

Cost and process optimization of precast segmental bridges in Israel

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Abstract

The paper addresses the use precast segment technology for concrete box bridges in the roadway infrastructure of Israel and the fabrication advantages achieved by reuse of segment mould on multiple projects. Ten bridges with different roadway width, superstructure height and span length are presented, showing the variability of the designed section and what modifications are required to the casting mould. Consideration is made for different equipment used in the balanced cantilever construction – gantry or ground cranes. Finley Engineering Group (FINLEY) has provided the design and construction engineering of the noted projects including: superstructure design, post-tensioning design, temporary support system, camber geometry and erection elevations.

Keywords: post-tension, concrete box, girder, casting mold, Israel, external post-tensioning



Figure 1: Precast segmental bridge under construction, using overhead launching gantry (Jerusalem, Israel)

1 Introduction

While for bridges with spans up to 40 m, the designer has a wide range of possible solutions, and many can be largely standardised (e.g. prefabricated girders), for multispan structures with longer spans (40 to 70 m) there are fewer suitable solutions and the variability is hard to achieve.

A popular choice in this case is to use the precast segment technology with balanced cantilever erection method. Using the example of 10 bridges designed in Israel, this paper describes the possibilities of adapting a concrete box section with minimal impact on the cost of fabrication due to consequent plant. The repeated use of the box on multiple projects has provided a major financial