

## Precast PSC Segmental Girders – An overview of failures during construction based on some case studies

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### Abstract

Considering faster pace of development, consistent increase in the volume of traffic in developing country like India and limitation of land availability especially in built up or urban areas, lateral expansion in transport facilities has become more challenging. Under such circumstances vertical expansion through construction of long flyover or elevated structures is most viable solution to meet the traffic demand. However, desired quality management, skilled human resources are not keeping pace to meet the requirement of rapid expansion in the field of bridge construction. Road and Railway Bridges are complex in nature w.r.to their design and construction which required a high level of knowledge expertise and experience. Hence, some failures are taking place even during construction of bridges due to some material quality issue as well as human error. Recently failures of some under construction railway and Road Bridge in India have rocked the civil engineering profession apart from public sentiment. This paper mainly covers the issues relating to risk sharing among stakeholders for different mode of Road and Bridge Construction, Role and Responsibilities of Contractor, Engineer & Client, reasons leading to failures of some Precast PSC segmental girders and few suggestive remedial measures.

**Keywords:** Lateral Expansion, Vertical Expansion, Role and Responsibilities, Human Error, Risk Sharing, Precast PSC Segmental Girders.

### 1 Introduction

Bridge structures consist of different parts which require different expertise as well as proper coordination among all stakeholders from conception to completion stage. In respect of bridge construction under FIDIC condition, the design risk was fully shared by the client as well as financial risk for funding the project. But on account of change of mode of Road and Bridge Construction to BOT (Toll) BOT (Annuity) Engineering Procurement (EPC) and Hybrid Annuity Modal (HAM), the entire design risk is shared by the contractor or concessionaire. In this process the contractors are adopting the analysis and design of the bridges with utmost factor of safety and going for adopting the sleek design modal of the structure in the light of available national as

well international code of practices for bridge engineering. On the other hand, in order to meet the fast pace of bridge construction there is a lack in total quality management aspect with respect to use of Imperfect Materials as well as Standard Operating Procedures and human errors. These are some vital reasons for causing failures in bridges during construction. Due to implementation of various mode of bridge construction, wherein risk sharing are mainly done by the contractor, a proper coordination on regular basis are desirable among contractor's designer, proof checker, safety consultant and engineer to bring improvement in quality management and minimizing or avoidance of bridge failures during construction.