

Optimal Solution for shallow tunnel at Dwarka expressway

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Abstract

Dwarka Expressway also known as Northern Peripheral Road (NPR) was proposed to be developed as northern ring road thereby providing additional connectivity between Gurgaon and Delhi apart from NH 8, Old Delhi Road, and MG Road. This paper presents Design and Construction aspects of the Shallow Tunnel, an integral segment of the Dwarka Expressway, connecting Shiv Murti Interchange to RUB (CH 1+200 to CH 4+800). The paper focuses on the optimization of construction sequence and its consequential impact on material saving and reduced carbon footprint thereof.

Study carried out demonstrates significant reductions in concrete, steel, and energy consumption. An improved construction sequence leads to cost savings and reduced construction duration but also lowers the project's environmental footprint.

1 Introduction

As part of Development Plan 2031 of Gurgaon Manesar Urban Complex (GMUC), Dwarka Expressway also known as Northern Peripheral Road (NPR) was proposed to be developed as northern ring road thereby providing additional connectivity between Gurgaon and Delhi apart from NH 8, Old Delhi Road, and MG Road. The entire expressway is divided into 4 parts based on homogeneous sections. Out of them, Dwarka Expressway Package I starts from Shiv Murti, NH8 and ends near RUB at Sector 21, Dwarka. It is expected to serve more than 1,60,000 annual average daily traffic in the next 20 years. The entire package length is 5.9kms out of which, the main expressway is an eight-lane divided road of structure type "Shallow Tunnel". The proposed

expressway also provides direct connectivity of New Delhi airport with the residential areas of Dwarka. The entire Package I is aligned parallel to New Delhi Airport and as such AAI had objections to elevated corridor in this zone. This led to the proposal of Shallow Tunnel in this stretch. Shallow tunnels are underground structures where finished road levels are at a shallow depth (10-15m) from the ground level. This tunnel once completed will be one of its kind in India because of its large span and parallel movement of traffic over the tunnel. The existing Dwarka Link Road and service roads will be running over the proposed shallow tunnel and the Link Road will join the proposed expressway at the same level near the existing RUB at Sector 21, Dwarka.