

# The Elongation Ratio of Korean Pavement Marking Letter Shapes for Legibility

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## Abstract

**Background** The fundamental problem with the pavement marking letter design is dealing with the phenomenon of image distortion by perspective. Because there has been a lack of a systematic way to deal with the problem on Korean pavement marking letters, the outputs have been determined by the installer's subjective design judgement. Ultimately, this causes low legibility. The purpose of this study is to derive the design direction that responds to the phenomenon of image distortion caused by this perspective and to enhance the legibility.

**Methods** Driving simulator and camera glasses were used to conduct legibility comparison experiments. 16 volunteers were asked to read out loud the pavement marking letters when driving 60km/h and 100km/h on average. And the legible distance was found through the recorded driving clips. The pavement marking letters were developed in elongation ratios of 1:4, 1:6, 1:8, and 1:10. Each ratio has two types of thickness treatment in the horizontal stroke. One has no change and the other has a gradual increase in the thickness as becoming far from the driver.

**Results** For 100km/h, the ratio of 1:8 with a gradual increase in the thickness of the horizontal stroke showed the high legibility with the highest economic value. For 60km/h, the ratio of 1:6 with a gradual increase in the thickness of the horizontal stroke showed the highest legibility.

**Conclusions** This study proposes the design direction on Korean pavement marking letters. This is one of the initial steps to deal with the phenomenon of image distortion by this perspective, and we expect to build a robust system in the following steps.

**Keywords** Korean Pavement Marking Design, Perspective, Phenomenon of Visual Distortion, Legibility at Acute Angle, Elongation Ratio

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