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Impact of Covid 19 on the Efficiency of Construction Projects – Precast and Cast in Situ

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Abstract:- The COVID-19 pandemic has significantly impacted the economically vulnerable construction industry. On the plus side, however, as it has the potential to generate jobs, the construction industry has a lot of scope to boost the recovery, which in turn might support the sector's transformation towards sustainability and digitization. In this article, research on the COVID-19 pandemic's effects on the effectiveness of precast and cast-in-place construction projects is discussed. The research described in this paper was conducted in a series of related stages, including developing a research plan, collecting and analysing data, and assembling research findings. For contextual understanding and comprehension of the situation in the field, qualitative approaches to data collection and evaluation, particularly on-site visits, were used.

Keywords:- *Precast and Cast in Situ.*

I. INTRODUCTION

The construction industry has been severely impacted by COVID-19 and is currently facing several challenges related to contractual commitments, resource availability, deliverables, health and safety standards, and project delays or cancellations. Precast and Cast in situ building project technologies were the subject of a study to determine their effectiveness. The study, which lasted five months, included five medium- and large-sized businesses from Hyderabad, Telangana. Ready mix concrete, commonly referred to as RMC, is produced in a batch factory in accordance with each unique task requirement before being delivered as "ready to use" to the job site. A combination of cement, water, and aggregates is a component of RMC. The component of the mixture that contributes the most strength to the mixture is cement.The mixture's essential fluid is water. At situ concrete is just concrete that has been put into shutters that will hold it while it sets into its final form and position, whereas precast concrete is concrete that has been formed in sites other than those where it will eventually be used .Cast in situ is cheaper but takes a little more time and required more manpower, whereas precast is more expensive but it saves a little bit of time and required less labour. In most of the cases the extra cost of precast is not worth the time saved so overall, cast in situ is preferred over precast.

- *Objectives of Project:*
- Collecting the data on material usage before, during and after Covid 1
- Identifying suitable statistical tool to analyse the data
- Compiling the data and drawing an inference from the compiled data
- Analyzing the data obtained from various RMC and Precast industries

II. LITERATURE REVIEW

- **Impact of the COVID-19 Pandemic on Construction Companies in the Czech Republic 2022,** The Lack of employees, supple of building materials and products caused by the health situation resulted in a declining construction industry. The pandemic has had a positive impact on the functioning of the construction companies.
- **Industrial construction safety policies and practices with cost impacts in a COVID-19 pandemic environment:** A Louisiana DOW case study 2022 ,this paper the amount of time to ensure process safety guidelines and risk assessments were completed were lengthy, but for very good reason. At this time as vaccines become available, the same pre-entry procedures will require those with symptoms to self-quarantine and work from home till they are symptom-free and cleared by a medical professional
- **A construction project scheduling methodology considering COVID-19 pandemic measures 2021**, Here theContinuing the construction works with fewer workers during the pandemic period results in extending the duration of the construction. Employee safety at work will benefit both the employees and the employer Designing safer construction areas will help decrease the unfinished construction projects' number due to the possibility of pandemic infections.
- **Safety and health management response to COVID-19 in the construction industry: A perspective of fieldworkers2022,** The study extends current knowledge by highlighting the need for continued advocacy aimed at smaller construction companies that have limited re-sources for occupational health and safety management. Contractors could utilize the findings of this study to integrate multiple practices and technologies within their existing safety programs to improve the effectiveness of their programs and prevent the spread of in- fectious diseases, such as COVID-19 on their projects.

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- **Evaluation of measures to prevent the spread of COVID-19 on the construction sites 2022,** Projects that are at the critical phase and experiencing resource shortages, will experience up to 70% increased costs and could delay projects by up to 60%. The data shows that con- tractors should offer a duty of care technique to the frontline site workers .The measures discussed have multiple implications for the control of many diseases because they can be used to reduce the spread of other types of infectious diseases like malaria, Ebola, and dengue on construction sites.

III. PROBLEM STATEMENT

Project Management Efficiency is the basic criteria for evaluating the success of any project in Construction sector. Since construction projects are related and dependent on many innumerable factors, project management efficiency is also affected by various factors ranging from choosing appropriate materials, machinery and monetary related factors. This study will be aimed at investigating various factors involved which affects the management efficiency of precast construction The purpose of this project is to identify the specific processes which are instrumental in project management

IV. METHODOLOGY OF THE PROJECT

In the present project study, We went to 5 different construction sites in a period of 5 months . The first step of this process was to visit the construction site in person to make suitable observations and know the Status of construction activities in precast and cast in situ. The follow up procedure is to collect data regarding consumption of raw materials pre-covid and during wave 1 and 2. The third stepis statistical analysis on the consumption of raw materials during the three phasesi.e. to Pick statistical method and analyze data.The final step or the conclusion is to analyze data and conclude project, in simple words, Compiling the data and identifying the critical parameters that has significance in construction.

- *Flow Chart*

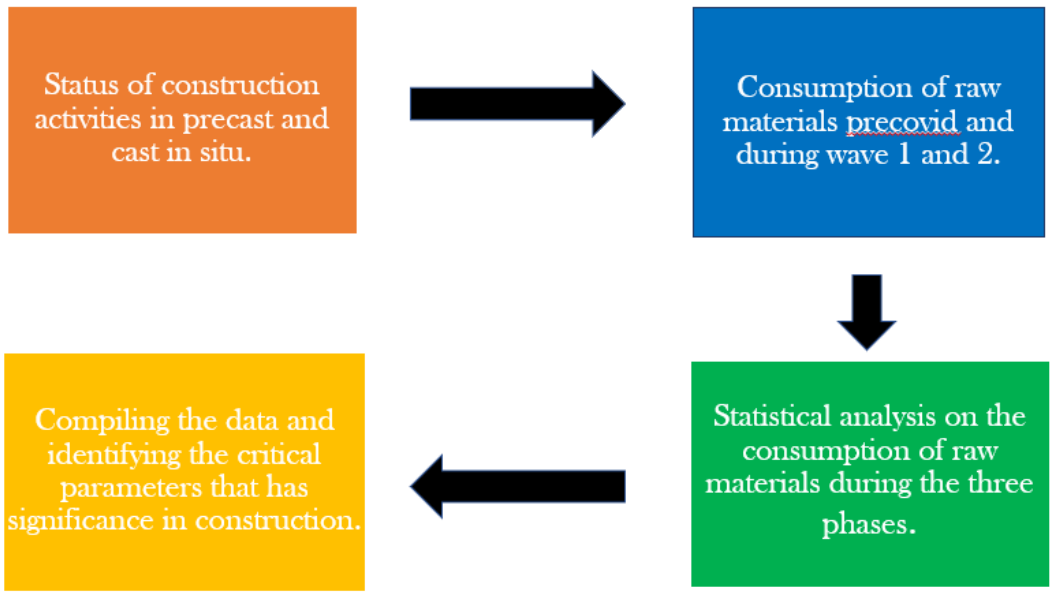

Fig 1:- Flow Chart

➢ *Data Collection*

The data required for the project is collected from the visit to the construction site for this project.

Site 1 : Pictures Of The Site : Vertex Construction

5th Floor Slab Work (Block F)

1st & 2nd Floor Brick Work (Block F)

Interior Plastering Work (Block F)

4th Floor RCC Slab Work (Block E)

Ground Floor Brick Work (Block E)

Cellar Floor Level Foundation Work (Block C)

Fig 2

Site 1 : RMC Used : Vertex Construction

S.No Quantities	Period in MT	M 7.5	M 10	M 20	M 20 Screed	M 25	M 30	M 35	M 40
1	Sep 19 – Mar 20	1414	351	8441.5	111	4732	60	0	0
2	Apr 20 – Apr 21	0	70	228	0	0	0	0	0
3	May 21 – Jul 21	5	0	7	252	5	0	0	0

Period	Cement	Steel	Robo Sand	10mm Metal	20mm Metal	40mm Metal
	Bags	MT	MT	MT	MT	MT
Sep 19 – Mar 20	29450	47016	3045	495	0	0
Apr 20 – Apr 21	0	0	555	37	0	0
May 21 – Jul 21	1700	0	272.75	55.24	54.71	18.24

Total concrete quantity : 263800 cum

done before first wave : 70000 cum

Done after first wave : 140000 cum

Done after second wave : 42000cum

Fig 3

Site 2 : Pictures Of The Site : Hardhik Construction

Actual image of the site

G + 2 Slab of villa 14

1st floor slab of villa 17

First floor slab reinforcement

Brick work of villa 22

Team leader at site

Fig 4

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Site 2 : RMC Used : Hardhik Construction

S.No Quantities	Period in MT	M 7.5	M 10	M 20	M 20 Screed	M 25	M 30	M 35	M 40
1	Sep 19 – Mar 20	0	0	0	0	0	0	0	0
2	Apr 20 – Apr 21	0	70	228	0	0	0	0	0
3	May 21 – Jul 21	0	211	658	0	0	0	0	0

Period	Cement	Steel	Robo Sand	10mm Metal	20mm Metal	40mm Metal
	Bags	MT	MT	MT	MT	MT
Sep 19 – Mar 20	200	77.58	45.34	0	0	0
Apr 20 – Apr 21	0	0	0	0	0	0
May 21 – Jul 21	1700	0	82.115	0	43.18	18.24

Total concrete quantity : 18163 cum

done before first wave : 3000 cum

Done after first wave : 4000 cum

Done after second wave : 4817 cum

Fig 5

Site 3: Pictures Of The Site : SRCM Project

Actual image of finished site construction

Brickwork in 5th floor (Block C)

Exterior cement work done (Block A)

Brickwork completed (Block D)

Slab under construction (Block E)

Team leader at site

Fig 6

Site 3 : RMC Used: SRCM Project

Quantities in MT	M10	M15	M20	M25	M30	M40	M50
Cement	225	251	301	321	361	403	405
20MM	657	595	670	670	648	670	1084
12MM	447	589	447	455	433	455	0
MSAND	816	774	810	809	705	750	789
WATER	167	159	155	157	181	164	169
ADMIXTURE	1.77	2	2.4	2.57	2.87	3.61	3.60
W/C RATIO	0.74	0.7	0.52	0.49	0.60	0.42	0.41
DENSITY	2287	2371	2418	2432	2399	2472	2433

Total Concrete Quantity: 11713 cum

Done before first wave: 3000 cum

Done after first wave: 4000 cum

Done after second wave: 4713 cum

Fig 7

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Site 4: Pictures Of The Site : My Home Mangala


Fig 8

Site 4 : RMC Used: My Home Mangala

Quantities in MT	M10	M15	M20	M25	M30	M35	M40
Cement	90	110	130	160	180	201	220
GCBS	120	140	180	170	170	170	210
Coarse Agg 20mm	601	599	0	562	565	568	555
Coarse Agg 10mm	470	469	816	457	462	445	434
Fine Agg	950	914	1090	872	846	832	813
Free Water	147	150	155	158	158	160	159
W/C Ratio	0.70	0.60	0.50	0.48	0.45	0.42	0.37
Total Water	195	191	202	197	196	197	196
Ad Mixture Dosage %	0.57%	0.55%	0.50%	0.50%	0.50%	0.55%	0.55%
Admixture (kg)	1.20	1.38	1.55	1.65	1.75	2.09	2.37
Density	2379	2383	2373	2381	2383	2387	2393

Total Concrete Quantity: 253000 cum

Done before first wave: 80000 cum

Done after first wave: 130000 cum

Done after second wave: 43000 cum

Fig 9

Site 5: Pictures Of The Site : My Home Tarkshya


Fig 10

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Site 5: RMC Used: My Home Tarkshya

Quantities in MT	M10	M15	M20	M25	M30	M35	M40
Cement	90	110	130	160	180	201	220
GCBS	120	140	180	170	170	170	210
Coarse Agg 20mm	601	599	0	562	565	568	555
Coarse Agg 10mm	470	469	816	457	462	445	434
Fine Agg	950	914	1090	872	846	832	813
Free Water	147	150	155	158	158	160	159
W/C Ratio	0.70	0.60	0.50	0.48	0.45	0.42	0.37
Total Water	195	191	202	197	196	197	196
Ad Mixture Dosage %	0.57%	0.55%	0.50%	0.50%	0.50%	0.55%	0.55%
Admixture (kg)	1.20	1.38	1.55	1.65	1.75	2.09	2.37
Density	2379	2383	2373	2381	2383	2387	2393

Total Concrete Quantity: 110000 cum

Done before first wave: 5000 cum

Done after first wave: 60000 cum

Done after second wave: 45000 cum

Fig 11

V. CONCLUSION

The observations and data we gathered allow us to derive the following conclusions: ready mix concrete use increased after the first wave, but then dramatically declined after the second wave.The prime reasons could be that most projects began to experience difficulties, including loss of cash or revenue as a result of plant closures, changes in the price of raw materials, and decreased or stopped production. The transportation problem was one of the most crucial ones. The transit of materials was severely disrupted as a result of the transportation sector's major damage . The lack of labour was caused by reverse migration .The budgets included additional expenses which could not b' ignored as they were compulsory precautionary measures. Cost of raw materials rising as a result of The usage of pandemic safety regulations and costs, such as avoiding social contact, regularly testing employees' health, 1696anitizing work areas, and purchasing personal safety gear including masks, face shields, hand sanitizers, soaps, etc. These factors are the major causes of the unfavourable effect after the second wave .

REFERENCES

[1]. Michael.C.Loulakis, Lauren P. McLaughlin. The Law: Construction Industry Impact in the COVID-19 World. ASCE News. https://news.asce.org/the-law-construction-industry-impactsin-the-covid-19-world/

[2]. Construction placement. 3April 2020. https://www.constructionplacements.com/top-constructioncompanies-in-india-2020/

[3]. WIKIPEDIA. Construction industry of India. https://en.m.wikipedia.org/wiki/Construction_industry_of_India

[4]. Jonathan Ananda. THE NEW INDIAN EXPRESS. 27th March 2020. https://www.newindianexpress.com/business/2020/mar/27/15-crore-unregistered-constructionworkers-in-the-lurch-sans-relief-2122056.html

[5]. Statista. GDP share of the construction industry value in China from 2018 to 2021. 12December 2020. https://www.statista.com/statistics/1068213/china-construction-industry-gdpcontribution-