m, every section of the job operation needs to be fully planned. If regulated steps cannot be implemented, it is desirable, for example, to reduce the duration and frequency of near communication. Where it is appropriate, employees do not communicate side by side or face to face. More ventilation should be provided in closed areas and a greater emphasis should be placed on cleaning surfaces and instruments.

G. Utilizing tech programs like Microsoft Teams, Zoom and Skype, all parties participating in development have been able to collaborate without social interaction as easily as ever [12; 13; 14].

V. CONCLUSION REMARKS

The pandemic of COVID-19 severely affected the Indian industries, especially public engineering, construction, and building materials companies. Many projects were forced to stop or slow down considerably. Consequently, there is a slowdown in the industries. With Corona still posing a possible risk, it would be necessary to implement new protection and sanitary procedures. Temperature screening, psychological dissociation and PPE (personnel safety equipment) have been a common feature of the modern standard. Technology should be implemented for compliance checks and security standards to be complied with. Such protection precautions are obligatory and must be followed by the industry in order to keep the industry alive. Actions would undoubtedly significantly boost building costs and reduce production at the facilities. Customers and the civil engineering sectors must be prepared for the cost increases as their budgets are prepared. The builders and contractors in the current situation are having difficulty obtaining permits both for new and on-going projects. Building firms and employees both want to restart or continue their business. However, new governance rules and legislation have created doubt and instability in the organization.

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The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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