

EFFECT OF CONSTRUCTION DELAYS ON PROJECT TIME OVERRUN: INDIAN SCENARIO

Ashwini Arun Salunkhe¹, Rahul S. Patil²

¹Post Graduate Student, ²Assistant Professor, Department of Civil Engineering, Padmashree Dr. D. Y. Patil Institute of Engineering & Technology, Pimpri, Pune (Maharashtra, India)

Abstract

The time and cost for performance of a project are usually important to the employer and contractor. About 57% of Indian construction projects are experiencing time overrun. These time overruns always contributed as expensive to all parties. This paper highlights the types of construction delays due to which project suffer time and cost overrun. Construction delay is considered to be one of the recurring problems in the construction industry and it has an adverse effect on project success in terms of time, cost and quality. The construction industry is the tool through which a society achieves its goal of urban and rural development. It is one of the sectors that provides important ingredient for the development of an economy. This paper studies external and internal factors that influence the construction process and outlines the effect of delay in large construction projects. Various media reports shows incidents of extended delays and extensive cost overruns in infrastructure projects. These delayed projects are further can conclude additional delays and this affects an ongoing projects and also new projects which could not be started due to pending projects whose completion date already elongated. Realizing the density of matter this paper studies the performance of previous year 2012 ongoing and also completed projects. These projects are from around 17 various central sectors costing Rs. 1000 crore and above (Mega Projects).

Keywords: Delays, Time overrun, Cost overrun, Megaprojects etc

1. INTRODUCTION

The delay problem in the construction industry is a worldwide phenomenon. Delays occur in most construction projects, either simple or complex. In construction, delay can be defined as the extension of time in the completion of project. In short delay means failure to complete project in targeted time & budgeted cost as agreed in contract. The occurrence of delay is may concurrently with other delays and all of them can impact the project completion date.

However, many projects experience extensive delays and thereby exceed initial time and cost estimates. Construction delay is considered to be one of the recurring problems in the construction industry and it has an adverse effect on project success in terms of time, cost and quality. It is shown from previous studies (Abd Majid and McCraffer (1998), Alwi and Hampson (2003), Assaf and Al-Hejji (2006), Assaf, Al-khalif and Al-Hajmi (1995)) that the failure of any project is mainly related to the problems and failure in performance (contractor, owner) of project which causes delay or time overrun and cost overrun in project. Delays are always measured as expensive to all parties concerned in projects and very often it will result in clash, claims, total desertion and much difficult for feasibility and also it slows the growth of construction sector[5]. Construction is a risky industry with uncertainties

due to many external and internal factors that influence the construction process.

All construction projects undergo several phases that are shown in fig 1. The under development period is before the projects put forward for approval. In development period the projects are put forward and headed towards for approval of it. During construction period project comes to execution of work. Operating/performance period shows the time span of operation and under maintenance period project is continued through maintenance.

The project time overrun and cost overrun problem is faced by numerous countries and the study on the causes of these problems is also conducted such as India (Singh R., 2010), Jordan (Sweis G., Sweis R., Hammad A., and Schboul A. 2008), Nigeria (Aibinu A. and Odeyinka H. 2006), Saudi Arabia (Assaf S. and Al-Hejji S. 2006). In most construction projects, best possible performance are unachievable with poor productivity resulting in time overrun and consequently cost escalation of the projects. The occurrence of delay is may concurrently with other delays and all of them can impact the project completion date. In delay project experiences delays in construction period where different gaps occurred between the actual progress on site work and scheduled work. Hence, projects are failed to complete in construction period as per contract and this failure to achieve targeted time, budgeted

cost and specified quality results in various negative effects. Services provided by infrastructure projects serve as input for other sectors, and cost overruns in these projects lead to an increase in the capital-output ratio for the entire economy.

Delays and cost overruns reduce the efficiency of available economic resources, limit the growth potential and reduce competitiveness of the economy (Singh R., 2010).

A study conducted by Infrastructure and Project Monitoring Division of Ministry of Statistics and Programme Implementation (www.csgm.gov.in) reports on ongoing projects. According to the reports published by programme implementation division of the MOSPI December 2012, more than 44% projects are experiencing time overrun. The Total Original cost of implementation of 205 projects when sanctioned, was of the order about Rs. 645643.20 crore but this was subsequently revised to Rs. 7,62,450.96 crore implying a cost overrun of 18.10% of original cost.

To measure the performance of projects, number of projects who achieved their goal and number of projects who doesn't are analyzed. To improve the performance of project if we could control the single most important factor of schedule delay, the cost escalation can ultimately contained. This paper studies the performance of previous year 2012 ongoing and also completed mega projects and also studies the frequency and magnitude of extended delays and extensive cost overruns of infrastructure projects.

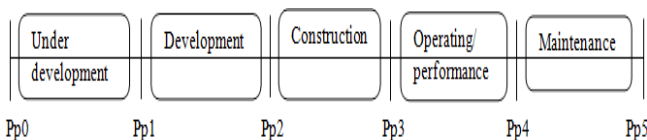


Fig 1: Project phases

2. LITERATURE REVIEW

Delays happen in most construction project; it could be defined as time overrun either beyond completion date specified in contract or beyond the date that parties agreed upon for delivery of project (Assaf and Ai-Hejji 2006).

The project time overrun and cost overrun problem is faced by numerous countries and the study on the causes of these problems is also conducted such as India (Singh R., 2010), Jordan (Sweis G., Sweis R., Hammad A., and Schboul A. 2008), Nigeria (Aibinu A. and Odeyinka H. 2006), Saudi Arabia (Assaf S. and Al-Hejji S. 2006), Hong Kong (Tommy Y., Ivan W. and Karen C. 2006), Egypt (Mohamed M. and Tarek I. 2013), Malaysia (Hamzah N., Khoiry M., Arshad I., Tawil N. and Che A. 2011). In most construction projects, best possible performance are unachievable with poor productivity resulting in time overrun and consequently cost escalation of the projects.

Singh R (2010) studied delays and cost overruns in 894 projects from 17 infrastructure sectors. According to this study, delays are one of the crucial causes behind the cost overrun. The bigger projects have experienced much high cost overrun compare to smaller ones.

Wei K. S. (2010), identified major causes of delays, effects of delays and methods of minimizing delays in construction project in UTM construction project. The most significant group that cause delay is contractor related, followed by client-related and consultant related.

According to Saleh, Abdelnaser and Abdul (2009), construction delay is a critical function in construction project and also one of the biggest problems construction firms face in Libya. In this study, the items of contractor's factors that cause delay and gave ranking based on the mean value criteria. And in further analysis they identified the impact of delay in construction projects i.e. loss of interest by stakeholder, blacklist by authorities, waste of money and time and declination of reputation.

Mohamad M. R. (2010) studies the factors and effects of delay in government construction project. Research indicates that, the most important causes of delay from 45 different causes and 5 different effects of delays. They were cost overrun, rescheduling and rearrangement, litigation, disputes and arbitration.

3. TYPES OF DELAYS

According to Menesi (2007), delays are classified into two different types according to liability: excusable and inexcusable (Fig. 2).

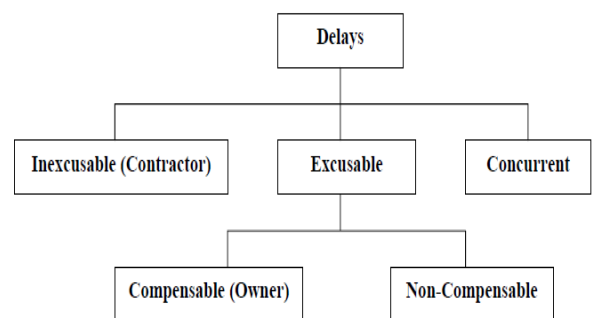


Fig. 2: Types of Delays [8]

Delays that affect project completion date as agreed on contract are considered as critical delays, while delays that do not affect project completion date are known as non-critical

delays. An excusable delay is beyond the contractor control i.e delay due to unforeseeable activity beyond the contractors or the sub-contractors control. Excusable delays without compensation are delays caused by neither the client nor the contractor. Non-excusable delays (NEDs) are within contractor control. NEDs are the responsibility of contractor and the client may be entitled to claim the damages [1].

Only excusable delay can be compensable delay. A compensable delay is a delay where the contractor is entitled to a time extension and to additional compensation. Under non-compensable delay the contractor is not entitled to any compensation resulting from the excusable delay [14].

When the same type of delay happens more than one time, either alone or consequently, impact the projects critical activity schedule, a concurrent delay occurs. The concurrent delay can also be classified as:

Table -1: Classification of concurrent delay according grant to the contractor (Wei, 2010)

Delays that occur concurrently	Entitlement to the contractor
Excusable and non-excusable	Only time extension granted
Excusable with compensation and excusable without compensation	Entitled to time extension but not to damages
Two excusable with compensation	Entitled to both time extension and damages

4. FINDING AND SUMMARY STATISTICS

The programme implementation division of MOSPI (India) publishes flash reports on mega projects having information of central sector infrastructure project costing Rs. 1000 crore and above. Each report contains information of all ongoing, completed as well as delayed projects for respective month. According to these reports during Jan 2011 – Dec 2012 the data of projects suffering time and cost overrun is plotted for that year shown in chart 1 & 2.

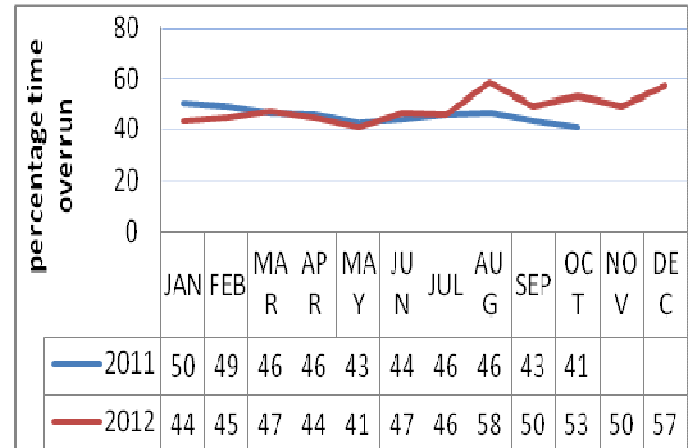


Chart -1: Percentage Time Overrun

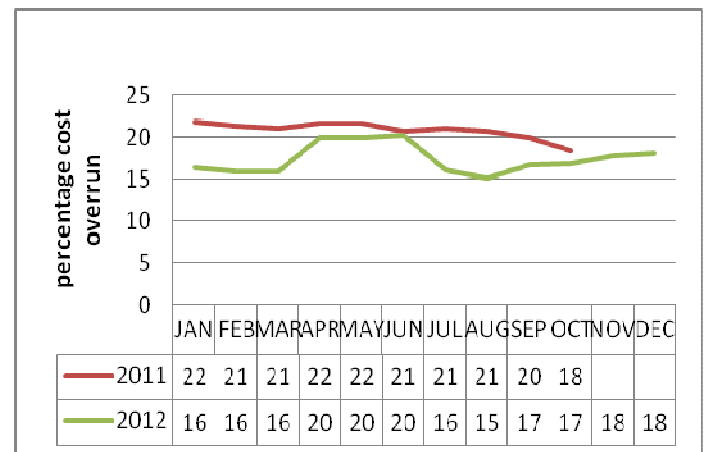


Chart -2: Percentage Cost Overrun

For meaningful summarization it is significant to consider time overrun and cost overrun in percentage instead of definite expression. Chart 1 describes the tendency of percentage time overrun in months for the year 2011 and 2012. The percentages of monthly time overrun for the projects are plotted against the respective months of that year when that delay has occurred. From the chart we can see as compare to year 2011, in year 2012 the time overrun pattern is irregular & it is in ascending order for the full year. In the same way Chart 2 shows the pattern of percentage cost overruns over the year 2011 and year 2012. The degree of cost overrun in 2011 seems to have come down over the months. Likewise the degrees of cost overrun in 2012 is irregular, as we see in April 2012 the percentage cost overrun is suddenly large and in July it come down, further it is increases uniformly. From both the chart 1 and chart 2, it should be seen that in year 2012 the percentage time overrun and percentage cost overrun is comparatively more. According to MOSPI report of Dec 2012, around 57 % projects are experiencing time overrun.

Collectively time overrun for these projects is huge, like out of 205 projects in 2012, around 28 projects are having time overrun in range of 13 to 24 months, 23 projects have delay in range of 25 – 60 months & 14 projects have delay of 61 &

above. In which 5 projects which are experiencing maximum delay and their cost expenditure in percentage is shown in following table 2.

Table -2: Projects Having Maximum Time and Cost Overrun (as on 31-12-2012)

Sr. No.	Name	Sector	Date of commissioning		Time overrun in months	Cost of project (Rs crore)		Cost overrun in %
			Original	Anticipated		Original	Anticipated	
1	UDHAMPUR-SRINAGAR-BARAMULLA(NL),NR	Railways	03/2001	12/2017	201	2500.00	20000.00	700.00
2	BANKURA – DAMODAR (GC) (SER)	Railways	03/2005	06/2016	135	111.90	1028.05	1162.50
3	TAMLUK DIGHA, LINE DOUBLING (SER)	Railways	06/2005	06/2016	132	293.97	1086.41	269.43
4	BELAPUR SEA WOOD URAN ELECTRIFIED DOUBLE LINE(MTP)	Railways	03/2004	03/2014	120	401.81	1512.86	276.51
5	IOR GELEKI (ONGCL)	Petroleum	03/2007	03/2017	120	-	-	-

Source Data: MOSPI 2012

CONCLUSIONS

Time and cost overrun have been a major recurring problem in construction industry. Brief reasons for time overruns as reported by various project implementing agencies are delay in land acquisition, delay in equipment erection, inadequate mobilization by the contractor, delay in forest clearance, fund constraints, change in scope of work, cancellation of tender, law & order problem, delay in supply of equipment, slow progress of civil work, escalation in cost.

Realizing the importance of subject, construction delay not only results in time overrun but also in cost overrun. There are various causes due to which project suffers from these delays. As the project is running on many number of factors & participant, these all are having individual causes. But the important participants like owner, contractor, and consultant have more influence on project performance. Hence the causes of these participants are discussed which will help to improve the project delivery in terms of time as well as cost efficient.

For owner the causes which affect the project are like, changes in plan by owner during construction, less capability of understanding technical terms. Also from the finance point of

view, if owner delays in payment of completed work it is going to affect the further work of project.

Contractor's improper planning & scheduling have more influence on project duration, as well as lack of experience will affect the ability of decision making which will result in rework & financing problems. Consultant's improper drawings, late revising the specification, less coordination with contractor also conclude in project time overrun.

REFERENCES

- [1]. Abd. Majid, M. Z., and McCraffer, R. (1998). "Factors of non-excusable delays that influence contractor's performance". J. Manage. Eng., 14(3), 42-49.
- [2]. Aibinu, A. A., and Odeyinka, H. A. (2006). "Construction delays and their causative factors in Nigeria". J. Constr. Eng. and Mgmt., (ASCE), 132(7), 667-677.
- [3]. Alwi, S., and Hampson, K. (2003). "Identifying the important causes of delays in building construction projects". The 9th East Asia-Pacific conference on structural eng. and constr., Bali, Indonesia.
- [4]. Assaf, S. A., and Al-hejji S. (2006). "Causes of delay in large construction projects". International J. Project Mgmt., Science Direct, 24, 349-357. 4

- [5]. Assaf, S. A., Al-Khalif, M., and Al-Hazmi, M. (1995). "Causes of delay in large building construction projects". J. Mgmt. Eng., 11(2), 45-50. 5
- [6]. Hamzah, N., Khoitry, M. A., Arshad, I., Tawil, N. M., and Che Ani, A. I. (2011), "Causes of construction delay-theoretical framework". Procedia Eng., Science Direct, 20, 490-495.
- [7]. Haseeb, M., Xinhai-Lu, Bibi, A., Dyian, M., and Rabbani, W., (2011). "Problems of projects and effects of delays in the construction industry of Pakistan". Australian Journal of Business and Mgmt. Research, 1(5), 41-50.
- [8]. Menesi, W. (2007). "Construction delay analysis under multiple baseline updates". A Thesis Report.
- [9]. Mohamad, M. R. (2010). "The factors and effect of delay in government construction project (case study in Kuantan)".
- [10]. Saleh, H. T., Abdelnaser, O., and Abdul H. P. (2009). "Causes of delay in construction industry in Libya". The International Conference on Administration and Business.
- [11]. Singh, R. (2010). "Delays and cost overruns in infrastructure project: Extent, causes and remedies". Economics and Political Weekly, XLV(21), 43-54.
- [12]. Sweis, G., Sweis, R., Hammad, A. A., and Shboul, A. (2008). "Delays in construction projects: the case of Jordan". International J. Project Mgmt., Science Direct, 26, 665-674.
- [13]. Tommy, Y., Fung, W. H., and Tung, C. F. (2006). "Construction delays in Hong Kong civil engineering projects". J. Constr. Eng. and Mgmt., ASCE, 132(6), 636-649.
- [14]. Wei, K. S. (2010). "Causes, effects and methods of minimizing delays in construction projects". A project report.

BIOGRAPHIES



Ashwini Arun Salunkhe is a P.G. Student & Lecturer in Department of Civil Engineering, Padmashree Dr. D. Y. Patil Institute of Engineering & Technology Pimpri, Pune – 411018.



Rahul S. Patil is assistant Professor In Department Of Civil Engineering, Padmashree Dr. D.Y.Patil Institute of Engineering & Technology Pimpri, Pune-411018. He is having teaching experience of 12 years. He is pursuing Ph.D. in Transportation Engineering from University of Pune, Pune - 411018