



# Load effects of overweight and oversize vehicle traffic on pavements and bridges

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## Abstract

Currently vehicle traffic regulations regarding on axle and total weights in Korea are simple, outdated and different from the regulations in other countries, such as US or European countries. In this study, load effect of over-loaded and special permit vehicle traffic on bridges and pavements are analyzed. Types of typical bridges include concrete and steel girder bridges. Types of pavements include asphalt and cement concrete pavements. Various weigh-in-motion (WIM) truck data are collected and used for comparing overweight ratios. Based on WIM truck data, load effects of various oversize vehicles mixed with common traffic are analyzed for various bridge types. Oversize vehicles include vehicles used in construction field, crane vehicles and transport vehicles for the military purpose. The effect of axle types on pavement design is also analyzed. The results of this study will be the basis of new provisions and regulations regarding on axle and total weights limitations as well as special permit vehicle.

**Keywords:** over-loaded trucks; special permit vehicle; bridges; pavements.

## 1 Introduction

Currently vehicle traffic regulations regarding on axle and total weights in Korea are simple but outdated. Axle weights are limited to 100 kN per axle regardless of the group axles. Total weight is limited to 400 kN per vehicle regardless of the vehicle length or vehicle types. These regulations are different from the regulations of other countries, such as US or European countries. In this study, load effect of over-loaded and special permit vehicle traffic on bridges and pavements are analyzed. Detailed bridge analysis models are developed with finite element methods and verified with experimental work. Types of typical bridges include reinforced concrete, prestressed concrete and steel girder bridges. Various weigh-in-motion (WIM) truck data are collected. Based on WIM truck data, overweight ratios are compared using various axle weight limits.

Oversize or special permit vehicles include vehicles used in construction field, crane vehicles and transport vehicles for the military purpose. Load effects of such vehicles mixed with common vehicle traffic are considered. The common vehicle traffic conditions are evaluated from long-term WIM data. The effect of group axles on pavement design is also analyzed. Types of pavements include asphalt and cement concrete pavements. The results of this study will be the basis of new provisions and regulations regarding on axle and total weights limitations as well as special permit vehicle.

## 2 Review of oversize and overweight vehicle limit

The size and weights of trucks have direct impacts on transportation infrastructures such as bridges and pavements. Since these infrastructures