



## Steps are needed to ensure higher safety during the design and construction phase itself.

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### How do you assess the year 2022-23 for the roads and highways sector? How is the sector progressing this year?

The average pace of highway construction in India in 2022-23 has fallen in 2022-23. It fell marginally from 20.89 km/day in FY21-22 to 18.97 km/day in FY22-23 but much lower than the average of 36.5 km/day during FY20-21. In FY23 (until October 2022), 4,060 km of NHs/roads were constructed, which was around 9 per cent lower than corresponding period in FY22. The government had targeted to construct 12,000 km of national highways in FY22-23 but only 10,331 km of it was completed. During the first half of the year, heavy rains and contractual issues dampened the highway creation but fastened land acquisition and quicker appraisal of projects by MoRTH improved the pace in January and February 2023.

The pace of road projects awarded in 2022-23 has also been lower than in 2021-22, with 7,497 km of highway projects being awarded in 2022-23 (till Feb 2023), 121 km lower than 2021-22.

However, there is a large volume of work in progress - road projects exceeding 65,000 km in length, costing more than Rs 11 lakh crores are under construction, of which work in respect of projects of more than 39,000 km length has been completed until Dec 2022 and in the balance length of more than 26,000 km, works are in progress.

### The Budget 2023-24 has allocated Rs 2.7 lakh crore for the roads & highways sector. How do you look at the opportunities for contractors?

A higher budget for roads and highways means that there will be more projects available for contractors and other stakeholders to bid on. This can lead to more business opportunities

and increased revenue. With a higher budget, the quality of the projects can be improved. Contractors can use better materials and equipment, which can result in a higher-quality finished product. This can lead to better reviews and recommendations for contractors, which can lead to more business opportunities in the future. A higher budget can also lead to more jobs in the construction industry. This can benefit contractors, workers, and other stakeholders by providing additional employment opportunities. A higher budget can encourage contractors and other stakeholders to invest in new technology and techniques for road and highway construction. This can result in innovative solutions, better efficiencies, and improved safety.

### What are the factors to be considered to design a road/highway project?

The volume and pattern of traffic on a road determine its width, alignment, and design speed. For instance, a road with heavy traffic requires a wider carriageway, better road surface, and suitable traffic control measures.

The terrain and geology of a region significantly impact the design of a road. The road design should consider the soil stability, drainage, and slope stability. For instance, roads in hilly areas may require extra earthwork, retaining walls, and adequate drainage.

The climate and weather conditions in a region determine the materials and construction techniques suitable for road construction. For example, roads in coastal regions require materials that can withstand the corrosive effects of salt spray.

Environmental factors such as proximity to wildlife reserves, water bodies, and forest areas must be taken into account. Proper measures need to be taken to prevent soil erosion, maintain water quality, and prevent soil contamination.

Road projects exceeding 65,000 km in length, costing more than Rs 11 lakh crores are under construction.

Design standards and guidelines provide guidance on road design elements such as lane width, vertical and horizontal curves, intersection design, and traffic control measures. The design team should consider relevant standards and guidelines during the road design process.

Safety measures such as road markings, speed breakers, lightings, sight distance, guardrails, signage and traffic signals should be incorporated to ensure road safety. The roadway should provide safe and accessible conditions for all users, including pedestrians, cyclists, and people with disabilities.

Road design should take into account the economic viability of the project. The design team should consider factors such as project cost, maintenance costs, and the economic benefits of the road project.

The design of the road should facilitate easy maintenance and upkeep. The road design team should factor in provisions for regular repairs, resurfacing, and maintenance.

### What are the changes needed in the current practices?

India was ranked number 1 among 20 countries for road crashes and reported over 4 lakh road accidents in 2021. The national highways, which constitute only 2.1% of total road length, accounted for 30.3% of the accidents (highest). Thus steps are needed to ensure higher safety during the design and construction phase itself. Currently, MoRTH has prioritised identification and rectification of black spots with the help of local agencies. On 13 January 2023, MoRTH issued a circular with specific guidelines for Road Safety Audit and other action plans for National Highways at all stages (design, during construction, pre-opening and O&M) to ensure safer road infrastructure.

The design of roads and highways should take into account the needs of pedestrians and bicyclists, including the provision of dedicated lanes, sidewalks, and crossings.

Computer modelling and simulation tools can help designers create more accurate and efficient road and highway designs. These tools can simulate traffic flows, predict safety hazards, and evaluate the environmental impact of different designs. By using these tools, designers can test different scenarios and optimize their designs for safety, efficiency, and sustainability.

The design of roads and highways can have a significant impact on the communities they pass through. By involving stakeholders, such as local residents, business owners, and environmental groups, in the design process, designers can ensure that their designs take into account the needs and concerns of these groups.

### How do you look at the trend in the adoption of new-age technologies in road/highway construction?

The use of drones has been mandated by the NHAI for national highway projects at all stages in June 2021. The LiDAR (light detection and ranging) survey is also being deployed for the preparation of detailed project reports and equipment-based testing. The two technologies have helped in optimising the planning process and enhancing the monitoring ability of contractors.

The adoption of building information modelling (BIM) system has streamlined the construction process and encouraged greater collaboration among all stakeholders. BIM emphasizes the integration of processes – specifically the creation and distribution of digital information by all stakeholders throughout the life cycle of the infrastructure asset.

Geospatial technology is also increasingly becoming helpful in monitoring the condition of bridges remotely, especially in difficult terrain.

The Network Survey Vehicle (NSV) carries out a road condition survey on national highways. Lasers are deployed below and above the surface of the road which provides road data covering texture, roughness, geometry and assets like bridges and culverts. It enables planning future expenditure on roads by the officials.

The Data Lake software utilizes advanced analytics, cloud computing, and artificial intelligence to facilitate project execution operations for NHAI's online portal. It tracks project workflows and forecasts delays to expedite decision-making, enabling NHAI to assess financial impacts and avoid disputes. All project documentation, contractual decisions, and approvals are now done through the NHAI's portal.

Tech-enabled technologies like telematics and sensor-based equipment are being used in construction equipment.

### What could be the major trends to look for in future?

The Government of India has made significant efforts to boost infrastructure development by allocating approximately \$1.4 trillion for investment until 2025. This has led to a significant growth in the Indian roads and highways market, which is expected to exhibit a CAGR of 36.16% from 2016 to 2025, mainly due to the government's initiatives to improve transportation infrastructure. Moreover, capacity augmentation work is expected to increase in the coming years, as many high traffic road stretches are approaching capacity. This presents contractors with additional business opportunities. ■

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