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Research Article

Impact of Covid-19 on The Construction and Engineering Industry

Darshankumar Patel[1], Basweshwar Jirwankar[2]
[1]Corresponding Author, Assistant Professor, Department of Civil Engineering, SVKM's Institute of Technology, Dhule, 424001, Maharashtra, India
[2]Assistant Professor, Department of Civil Engineering, SVKM's Institute of Technology, Dhule, 424001, Maharashtra, India

Abstract:
The global disruption triggered by the Corona Virus pandemic has had a significant influence on society, the environment, and the economy. Only two events world wars and the 1918 flu pandemic have had such a wide range of effects over such a brief period of time, including fatalities. Unfortunately, we should brace ourselves for more significant disruptions in the future. The Corona virus has a serious impact on the construction sector, which is the second-most significant sector among all sectors contributing to India's GDP. This paper focuses on the impact of this global epidemic on the world and Indian constructing industries. It also emphasizes the significance of civil engineering & town planning in reducing the pandemic's impact on the construction industry and resuming normal operations with appropriate remedies and mitigation strategies for all sectors that depend on the building industry. After the Corona virus, the future of the building industry is also briefly considered. The moment has come for us to pull up our socks and start searching for more effective planning for the future, not just for urban regions but also for slums, if we want to salvage the future after lockdown. Everyone has a lot to learn from the pandemic. Construction firms should work to make their business models more resilient as they design their recovery roadmaps, and they may concentrate more on plug-and-play solutions such prefabricated ducts & utilities, etc., to enhance the quality and efficiency of project execution. Early in 2020, the COVID-19 pandemic broke out, posing significant problems for the world economy and having an impact on many different sectors. Even the resilient building and engineering industry was susceptible to the pandemic's devastating effects. The multiple effects of COVID-19 upon the construction as well as engineering industries are thoroughly examined in this paper, encompassing disruptions to supply chains, shortages of workers, project delays, financial limitations, and the adoption of creative mitigation techniques. Paper also focuses on the adapting actions made by industry players and offers insights into probable long-term changes and future prospects for the building and engineering industry.

Key Words: COVID-19, Construction Industry, Engineering Sector, Supply Chain Disruptions, Adaptive Measures, Future Prospects.

1. Introduction:

The multiple effects of COVID-19 upon the construction as well as engineering industries are thoroughly examined in this article, encompassing disruptions to supply chains, shortages of workers, project delays, financial limitations, and the adoption of creative mitigation techniques. The report also focuses on the adapting actions made by industry players and offers insights into probable long-term changes and future prospects for the building and engineering industry. Particularly at Nagasaki and Hiroshima, when the nuclear bombs decimated not just the present day but also the past as well as the future of that Country, Japan, was the savage anger of retribution on display. We can still see the nuclear evil there ringing in the distance. Even more comprehensive improvements have been made to the building. Take a look at the situation right now. Once more, history is repeating itself. Humans and the Corona Virus are engaged in a virtual conflict.

This is a virtual conflict, not a battle of weapons. Its fury is visible not just in particular countries but also throughout the entire world. Why not build after this pandemic war if development had begun after nuclear destruction? Since the beginning of time, building has been a basic need for people. But only briefly because of

National Lockdown was it examined. We can only advise our fellow civil engineers to be patient and to not be concerned. The dynamics of the global construction and engineering business have been greatly changed by the COVID-19 pandemic. Movement limits, broken supply chains, and increased safety concerns presented the sector with a variety of problems that required quick responses. This essay strives to clarify the pandemic's broad effects on the building and engineering sectors by exploring the difficulties encountered, the solutions used to address them, and the possibilities for continued resilience and expansion.

1.1 Impacts of the Corona Virus On the Global Economy:

As it affects households, businesses, financial institutions, and markets simultaneously, the corona virus (COVID-19) outbreak is creating significant economic disruption with more severe effects anticipated than what had to be dealt with following the global financial crisis in 2007–2008. The worst effects may be felt by nations that are highly open, have few budgetary resources, and are disproportionately dependent on industries that are negatively impacted, like tourism. The virus's negative economic effects will spread throughout the planet. It is not impossible for stakeholders along whole supply chains to experience imminent insolvency. Anxiety, doubt, and unrest are caused by this predicament in all industries. The virus' effects on the worldwide construction industry could be disastrous. Contractors are in the lead since they offer both services and products. Covid-19 has an impact on both labor and materials, which are important cost factors for construction projects, and poses a barrier to ongoing project delivery, company liquidity, and entire business models.

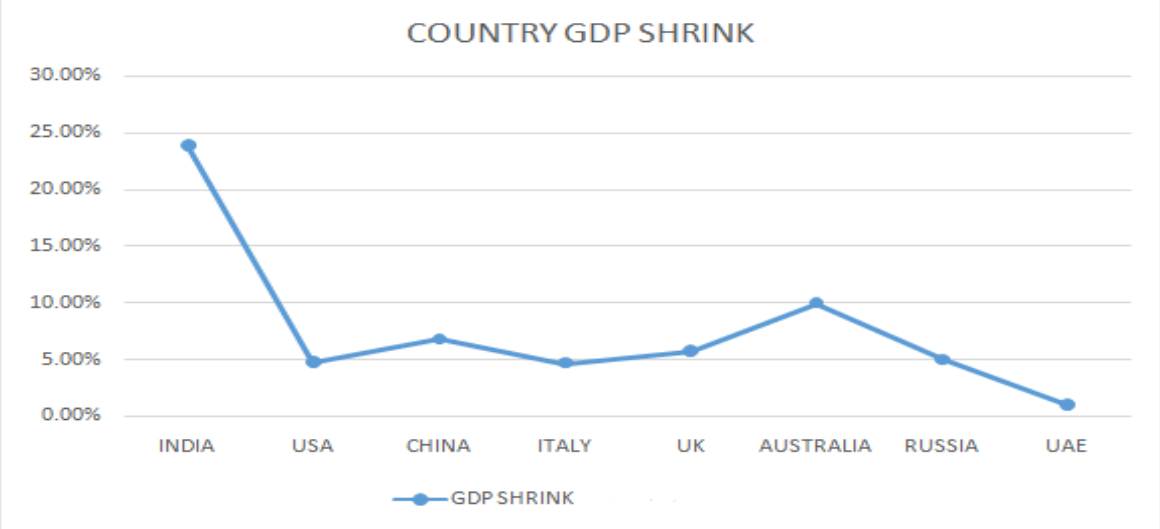

Figure 1. percentage of GDP shrinks

The new coronavirus that sparked the COVID-19 epidemic had a significant effect on world trade. The following are a few of the major effects seen:

1. Economic Recession: As a result of the pandemic's impact on the global economy, many nations experienced a recession. Businesses, supply networks, and consumer spending were greatly disrupted by the lockdowns and limitations implemented to combat the infection.

2. Rising Unemployment: Numerous companies suffered huge losses, which resulted in numerous layoffs and job losses. The outcome was a substantial rise in unemployment rates around the world, particularly in the tourism, hospitality, and entertainment sectors.

3. Disruptions to global supply chains caused by the epidemic resulted in shortages of essential products and services. Delays and closures in the manufacturing sector had an impact on other sectors as well as on international trade.

4. Increased Government Spending: To control the health crisis, stimulate the economy, and assist the

individuals and businesses that were impacted, governments all over the world had to commit significant resources. The level of public debt has increased as a result of this spending boom in many nations.

5. Transition to Remote Working: The epidemic hastened the widespread use of remote work, which has changed how firms run. While some industries saw continuity as a result of this change, others that primarily depended on face-to-face interactions faced difficulties.

6. Accelerated Digital Transformation: To adapt to the new normal, businesses were compelled by the crisis to accelerate their digital transformation activities. To stay competitive and relevant, businesses have become more and more focused on digital services, e-commerce, and automation.

7. Global Trade Disruption: The epidemic caused travel and trade to be disrupted, which had an impact on how interdependent the world economy is. Movement restrictions and trade barriers affected the flow of products and services, which resulted in a decrease in the volume of international trade.

8. Impact on Small enterprises: During the epidemic, small enterprises, especially those without substantial cash reserves, encountered enormous difficulties. Many were compelled to permanently close, which resulted in employment losses and added economic pressure.

9. Uneven Recovery: As vaccination efforts increased, certain regions and industries began to recover, while others were still struggling with emerging infections and variations that were changing. Existing economic inequities around the world were made worse by this uneven recovery.

10. Social & Mental Health Consequences: In addition to its economic effects, the pandemic had social and mental health repercussions since people were more stressed, anxious, and worried about their futures.

These effects underline the significant difficulties the epidemic has placed on the world economy, highlighting the demand for cooperative efforts to increase resilience and adaptation to the possibility of future crises.

2.COVID-19 Impacts on Construction Projects

2.1. A Higher Rejection Rate for Project Financing

The national lockdowns that followed COVID-19 were made possible by the increase of loans and requests for credit from financial institutions, which became the main source of funding of projects. But since there is still uncertainty about both the short- and long-term prospects for economic growth, lending institutions are growing more cautious. As a result, by adding more review procedures, financial institutions choose to lower the approval rate for funding, especially for building projects. Consequently, the percentage of Indian finance bids that are rejected have increased form 20–25% and 30–35%, with proposals exceeding INR10,000,000 (about USD 130,000) receiving more scrutiny.

2.2. Labour Scarcity: Labour-intensive industries are greatly impacted by the COVID-19 pandemic. A significant portion of the workforce in the construction sector is made up of migrant labourers, who usually reside in temporary housing on job sites. The Confederation of Real Estate Developers' Associations of India (CREDAI) reports that there are 18,000 sites and 20,000 active development projects in India on average. Reverse migration has occurred as a result of the 40-day lockdown, which ran from 25 March to 17 May 2020, with workers moving out of cities and back to their hometowns. An estimated 600,000 workers travelled on route to their hometowns, while a further 1,000,000 people are thought to be housed in relief camps spanning several industries. Consequently, almost thirty percent of construction workers left their sites following.

2.3. Reduction in the Amount of Public Projects:

Government funding has been greatly impacted by the necessity of government interventions (such as public health initiatives, government initiatives, restrictions, emergency social and economic measures, etc.) to combat COVID-19 effects. Government-owned assets have been harmed by COVID-19, which has also affected stock markets. Public firms in the area are also impacted by the COVID-19 situation. Certain sectors suffered from the slowdown or stoppage of operations, especially the travel, entertainment, and transportation industries, which had an impact on the government as stockholders.

The capacity to pay for public projects both now and in the future is hampered by a reduction in funding for state and municipal governments. The Indian government is consequently under tremendous pressure to reduce spending and increase revenue. As a result, Indian local governments have decided not to provide funding for public Projects.

2.4. Current Initiatives

Real estate has turned to layoffs and wage cuts as a means of reducing operating costs as the nation struggles with the pandemic and ensuing lockdowns, as sales are predicted to be subdued in the near future. Government rules and approval delays have been major challenges for the building industry over the last three to four years. On market sales, the COVID-19 problem had an even bigger effect. There are about 7 million workers in the industry, 300,000 of whom are white-collar employees. The majority of developers centralize their work and labour, close offices, and fire staff in order to manage liquidity. Larger reserves have been used by companies to offer a short-term salary decrease with the promise of reimbursement when sales rebound. Companies are making cuts and getting rid of extra expenses since sales have stalled and revenues have fallen dramatically. In general, the industry as a whole has been set back by at least five years due to the shutdown.

2.5. A Drop in Project Team Members' Morale

The COVID-19 virus has spread to every nation during the last two years, infecting people all around the world. The virus affects economies, corporations, and society as it spreads. When traveling for work, top management frequently falters. Every employee is at danger; periodically, a worker's absence from work occurs because of disease or quarantine. Effective decision-making that boosts morale is therefore disregarded. Morale in the workplace is negatively impacted by the corporate manager's lack of connection and communication with the staff. The pandemic's effects have resulted in a decline in morale, which has raised employee absenteeism rates.

2.6. Disruption in Supply Chain

An unanticipated and unforeseen triggering event that happens someplace in the supply chain upstream (the availability network), the outbound logistics network, or the purchase (sourcing) environment, combined with a consequential situation that poses a serious threat to the regular business operations of the local firm, is what causes supply chain disruptions. Global supply networks are being tested by the unprecedented disruption caused by the COVID-19 outbreak.

2.7. Termination of Current Project

Due to owner-imposed or government-imposed shutdowns, several public and private construction projects have been put on hold, which has interfered with progress payments that are essential to maintain overall operations. Rather than bear the expense of ongoing project delays brought on by COVID-19's affects, obligees may decide to halt development on a bonded project until the severity of the disease has subsided. A completion date and a clause stating that "time is of the essence" are found in almost all construction contracts. The contract may be terminated for default if the completion deadline is not met; this is typically followed by a demand that the performance bond surety finish the work; payment of the obliged costs to supplement the principal's labour force to mitigate delays; and/or the assessment of liquidated damages or other penalties.2.8. Shortage of Materials. A project may be delayed if supplies cannot be delivered or if there is a shortage of even one essential part. A consequence of the state's economic crisis is the cancellation of ongoing projects due to financial constraints.

While it is nearly impossible to pinpoint the precise effects of the COVID-19 pandemic, any prolonged downturn in the manufacturing and economic sectors is probably going to have a significant impact on material prices. The implementation of measures to control viruses may lead to a notable decrease in the demand for materials, hence exerting a substantial influence on material cost. Materials that have been trending lower over the past year are probably going to decrease another 5% to 10%. By contrast, materials which have been expanding can have a slight rise of 1% to 3%. Rising demand mostly from Asia and Europe is driving up the cost of raw materials. The COVID-19 pandemic has largely healed China's industrial output, which has surged to maximum capacity and sharply raised the country's need for raw materials. The market experienced shortages as a result. Materials can become more expensive to obtain on time as a result of global manufacturing shutdowns

(e.g., goods made in China), port closures, and general delays in material transit within the United States. A bonded project may suffer even if the bonded principle weathers the storm since suppliers and lower-tier subcontractors may also have issues.

2.9. A Drop in the Amount of Private Projects

The quantity of current private projects in India was impacted financially. Due to the restricted amount of available projects, companies found it difficult to recruit new ones. An additional challenge that enterprises encounter in luring new contracts is the heightened degree of competition resulting from the COVID-19 epidemic. These issues have led to low profit margins on numerous construction contracts. As a result, many contractors are unable to bear the COVID-19's financial burden.

2.10 Lower Productivity in Construction

Informal enterprises typically have low capital accumulation, low rates of savings and investment, and low productivity. They become vulnerable to shocks and catastrophes as a result. The construction sector is experiencing financial difficulties, and a lack of workers has resulted in decreased production.

2.11. Decreased Demand for Jobs Associated with Construction

The demand for construction projects has already declined. The current level of uncertainty, negative business sentiment, decreased operational surpluses and revenues, money diverted for COVID-19 management, and credit and liquidity issues are all expected to have a significant impact on the construction industry. It is yet unclear how much the current economic crisis will affect upcoming and ongoing building projects, demand in the future, and the industry as a whole.

2.12 Decreased Foreign Investment in the Building Sector

In 2018, India ranked as the nineteenth largest exporter and the tenth largest importer. In 2018–2019, India received 4 trillion Indian Rupees in foreign direct investment (FDI), with the computer, telecom, and service sectors continuing to be the main recipients of FDI inflows. Foreign direct investment (FDI) is a crucial factor in bolstering economies throughout the post-pandemic recovery. Manufacturing and agriculture—two industries severely impacted by the pandemic—account for a larger percentage of foreign direct investment (FDI) in developing economies compared to industrialized ones. Thus, it is anticipated that FDI flows to poor nations will decline even further. Through financial support to its affiliates, FDI may be able to significantly contribute to the strengthening of economies both during and after the crisis, helping governments tackle.

2. Effect of Covid-19 on Construction and Engineering Sector: Indian Scenario

The economy, the environment, and people are all greatly impacted by COVID 19. Over 51 million people are employed in the construction industry in India, including both skilled and unskilled labourers as well as specialists in the field. Massive shocks brought on by COVID 19 include food scarcity, fear of the virus, and loss of income. These are serious problems for migratory workers. Furthermore, several industries suffer large income losses as a result of temporary closures. Widespread COVID-19 caused unexpected consequences in the Indian construction industry, including monetary loss, unanticipated hurdles, and unforeseen circumstances during the epidemic. The blow of the national and international recession and economic slump was caused by all of these factors.

The entire impact of projects being delayed, demand slowing down, and lockdown effects extending to supply network management and labour mobility has been felt by the construction industry. Fear of contracting a disease caused almost 30% of the labour to leave building sites, which had a significant impact on the amount of work completed. Among the industry's most negatively impacted is the construction sector in India. Government agencies ought to implement stimulus programs that are justifiable, advantageous, and capable of boosting the country's economy. The stability of the Indian economy depends on the construction sector, which is the country's second-largest employer after agriculture. With a 10.5 trillion INR market size, it contributes about 8% of the country's GDP & employs 57.5 million people.

There are numerous industries in our nation that rely on the building industry, which is also a core sector. Despite being very

fragmented, the construction sector in India received the second-highest amount of foreign direct investment (FDI) in 2017.According to a KPMG report, the new corona virus, also known as COVID-19, has a daily economic impact on India's construction industry of Rs 30,000 crore. The pandemic is also anticipated to decrease spending on construction-related projects between 13 to 30 percent, and is anticipated to have an effect on employment and gross value added.

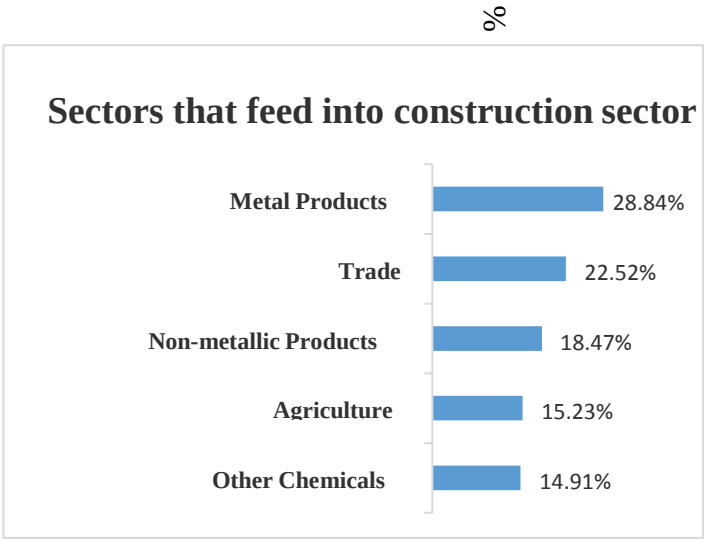

Figure 2: Sectors that feeds into construction sector

The graph mentioned in the Fig.2 are show the backward linkage of the construction sector with other sectors.
These 5 sectors that are used as inputs in the construction industry are metal products, trade, non-metallic products, agriculture and other chemicals. These sectors are dependent on the construction sector and demand from these is affected when the construction industry experiences a demand shock in the form of loss in investments.
Construction contributes around 60% of the total investments among all sectors that take place in India. An investment of 100,000 INR in the construction sector contributes, 150,000 INR for the Gross domestic product (GDP), generates 320,000 INR total revenues, and creates large scope for employment.
95% of the investment took place in six sectors alone namely Power, Roads and Bridges, Urban, Telecommunication, Railways, and Irrigation.

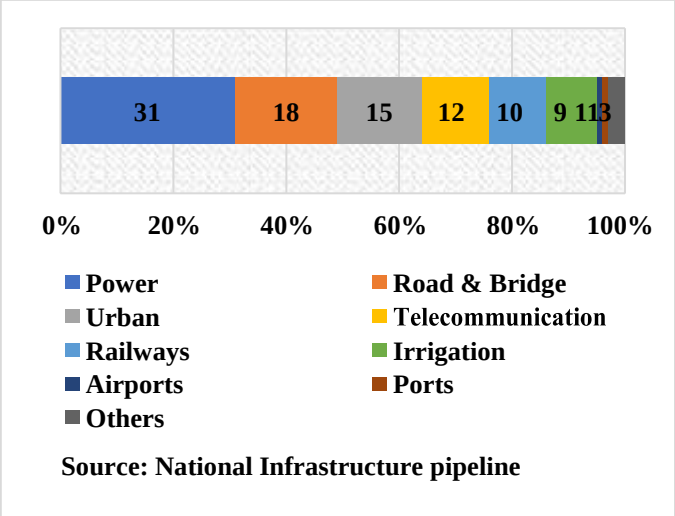

Figure 3 Sector wise share of Infrastructure investmentsof INR 80 Lakh Crore during FY 08 to FY19

The Covid-19 pandemic has had a significant impact on the construction and engineering sector in India. While the sector was already facing challenges such as project delays, funding issues, and regulatory hurdles, the pandemic exacerbated these difficulties and introduced new challenges. Some key effects include:

- Disruption of Supply Chains: The lockdowns and restrictions on movement disrupted supply chains, leading to delays in the delivery of construction materials and equipment. This significantly impacted project timelines and increased costs for many construction companies.
- Labor Shortages: The mass exodus of migrant workers from cities to their hometowns during the lockdowns led to a severe shortage of labor in the construction sector. This affected the progress of many projects and added to the existing labor-related challenges.
- Financial Stress: The pandemic-induced economic slowdown led to financial stress for many construction companies, especially small and medium-sized enterprises. Reduced cash flows, payment delays, and a decrease in new project orders added to the financial strain on the sector.

- Project Delays: Due to the restrictions imposed during the lockdowns, construction activities were halted, leading to significant project delays. Even after the restrictions were lifted, productivity remained below pre-pandemic levels due to the various challenges faced by the sector.
- Shift towards Digitalization: The pandemic accelerated the adoption of digital technologies in the construction and engineering sector. Remote working, virtual collaboration, and the use of Building Information Modelling (BIM) gained prominence, enabling the sector to adapt to the new normal and improve efficiency.
- Policy Reforms and Government Support: To revive the sector, the Indian government introduced various policy reforms and stimulus packages. Initiatives such as the Atmanirbhar Bharat Abhiyan and the National Infrastructure Pipeline aimed to boost infrastructure development and create new opportunities for the construction and engineering sector.
- Focus on Health and Safety Measures: The pandemic brought a heightened focus on health and safety measures at construction sites. Companies had to implement strict protocols to ensure the safety of workers, leading to additional costs and operational changes.
- Project Delays and Disruptions: The pandemic caused supply chain disruptions, labor shortages, and travel restrictions, which delayed ongoing projects. Project completion delays may have also been caused by a labor and raw material scarcity.
- Financial Restrictions: The pandemic-induced economic downturn may have resulted in financial restrictions for a number of construction projects. The development and feasibility of numerous projects may have been impacted by decreased liquidity, elevated borrowing costs, and disturbed cash flows.
- Safety and health precautions: Due to the large workforce required for construction and engineering projects, safeguarding their safety and wellbeing throughout the pandemic may have presented additional difficulties. Increased health and safety expenses, social isolation policies, and safety protocol implementation could have affected the overall project budget and timeline.
- The real estate industry is intimately related to engineering and construction-related businesses. The pandemic may have harmed the prospects for the commercial and residential real estate markets by decreasing consumer demand.
- 5Governmental Initiatives and Stimuli: The Indian government may have taken specific actions to support the engineering and building industries throughout the pandemic. These programs might have included financial assistance, regulatory easing, and stimulus packages in order to lessen the pandemic's negative effects on the industry.
- Transition to Digitalization: It's possible that the pandemic hastened the use of technological advances &

virtual instruments in the engineering and construction industry. The usage of building information modeling (BIM), digital project management, and remote working may have increased.

Despite the challenges, the construction and engineering sector in India showed resilience and adaptability, with a gradual recovery in the post-lockdown period. The sector's long-term outlook remains positive, with increased government spending on infrastructure projects and the continued adoption of technology to drive growth and innovation.

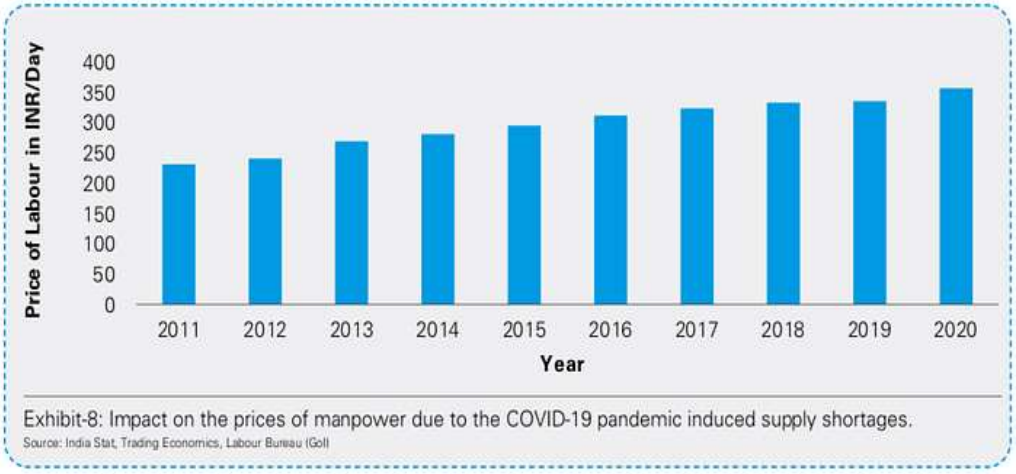

Figure 4 : Impact on prices of manpower due to the COVID-19 pandemic induced supply shortage

3. Upcoming Challenges

The first and biggest issue we will experience is "INFLATION." Yes, the cost of building will rise. Even when the lockdown is lifted, masks and hand sanitizer will be required under the recommendations of health groups. In the future, insurance for masons as well as other masonry employees will also be a serious topic. Therefore, contractors must take care of these essential elements for their future construction attempts. Additionally, for a while in the future, contractors will face a labor shortage as a result of workers returning to their hometowns. As a result, building will become more expensive.

4.1 Future Construction slogan:

Design- Manufacture-Assemble is the ground-breaking slogan for future construction. To combat the negative consequences of lockdown in the ensuing decades, we must all concentrate on precast construction in the future. Say briefly, then try to build the factory in the allotted amount of time. Workers precast the crucial components of the structure inside the industries, though, during that operation. In our cities, there are several ready-mix manufacturing facilities and construction businesses. If we begin precasting some essential structural parts like beams, columns, slabs, etc. in some green zone where a few factories are already operating under some regulations, we will undoubtedly save time for large projects that may become stalled in the future. The projects range in scope and were left unfinished due to the abrupt declaration of a nationwide lockdown. With this, we can utilize our time very effectively.

4.2 Virus Free Building – Myth or Reality:

Can we ever have a structure that is virus-free? Part of "NO" is the correct response to this. There is no such technology available today. The air inside our home is cleaner than the air outside thanks to certain anti-bacterial paints we have. Although some aspiring engineers and full-time academics have been working on this, new technology will undoubtedly be developed in the future. Some government and non-government organizations have developed the DISINFECTANT TUNNEL, where cleansed raindrops fall continuously in the event of a pandemic today. However, it is not particularly cost-effective and also requires good upkeep.

4.3 Construction in Economic Slump:

Builders and civil engineers can rest easy knowing that digital account audits of building projects have been registered even while the site is under lockdown. Even visiting their offices is not required. Design architects and engineers have

been using software similar to CAD, REVIT, and STAD-PRO in an effort to come up with more creative and cost-effective designs. Some people do believe that we shall soon experience unemployment in light of this. Some pupils believe that in the future, the government won't offer any jobs for a specific term. These false beliefs are false beliefs. Never, ever worry. The Indian economy is thought to be the largest and fastest-growing in the world, valued at five trillion dollars. Money has been set aside for important occasions. Consider the fact that we are all staying at our house for two months. The amount of gasoline and diesel consumed has substantially decreased during these months of lockdown. As a result, the government stopped purchasing crude oil from other nations. The claim that the funds can simply be injected into future projects and jobs is apparent.

4.4Civil Engineer – Only Solution for COVID-19:

Do we know what the most recent vaccine is that we are all taking every day to combat Corona?

You everyone will wonder what kind of nonsense this is. There isn't a vaccination available yet. But in order to offset Corona, we are all eating the generosity and aura of home. Our house is our deadliest weapon against Corona. However, a well-planned house is superior to one that was built quickly. Consider it from a broad perspective rather than a micro perspective. Compare other well-planned areas of Mumbai with the Dharavi neighborhood in Mumbai. The largest slum in Asia, Dharavi, which is home to 1.6 million people, is not a well-planned neighborhood. Here, Corona instances outnumber intended locations by a wide margin. Therefore, it follows that town design is crucial in preventing pandemics

4. Effect of COVID-19 on food chain in India

The COVID-19 pandemic has significantly impacted various sectors in India, including the food chain. Some of the effects observed include:

- Disruptions in the food supply chain: During the lockdown phases, there were disruptions in the transportation and distribution of food products, which led to a shortage of essential food items in some regions. This caused challenges in maintaining the supply of perishable goods like fruits and vegetables.
- Impact on agriculture: The pandemic led to a shortage of labor in agricultural activities due to restrictions on movement and migration. This affected the planting, harvesting, and processing of crops. Farmers faced difficulties in getting their produce to the markets, leading to losses and decreased income.
- Changes in consumer behavior: With the fear of contamination, consumers shifted their purchasing patterns, opting for non-perishable and packaged food items over fresh produce. This change in demand had an impact on the market dynamics, affecting the income of small farmers and local vendors who primarily sell fresh produce.
- Challenges in the food processing industry: The food processing industry faced challenges due to labor shortages and restrictions on movement, impacting production and processing activities. This led to a decrease in the production of processed foods, which are crucial for meeting the demand of the population.
- Impact on Small-Scale Farmers and Local Markets: Small-scale farmers and local markets faced challenges in accessing markets and finding buyers, as the usual distribution channels were disrupted. This affected their livelihoods and income, leading to financial hardships for many.
- Increased food insecurity: The economic repercussions of the pandemic, such as job losses and reduced income, led to an increase in food insecurity, especially among vulnerable communities. The lack of access to nutritious food has worsened the situation for many households, leading to issues of malnutrition and hunger.

In response to these challenges, the Indian government and various non-governmental organizations have taken initiatives to ensure food security and provide support to farmers and vulnerable communities. These measures have included financial assistance, food distribution programs, and policy interventions to stabilize the food supply chain. Additionally, efforts have been made to promote online sales and e-commerce platforms to facilitate the smooth flow of food products to consumers.

5. Road to recovery for India:

The COVID-19 pandemic has significantly impacted the global economy, and India's construction industry has not been an exception. However, there are several steps that can be taken to facilitate the road to recovery for the construction industry in India during this crisis. Here are some strategies and measures that can be implemented:

- Adoption of Health and Safety Protocols: Ensuring the implementation of stringent health and safety protocols at construction sites is crucial to protect the workforce from the spread of the virus. This includes regular sanitization,

social distancing, and the use of personal protective equipment.

- Encouraging Digital Transformation: Promoting the adoption of digital technologies such as Building Information Modeling (BIM) and construction management software can enhance productivity and efficiency, minimizing the need for physical contact and enabling remote work where possible.
- Government Support and Policy Initiatives: The government can play a significant role by introducing supportive policies and providing financial aid to the construction sector. This can include tax incentives, subsidies, and special funding for infrastructure projects to stimulate growth.
- Focus on Infrastructure Development: Accelerating infrastructure development projects can create job opportunities and boost economic growth. Investing in the development of roads, bridges, and affordable housing can help revive the construction sector and the overall economy.
- Promotion of Affordable Housing Schemes: Implementing affordable housing schemes can drive demand in the real estate sector, leading to increased construction activities. This can be facilitated through easier access to loans and subsidies for both developers and homebuyers.
- Skilling and Training Programs: Investing in skill development and training programs for workers in the construction industry can enhance their capabilities and ensure a skilled workforce for future projects. This can be done through partnerships with educational institutions and vocational training centers.
- Collaboration and Partnerships: Foster collaboration between public and private sectors to facilitate the exchange of knowledge, expertise, and resources. Public-private partnerships (PPPs) can help in the execution of large-scale projects and attract private investments in the construction sector.
- Sustainable and Green Practices: Encouraging the adoption of sustainable and eco-friendly construction practices can not only reduce environmental impact but also attract environmentally conscious investors and buyers.
- Streamlining Regulatory Approvals: Simplifying and streamlining regulatory approvals and permitting processes can reduce delays and bureaucratic hurdles, thereby expediting construction projects and stimulating growth in the industry.
- Market Diversification and Global Outreach: Exploring international markets and expanding global outreach can create new opportunities for Indian construction firms, fostering growth and resilience in the face of economic uncertainties at home.

By implementing these measures, India can pave the way for a robust and sustainable recovery of its construction industry amidst the COVID-19 crisis.

6. Conclusion

It might be an understatement to say that the businesses involved in engineering and construction would be impacted by the current exceptional scenario. The various restrictions imposed by the Governments to counteract the virus's impacts may result in a lack of raw materials and labor, a disruption of the supply chain, and further difficulties in fulfilling contractual responsibilities. The least of the sector's concerns should be a decline in consumption demand. Construction and engineering industries import some components from nations that might be more severely impacted, which has a cascading effect on the entire industry. However, one must take precautions against the unavoidable by promptly taking corrective actions.

Construction executives will be judged on how they act in relation to the three crisis management pillars of Respond, Recover, and Thrive. Among the crucial procedures are:

• assessing the contract clause(s) to determine the severity of penalties upon breach

• To proactively take all necessary steps to reduce the potential for liability by timely applying the appropriate legal doctrine(s).

• Be ready for more contract liquidations and renegotiations.

• Restructure in response to weather and storm

• Take into account whether the crisis may be utilized as a spur to rethink how work is done and to speed adaptations of digital capabilities.

• Modify your approach to the new normal of considerably smaller markets in some nations.

The moment has come for us to pull up our socks and start searching for better planning in the future, not just for the urban

area but also for slums, if we want to salvage the future after lockdown. Everyone has a lot to learn from the pandemic. Construction firms should work to make their business models more resilient as they design their recovery roadmaps, and they may concentrate more on plug-and-play solutions like prefabricated ducts and utilities, etc., to enhance the quality and efficiency of project execution.

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