

# A Review on Delay in Construction of Highway with a Case Study of Samruddhi Highway

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**Abstract** – India has world’s second largest road network with total length just short of 6 million. But, the important fact is that more than 70% of the roads are Village Roads and merely 2% of the road length are highways. The present highway network needs a major upgrade in terms of width, pavement quality, design and roadside amenities. Government is very conscious about connecting each and every part of the country by roads but the projects awarded are not getting completed in time. More than half of the infrastructure projects are experiencing cost overruns or time overruns. A recent highway project in Maharashtra for construction of Maharashtra Samruddhi Highway is underway and the project is already been delayed by over two years.

**Key Words:** National Highway, Samruddhi Highway, Delay in Highway Construction

## 1. INTRODUCTION

Humans settled at one place after agriculture and slowly civilisations were formed. After urbanisation, civilisations were differentiated into two categories i.e. rural and urban. Cities started growing at a rapid pace and soon enough need of communication was at peak. India has one of the oldest railway networks in the world but still the preferred mode of transport is roadways. More than 80% of the passenger traffic and 65% of the freight traffic is carried by the national highways of India [das]. The current road network in the country is not enough to fulfil the need of growing traffic and hence a lot of highways are being upgraded. At the same time, various new expressways or economic corridors are being constructed across the country.

### 1.1 Objectives

- To study the current highway network in India
- To identify the causes of delays in construction of National Highways in India
- To carry out a case study on Maharashtra Samruddhi Expressway

## 1.2 Methodology

The research for paper is divided into two parts namely literature review and data collection. The details of road network and highway projects will be studied to identify the problems in highway construction and data will be collected for Samruddhi Highway to see the current progress of work. Various papers related to the highway construction and causes of delays and cost overruns will also be studied.

## 2. LITERATURE REVIEW

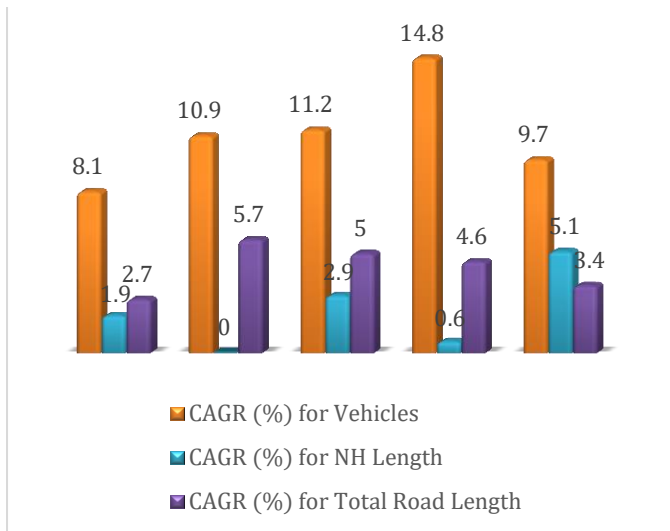
India has a very long road network but it falls short on many parameters as compared to developed countries as seen in Table 1. [NHAI – statistics]

**Table -1:** Comparison of Road Networks

Country	Road Length		% of NH	% Paved Roads	Road Density
	Total	Per 1000 people			
	(km)	(km)	(%)	(%)	km/km <sup>2</sup>
USA	6645709	20.55	0.45	66.02	0.68
India	5897671	4.87	1.94	63.24	1.8
China	4696263	3.41	2.11	75.9	0.49
France	1088089	16.27	0.76	100	1.98
Australia	873561	36.08	20.8	-	0.11
UK	422097	6.43	11.59	100	1.73

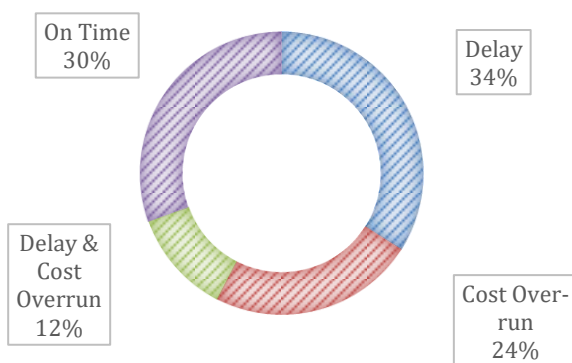
As seen in above table, Indian road network has many short comings like only 2% of NH out of total length, % paved roads are just above 60% and, on an average, only 5 km road length is available per 1000 people. The present road network is not sufficient to fulfill the needs of population in the country and more and more highway projects must be undertaken to improve the economy of the country.

In a report for 11<sup>th</sup> Five-Year Plan, growth of vehicles is given as compared to increase in length of roads in India. From 1951 to 2002, no. of vehicles increased at an annual rate of 11% as compared to 4.3% increase in road length and 5.1% in NH length. Overall number of vehicles increased from 3 Lacs in 1950 to 5.88 Crore in 2001, around 200 times increase in 50 years[11<sup>th</sup> 5 year plan, chand].



**Chart -1:** Growth in Vehicles and Road Length

Government of India has launched several highway projects including Golden Quadrilateral, Bharatmala, Delhi-Mumbai Economical Corridor (1350 km), Delhi-Amritsar-Katra Expressway (600 km), Amritsar-Jamnagar Expressway and Indore-Hydrabad Expressway (713 km). Most of the projects are set to be opened till 2025 but they are lagging behind their schedule.



**Chart -2:** Breakdown of Infrastructural Projects in India

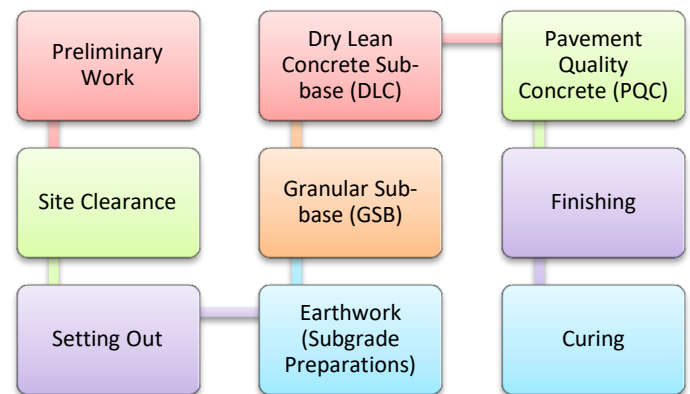
As per Ministry of Statistics and Program Implementations, less than one-third of the infrastructural projects were experiencing either delay or cost overrun or both [mosp]. The major causes identified were problems in land allocations, lack of communication between authorities and environmental clearance. Lack of project management and unavailability of skilled labor also plays a vital role in delay in construction processes.

Construction delays are classified as Excusable and Non-excusable. Excusable delays are caused by faulty decisions

of client or consultant and hence they are compensable. While non-excusable delays are caused by contractor and hence it is responsibility of contractor to bear the losses due to additional time and costs [Uddin, hamraz].

### 3. PROBLEMS IN CONSTRUCTION OF HIGHWAY

Construction of highway is a very complex process with lot of activities which must be dealt properly to achieve efficiency in construction. IRC:15 has specified the construction process of a rigid pavement as:



**Fig -1:** Construction Process of Concrete Highway

Construction process can be easily disturbed due to various factors. Every cause of delay can be categorized on the basis of the responsibility of the delay so that the rules for compensations can be finalized. Some of the common factors causing delay in construction of highway are listed below in their respective category.

#### Delays by Owner (Excusable)

Most of the owner caused factors are depending on change in design, slow decision-making process, conflict between partners, improper documentation, absence of clear instructions and lack of proper consultation, etc. Contractor are eligible for compensation as the delay is caused by client.

#### Delays by Contractor (Non-excusable)

Lack of continuous source of finance, improper site and project management, errors in construction, lack of essential machinery and technology, delay in sub-contractor's work and faulty practices of construction often leads in delaying the project. Since the contractor has caused the delays, no compensation will be provided for delays and contractor will have to make up for lost time and cost.

#### Delays by Nature (Concurrent)

Various natural phenomenon like floods, fire, earthquake, heavy rainfall and some external factors like labor disputes, changes in government policies lead to uncontrollable delay in the project. Sometimes not only the ongoing work comes to a halt but part of the project or entire project needs additional maintenance. Since, neither

client nor contractor are responsible for the same, delays can be excused but not compensated.

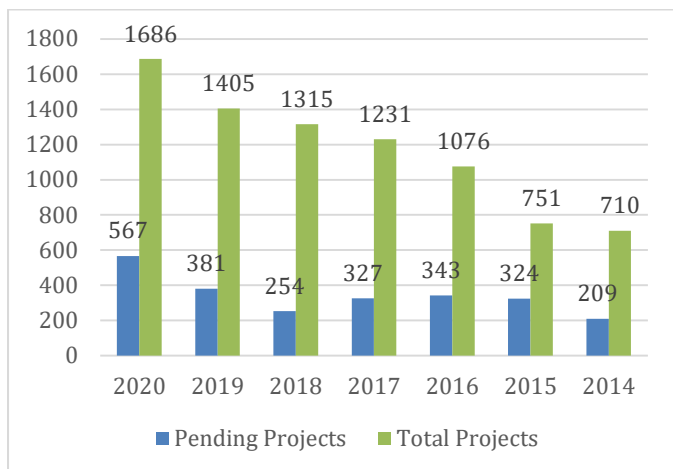


Chart -3: Delayed Infrastructural Projects in India

Table -2: Cost Overruns in Infrastructural Projects

FY	Original Cost (₹) (Cr)	Cost Overrun (₹) (Cr)	% Increase
2013-14	9,24,307	1,79,607	19.4
2014-15	10,28,236	2,05,973	20.0
2015-16	12,38,517	1,55,111	12.5
2016-17	15,59,571	1,71,591	11.0
2017-18	16,23,254	2,18,146	13.4
2018-19	18,09,681	3,30,243	18.2
2019-20	20,66,771	4,05,176	19.6

More than 25% of the projects are failing to meet the scheduled timeline and are putting an extra burden on already stressed economy. Delays in infrastructure project not only impact the project deadline but also budget of the project touches new skies. Over last few years, many infrastructural projects in India are delayed and due to which the cost of the project has also increased upto 20% in recent year of 2019-20.

#### 4. SAMRUDDHI MAHAMARG (EXPRESSWAY)

Samruddhi Expressway is a crucial project for Maharashtra as it connects the two capitals of the state namely Mumbai and Nagpur. A distance of more than 800 kms will be reduced to 701 kms with a travel time of 6 hours. The highway, once complete, will become India's fastest highway with international standards. The highway is connected to Mumbai Delhi Economical Corridor and JNPT Port Mumbai. The financial capital of the country Mumbai and the centre of the country Nagpur are going to be connected using this highway and hence the completion of highway will boost economic condition of Maharashtra

and India also. The expressway will be called "Hindu Hrudaysamrat Balasaheb Thackeray Maharashtra Samruddhi Mahamarg".

The expressway will pass through ten districts, namely Nagpur, Wardha, Amravati, Washim, Buldhana, Aurangabad, Jalna, Ahmednagar, Nashik and Thane. Inter-connecting highways and feeder roads would be constructed to connect all important cities and tourist places along this route. This will connect another fourteen districts, namely Chandrapur, Bhandara, Gondia, Gadchiroli, Yavatmal, Akola, Hingoli, Parbhani, Nanded, Beed, Dhule, Jalgaon, Palghar and Raigad.

Entire stretch of 701 kms is divided into 16 sections and each one of them is awarded separately starting from January 2019. All of the sections have to undergo five categories of works namely Clearing and Grubbing (C&G), Embankment upto subgrade top (EMB), Granular Sub Base (GSB), Dry Lean Concrete (DLC) & Pavement Quality Concrete (PQC)

The construction rate in different section is very much different and even after completing the land acquisition, the project is far from completion and already crossed the deadline of December 2020 [8th review meeting]. As per the site visit in December 2019, the overall status of work is represented in flowing charts for all 16 sections. With an exception of few sections, only clearing and grubbing work has been done properly so far and hence the project is quite lagging behind in the schedule and hence it is evident that the need of project management is quite inevitable.

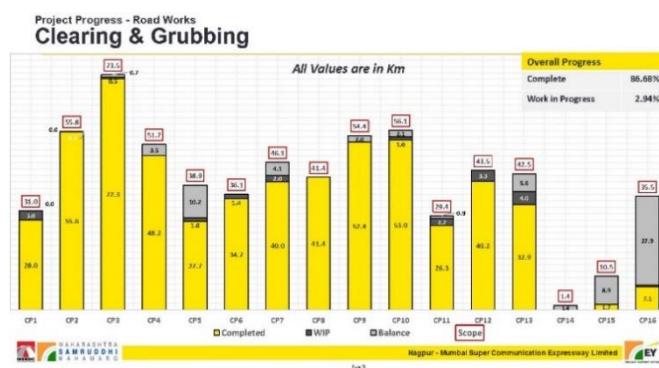


Chart -4: Cleaning and Grubbing

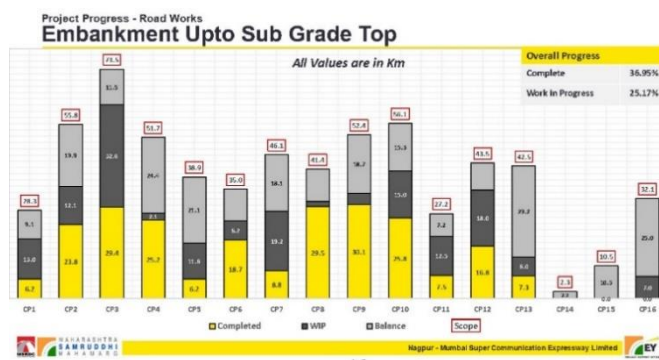


Chart -5: Embankment

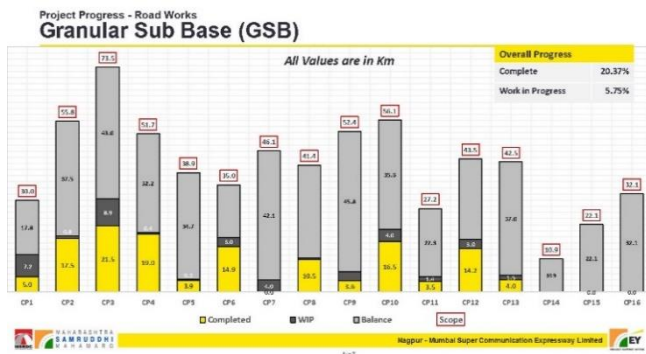


Chart -6: Granular Sub Base

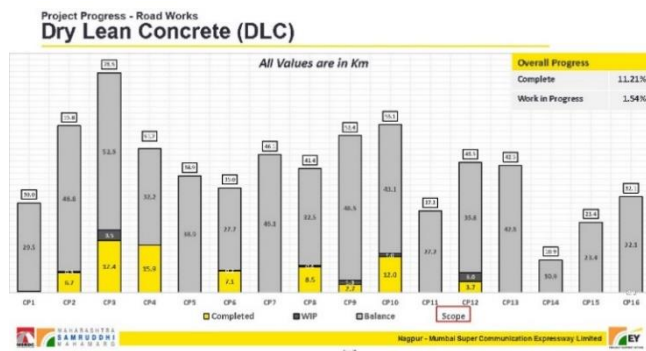


Chart -7: Dry Lean Concrete

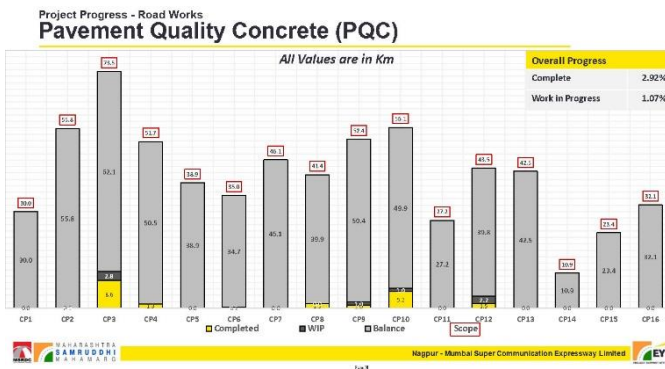


Chart -8: Pavement Quality Concrete

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5. CONCLUSIONS

India ranks among the top countries in terms of road length and density but lags behind in terms of road quality or per capita road length. Also, the percentage of paved roads is quite less in India as compared to France, UK and China. The process of Highway construction is time consuming. More than half of the infrastructure projects are lagging behind their schedule due to some common factors like slow land acquisition, delay in environmental clearance and inefficiency of contractor. Samruddhi highway is an important project for the state but it has been delayed by almost 2 years. Only 70% of the total work is completed after crossing the initial deadline of January 2021 and now the highway is set to be completed until July 2022.