

83.92 m Wide Rail Over Bridge – Chipiyana, Gautam Buddha Nagar, UP, India

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Abstract

The paper deals with the planning, design & construction of the widest Rail Over Bridge (ROB) at Railway km. 1429/6-8 between Ghaziabad & Maripat Railway Station on NH-24 at km. 20+213 at Chipiyana, Gautam Buddha Nagar, Uttar Pradesh, India. This ROB is a part of package-II of India's widest, 96 km long, access-controlled Delhi-Meerut Expressway (DME). There is an existing ROB of width 23 m & 60° skew to the main expressway alignment. To provide additional lanes of expressway, new bridges are constructed on the left and right sides of existing ROB. Existing ROB will serve as the carriageway for DME leading to sustainability by utilizing the existing resources. The ROB comprises four new carriageways with three long spans consisting of 115 m steel truss, 74,410 m (61,574° skew) & 66,375 m (58,352° skew) SCC superstructures. This ROB has achieved various milestones such as Launching of 76 m long steel girder assembly, the fabrication & launching of 115 m long steel truss and the construction of 50 m wide portal frame type substructures in an exceptionally high skew angle of around 60°.

Keywords: DME; ROB; Existing Railway Tracks; Steel Truss (Pratt-type); Steel Concrete Composite (SCC); Profile Sheet; HSFG Bolts; Sustainability; Planning, Design & Construction.

1 Introduction

Rail and Road transport in India are the principal mode of conveyance for people as well as goods and plays an important role in the development of industries and agriculture in the country. Indian Railway is the 4th largest railway system in the world, with a total route length of approximately 68,103 km. The Road network in India is approximately 59,00,000 km and is 2nd largest road network in the world after the United States of America. Whenever new highway or expressway is constructed, they often cross the rail track at one or more places and necessitating the construction of a Rail Over Bridge (ROB). In India, Steel Concrete Composite or Steel structures such as Trusses, Bow String are extensively used for ROB structures. Being Costlier than RCC & PSC, Structural Steel have its independent advantages such as:

a). Steel is a highly durable/tensile metal. It can withstand a considerable amount of external pressure with a good load carrying capacity. Steel

structures weigh 60% lesser than concrete. Hence, steel structures are earthquake resistant.

b). The construction process is faster with steel structures as they are easy to fabricate (off-site by professional steel fabricators and then assembled, disassembled and replaced at the site), transport, erect & mass produce. This contributes to faster project completion.

c). Steel structures are an eco-friendly option as are easily recyclable with a good scrap value & versatility.

This paper deals with the planning, design and construction engineering of the ROB which was constructed by NHAI adjacent to the existing ROB between Ghaziabad & Maripat Railway Station on NH-24 at km. 20+213. This ROB is the part of the DME corridor. The ROB have several unique features, most notable amongst them is the fabrication & launching of 115 m long steel truss weighing around 2300 t and the launching of 76 m long steel girder assembly weighing around 215 t.