

Delays in Construction Projects: Causes, Effects and Impacts of RERA

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Abstract— a construction project is commonly accepted as a successful project when the aim of the project is achieved in terms of scheduled objectives of finishing the project on time, within budget and to the required quality standard. Delay in construction projects is considered one of the most common problems causing a multitude of negative effects on the construction projects. Construction delays can be minimized only when their cause are identified. Real Estate (Regulation and Development) Act, 2016 (RERA) became effective in the entire country. The bill was passed by the *Rajya Sabha* and the *Lok Sabha* in March 2016. The Act came into force from 1 May 2016. Remaining provisions came into force from 1 May 2017. The objective of this study was to identify the major causes of construction delays. A literature review was conducted to compile a list of delay causes in construction industry. 101 causes of delays categorized into 9 different groups. Also effects of various delays identified. The numerous mitigation methods suggested and how new regulatory act Real Estate (Regulation and Development) Act, 2016 will help to reduce or mitigate the several delays in construction projects.

Index Terms— causes of delays, effects of delays, construction industry, Real Estate (Regulation and Development) Act, 2016 (RERA)

I. INTRODUCTION

Delay in construction projects is considered to be one of the common problems in the construction industry. Delays have adverse effect on the project in terms of performance, time and cost. Thus, it is essential to identify the types of delays that usually occur in a project. Delays occur due to so many reasons (or, in other words, have various origins); can be compensated or not; and they may appear alongside or subsequently. Further, the influence caused on the project performance may be direct or indirect. Their presence leads to additional cost generation, conflicts among project participants and, in worst-case scenario, litigation where additional costs may be generated. When dealing with the delays, it is not only important to identify delays and quantify the delay effects on project performance but also to identify and quantify the impacts of delays already occurred upon additional project development. In order to regulate responsibility and allow to learning from these undesirable events, the primary causes and source of delays should be identified as well.

The mitigation of construction delays can be achieved by adopting the process of knowledge management and project learning which gives perception into the various problems and their solutions. In fact the lessons learnt response from projects is a real eye opener and helpful for others to avoid similar issues. Prevention of delays by adopting innovative and teamwork helps in planning and analyzing the requirements in detail which will allow the plotting of resources and identifying the risks.

The Real Estate (Regulation and Development) Act, (RERA) 2016 is an Act of the Parliament of India which aims to protect home-buyers as well as help boost investments in the real estate industry. The bill was passed by both the *Rajya Sabha* and the *Lok Sabha* on March 2016. The Act make into law force from 1 May 2016. This act provides for establishing regulatory authorities at the state level to register residential real estate projects and seeks to regulate contracts between buyers and sellers in real estate sector to guarantee sale of plots, apartments or building etc. in an efficient and transparent manner. It also aims to promise greater accountability towards consumers and significantly reduce frauds and delays.

II. OBJECTIVES

- To identify the various causes of delay in construction projects
- To study the impact of delays in construction projects.
- To study how RERA will help to mitigate the delays in real estate industry.

III. LITERATURE REVIEW

Several researchers have studied about the causes of the construction project delays in different countries. The findings of such studies have been reviewed for this research.

Al-Momani inspected causes of delay in 130 public projects in Jordan. The main causes of delay were related to design, weather, site conditions, and late material deliveries, economic conditions and increase in quantity. The study suggested that special

consideration to factors will help industry practitioners in minimizing contract disputes. Delays have strong association with failure and in effective performance of contractors.

El-Razek et al. (2008) identified main causes of delays in construction projects in Egypt concluded that different parties of construction don't agree on the relative importance of different factors of delay, most of them blaming each other of delays using importance index and spearman rank correlation similar to Assaf et al. (1995). He also recognizes the importance of team effort in the success of a project.

Frimpong et al (2001) conducted the research on finding out delay causes in ground water construction projects in Ghana as a case study. The objective was to study and evaluate the factors that contribute to delay and cost overrun in ground water constructions. There were 26 factors affecting construction delays identified from the previous observations their relative importance index were determined.

Assaf and Hejji (2005) a survey was conducted on time performance of different types of construction projects in Saudi Arabia to determine the causes of delay and their importance according to each of the project participants, i.e., the consultant, developer and the contractor. The field survey conducted included 23 contractors, 19 consultants, and 15 developers. 73 causes of delay were identified during the research. 76% of the contractors and 56% of the consultants specified that average of time overrun is between 10% and 30% of the original duration. Surveys concluded that 70% of projects experienced time overrun and found that 45 out of 76 projects considered were delayed.

Doloi H. et al. (2012) did research to analyse factors affecting delays in Indian construction projects. They selected set of 45 attributes. Their research first identified the key factors impacting delay in Indian construction industry and then established the relationship between the critical attributes for developing prediction models for assessing the impacts of these factors on delay. A questionnaire and personal interviews have designed the basis of their research. Factor analysis and regression modelling were used to survey the significance of the delay factors. From the factor analysis, most critical factors of construction delay were identified as lack of commitment followed by inefficient site management and poor site coordination ranked third.

Also for detail overview and study of Real Estate (Regulation and Development) Act, 2016 (RERA) few news articles and interviews referred. Article from The Economic Times by Sunil Dhawan, he interviewed R K Arora (Chairman, Supertech), and other article from NDTV Property by Anuj Puri (Chairman & Country Head, JLL India) as per them the delays due RERA for ongoing projects are the time consumed in obtaining all approvals, delay in getting completion certificate.

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IV. METHODOLOGY

The research methodology for present study contains two steps. At first literature review was made in order to find out the delay causing factors in construction project. From the literature review, 101 causes of delays classified into 9 different groups (Owner related, Contractor related, Consultant related, Design-related, Labor related, Material related, Equipment related, External factors & RERA related). And also find out their different impacts/effects on construction project.

A. Causes of delay:

- *Owner Related*
 1. Delay in progress payments
 2. Delay to furnish and deliver the site
 3. Change orders (plan/design) & extra orders by owner during construction
 4. Late in revising and approving design documents
 5. Slowness in decision-making process
 6. Conflicts between joint-ownership of the project
 7. Suspension of work by owner
 8. Owners lack of experience and involvement
 9. Bureaucracy in client's organisation
- *Contractor Related*
 1. Difficulties in financing project/insolvency
 2. Conflicts in sub-contractor's schedule during execution
 3. Rework due to errors during construction
 4. Conflicts between contractor and other participants
 5. Ineffective & inadequate early planning and scheduling of project
 6. Implementing improper & obsolete construction methods
 7. Fraudulent practices and kickbacks
 8. Negotiations and obtaining of contracts
 9. Inadequate contractor's work & experience & also poor risk management and ignorance
 10. Delays in sub-contractors work and their incompetent which leads to frequent change in subcontractors
 11. Poor supervision & managerial skills and lack of training personnel
 12. Poor estimation of project time and quantities of material required before contracting
 13. Often changing project schedule

14. Unsafe working condition due to improper safety management by the contractor

- *Consultant Related*

1. Poor qualification & inadequate experience of consultant's engineering staff
2. Delay in approving overall designs, shop drawing, sample tested materials and major changes in the work
3. Incompetent/Poor management by consultant
4. Delaying in performing site inspection & testing
5. Consultant's reluctance for change and their inflexibilities

- *Designer Related*

1. Insufficient data collection and survey before design
2. Mistakes and discrepancies made in design documents leads to frequent revisions of drawings/designs
3. Inadequate design team experience & delay in producing design documents
4. Unclear and inadequate details in drawings and also slow response on doubts arising from the drawings
5. Using poor/old engineering design software
6. Complexity of project conception & designing
7. Misunderstanding of owner's requirements by design engineer

- *Labour Related*

1. Shortage of labours
2. Working permit of labours
3. Low skilled/productivity level or unqualified labours
4. Personal conflicts among labours
5. High labour wages insists to hire low amount of labours
6. Labour exodus/evacuated from the region
7. Labour strikes at site
8. .Labour Safety & health problems when working in hazardous conditions and their absenteeism
9. Slow mobilization & demobilization of labour
10. Nationality and language of labours
11. Lack of motivation

- *Material Related*

1. Shortage of construction materials in market
2. Changes in material types during construction
3. Delay in material delivery especially while importing
4. Damage of sorted material while they are needed urgently due to improper storage of materials
5. Delay in manufacturing special-building materials
6. Late procurement of materials/late ordering
7. Quality problem with procured material
8. Procuring undesired or unwanted material instead
9. Problem with material transport and processing at site (lack of adequate space for storing materials in site)
10. Price fluctuation/inflation in material prices
11. Late in selection of finishing materials due to availability of many types in market
12. Sudden increase in quantity needed

- *Equipment Related*

1. Equipment breakdown and their idle time and lack of tool in market
2. Shortage of heavy equipment when needed
3. Low level of equipment-operator's skill
4. Low productivity and efficiency of equipment
5. Wrong kind or verity of equipment/selection
6. Lack of hi-tech, advanced and special equipment
7. Complication of hiring and transporting to the site
8. Limited mechanization due to cheap labour cost in the locality

- *External Factors*

1. Effects of unforeseen subsurface and changing ground condition (e.g. Soil, high water table) factors
2. Delay in obtaining permits from municipality
3. Weather, climate (hot or cold) & rain effects on construction activities
4. Heavy traffic, over-crowd & other restrictions at site
5. Accident during construction
6. Changes in government regulations and laws
7. Unavailability/poor temporary facility of utilities in site (such as water, electricity etc.).

8. Civil unrest/public strikes
 9. Economic crisis
 10. Delay in performing final inspection and certification by a third party
 11. Bureaucracy restriction by government agencies.
 12. Slow site clearance due to restrictions
 13. Work complexity
 14. Litigation b/w various parties in the mid of construction
 15. Poor government judicial system for construction dispute settlement
 16. Security (checking process for quality and other purposes)
 17. Corruption & hostile political conditions and also strikes called by political parties
 18. Effects of social and cultural factors
 19. Original contract duration is too short – Unrealistic time schedule imposed in contract
 20. Lack of motivation for contractors for early finish and ineffective delay penalties
 21. Types of construction contract (Turnkey or design/construction only)
 22. Type of project bidding and award (negotiation, lowest bidder.)
 23. Aggressive competition at tender stage
 24. Short bid preparation time leads to improper bidding by contractor
 25. Land acquisition
 26. Faulty soil investigation report
 27. Delay in finalisation of rates for extra items
 28. Lack of periodic meeting among the management, site personnel and the contractors and also weekly project evaluation meetings
 29. Problem with neighbours
 30. Improper project document management
 31. Lack of database and experience for estimating activity duration and resources required in a new type of construction project
 32. Poor communication and coordination between the participants of the construction project (owners, contractors & sub-contractors, designers, consultants, workers and suppliers) observed
- *RERA Related*
 1. The time consumed in obtaining all approvals
 2. Delay due to re-work of specification area
 3. Delay obtaining completion certificate

B. Effects of delay

1. Schedule Overrun or Time Overrun

Time is the significant project outcome which decides the standard of our work because if we are not able to complete the project within the specified time, there is no use of setting all those time scale restrictions, so it is going to have serious effect on each and every other outcome, so by memorizing that every activity is an interlink and dependent on another activity which will have an impact on the other due to its delay, project can be completed as per schedule, so project review meetings must be conducted at regular time basis.

2. Cost Overrun or Budget Overrun

Cost overrun, which is also referred as budget overrun is directly related to time overrun or schedule delay because when there is a delay in construction project they are either accelerated or there will be an extension in scheduled time for the completion of the project, which clearly results in cost overrun. Here the logic is very simple because organizations need to bear the respective cost of labour, equipment, and tools for the extended period of time. Moreover, if there are any constructions mistakes committed it results in rework and generally, rework requires 10-15% more cost as compared to that of estimated cost. Other reasons leading to cost overrun will include an increase in material cost due to inflation, incorrect estimation of quantities and so on.

3. Disputes or Difference of Opinion

Disputes or difference of opinion arises between the owner and contractor due to several reasons, they may be due to delay in payment by owner or issue of a change order or poor management and supervision of the contractor, like these there are numerous causes as mentioned in the earlier which may lead to disputes. The contract signed parties have various ways to resolve the disputes raised between them like a dispute can be resolved by negotiations, arbitration, and mediation. If the owner or contractor directly wants to solve the issue legally by claiming lawsuit they may defer to litigation where the final decision would be evolved based on proofs and contractual rules.

4. Arbitration

The delays which is caused by the contractor related factors and the factors of consumer related as change in order, documents, mistakes or disagreements in contract and communication is insufficient between various parties which may rise the disputes will

be settled through the process of arbitration. For these situations, it is need to have an expert third party that can settle the disputes easily.

5. *Litigation*

When the delays caused by consumer related, external related, labor related, contract related, and the factors of contract related such as problems with site conditions, delay in payment for completed works, and less of labor supply where eventually rise the disputes to be settled by the litigation process. The comprising of the parties in the construction housing projects use of litigation as a last alternative to settle the disputes.

6. *Abandonment of project*

The abandonment is the most critical impact of time delays in construction projects that could be temporary or in worse condition for permanent period. Obviously, security factors are the main reason to be responsible for this. Likewise, the security conditions are stricter in rural areas where most construction projects are realized. The political instability in the country means also payment difficulties, poor cash flow, and low determination which are essential factors for big-scale international projects. Many of these projects have now become too expensive that they have been abandoned permanently.

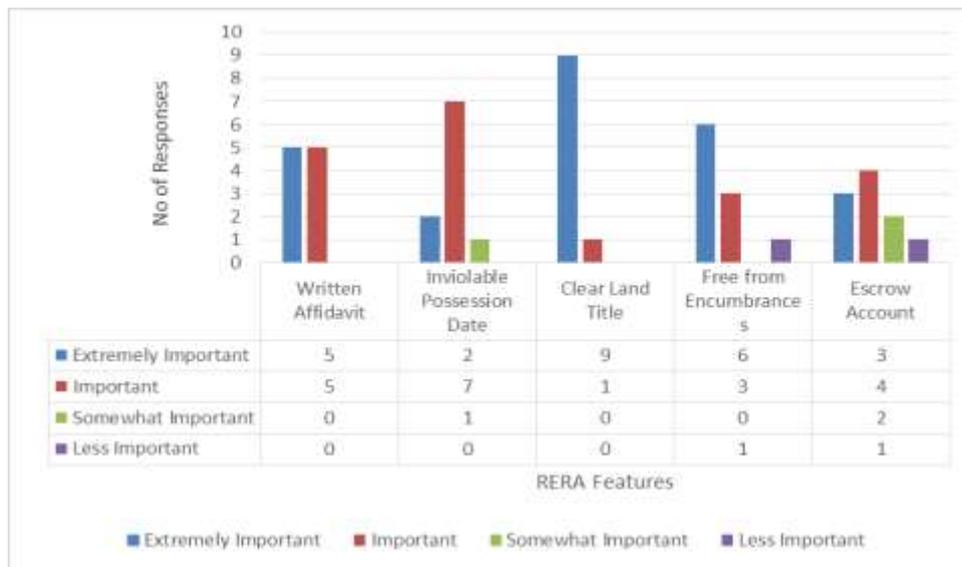
The second step includes preparation of questionnaire based on RERA provisions that are likely to mitigate the construction delays. Respondent are asked to select how important are these features and their impact (Extremely Important, Important, Somewhat Important, Less Important).

➤ Following are six features in RERA that will reduce or mitigate delays in construction projects.

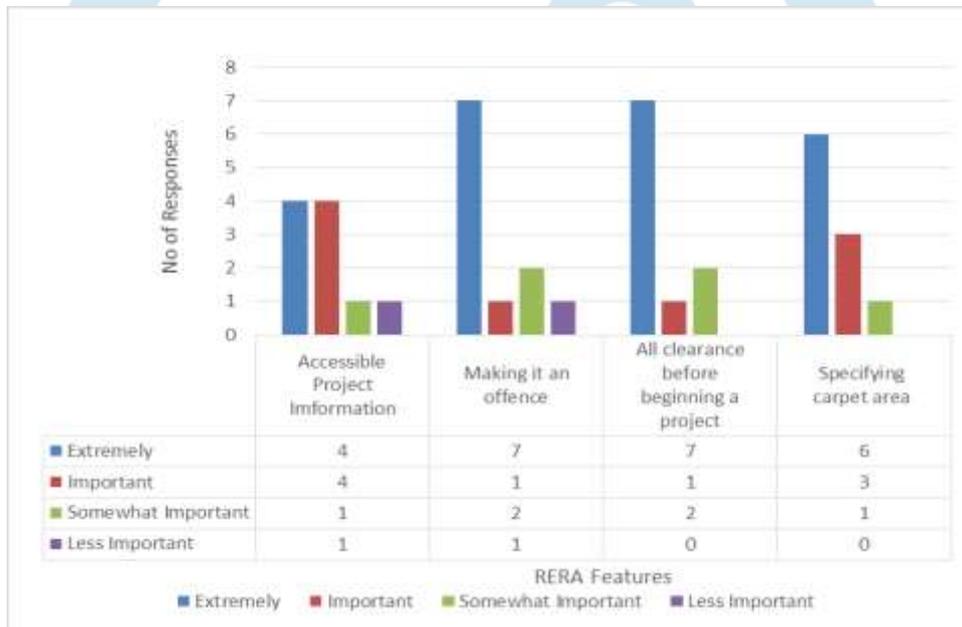
- i. *Written affidavit*: The promoter's promise will now have a legal standing to it. Along with all the required documents, the promoter has to give a declaration, supported by an affidavit stating the time period within which the project or the specific phase will get completed.
- ii. *Possession date will be inviolable*: Further, the 'agreement of sale' will have to specifically carry the date of possession and the rate of interest in the case of any default. Remember, the time period could differ amongst builders.
- iii. *Clear title of the land*: At times, the land on which the project is supposed to be built gets involved in disputes leading to a delay in construction and delivery. A written affidavit has to be provided by the promoter that the legal title to the land on which the development is proposed has legally valid documents with verification of such title if such land is owned by another person.
- iv. *Free from encumbrances*: Frequently, it has been seen that several projects get delayed due to burdens which can restrict the promoter's ability to transfer title to the property. A written affidavit has to be provided by the promoter that the land is free from all encumbrances.
- v. *Maintaining separate account*: Diversion of money or funds has been the most common fear across the construction industry. Now, as per RERA, 70 percent of the amount gathered for the real estate project from the buyers, from time to time, shall be deposited in a separate account to be maintained in a scheduled bank to cover the cost of construction and the land cost and shall be used only for that purpose. The withdrawals from the account will be according to the extent of the work completed after it is certified by an engineer, an architect and a chartered accountant and will be subject to an audit every six-month. Such measures to a large extent are expected to minimize the diversion of funds.
- vi. *Making it an offence*: In case of not obeying to the rules, the builder not only lose the registration of the project but may also be punishable by caging for a term which may extend up to three years or with fine which may extend up to a more ten per cent of the estimated cost of the real estate project, or both. Some states have, however, compounded the offence to avoid protection of the developers.

V. DATA ANALYSIS

The questionnaire survey is conducted through google forms. This google form is forwarded to various participants of construction industry via mail, whatsapp, messaging the link. Total 10 responses are received. Graph No. 1 and Graph No. 2 shows the relation between RERA features with respective number of respondents.



Graph No. 1



Graph No. 2

VI. FINDINGS

1. 50% of respondents agreed that written affidavit by promoter is extremely important to control the delay in construction.
2. 70% of respondents says inviolable possession date of project is important to avoid time overrun of project and delivery of flats should be on committed date.
3. Clear title of land is extremely important to avoid future disputes as per 90% of respondents.
4. The proposed land should be free from any past burdens is extremely important to avoid difficulties during work progress, 60% respondents agreed.
5. Maintaining the separate account with 70% of the amount of the project is helpful to stop the diversion of the money to other projects.30% says extremely important and 40% says it is important.
6. Escrow account will help to avoid delay in progress payments, delay in material & equipment.
7. 70% of respondents says that making an offence to builder and all clearance before beginning a project are extremely important features of RERA

VII. CONCLUSION

1. However The Real Estate (Regulation and Development) Act, (RERA) 2016 is enacted just one and half year ago, so many provisions are not yet came in force. But this act brought better transparency and accountability.
2. This act is helps to mitigate so many causes of delay that are enlisted above.
3. Due to single window approval system it helps to speedy approvals at beginning of project and also at project closure stage.

4. Escrow account is very good concept. It control the diversion of money from one project to another, also the chances of corruption will reduce.
5. Ongoing projects are affected by the RERA. Especially those projects which are project closure stage.
6. RERA is beneficial for both consumer and builder.

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