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The efficient use of precast concrete technology in the construction of elevated guideways

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1 Abstract

Several Elevated Transit Guideway projects in congested urban enviroments have been completed in the last 30 years. A lot more will be built in the near future to minimize the use of private cars, avoid traffic congestion and reduce carbon emissions. The use of precast segmental technology has been largely preferred for the construction of these structures for a number of advantages that the technology offers, including but not limited to: aesthetics, fast construction, durability, limited urban impact, low sensibility to construction constraints. In recent projects a some new governing design factors are being considered, such as sustainable construction, health and safety, materials efficiency, longer design life. Purpose of this presentation is to summarise the last thirty-years experience in design and construction of precast segmental elevated guideways, focusing on the key design factors such as: Urban impact, Train system – structure interaction, Noise emission Riding comfort, Design criteria, etc. In addition to the above, new factors that may govern the design and construction of the projects planned for the near future will be presented and discussed.

Keywords: Elevated guideways; precast concrete; precast segmental technology

2 Introduction

The benefits of precast technology and especially precast segmental construction methodology for elevated light rail structures are well known and already discussed in several publications.

Their benefits are revealed through the speed of production in both the manufacturing and assembly of segments, even in highly congested environments. With production typically occurring off-site in a controlled environment, the quality of the pre-cast bridge can be assured with regard to colour consistency, as well as strength and durability requirements. This in turn results with abridge that would require reduced maintenance in the future. This construction method typically has a well-defined and controlled carbon footprint and thus is often regarded as being the right choice in sensitive environmental areas.

By comparing different projects around the world that have utilised the same technology in support of similar train vehicles, it is evident to see that the approach followed by designers is indeed showing significantly different outcomes. Despite the fact that all structures meet the design and performance criteria, some structures are very light and elegant (Figure 1), while others may appear to be more heavy, massive and overdesigned.

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