

# Behavior of Large Precast Box Culverts with Prestressing in Longitudinal Slope

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**Abstract.** In recent years, precast products have been increasingly adopted at construction-sites as part of efforts to improve productivity. In the construction of precast products at actual sites, it is necessary to install and construct the products according to the site conditions, but there is insufficient study on the effects of various site conditions on the installation and construction of precast products. Especially, when the precast box-culvert was adopted to the construction-site with longitudinal slope, occurring cracks to axis direction on top face of the culvert and/or to cause falling forward of the culvert have been reported.

In this study, the experimental investigation of the influence of the longitudinal slope on the load resistance and/or of the deformation performance of precast products was performed. Additionally, the difference of the influence of longitudinal slope for the load resistance or the deformation performance of precast box-culvert and on-site casting box-culvert was examined with structural analysis.

From the result of this study, it was confirmed that the stress occurring in box-culvert constructed on longitudinal slope was different with the longitudinal slope and/or loading. However, it was confirmed that the shearing stress caused to each element of precast culvert was similar to that caused to on-site casting culvert by experiment and analysis.

The structural integrity of precast culvert made improve due to introduce PC tension force and due to adjust it, and it was cleared that the behavior of the precast box-culvert can be made similar to that of an on-site casting box-culvert.

**Keywords:** Longitudinal slope, Precast box- culvert, PC tension

## 1. Introduction

They have been widely used in cold regions where the construction period is limited and in reconstruction roads where rapid construction is required, because the precast box culverts are superior to on-site casting ones in terms of quality and construction period. In addition, it will be possible to use high-quality products for a long period of time by using the precast products, and it will play an important role in the sustainable development goals of the SDGs.

From these background of above, many researches about the increase of the demand for precast products and the expansion of utilization of it have conducted.

Large precast box culverts function as a series of structures by connecting many elements of a certain



Fig.1 Water leakage from joint gap

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