



# Safety of horizontal curves on rural roads in Norway

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**Abstract:** Horizontal curves are found on all roads. The relationship between horizontal curves and the number of accidents is complex and no previous studies have examined factors that are potentially influential for accidents. This paper presents a study of horizontal curves on rural two-lane roads in Norway. Accident prediction models including horizontal curves that were not used in any previous study were developed. Most of the variables were found to be related to the number of accidents. Most coefficients were consistent with previous studies, but some findings were surprising. Compound curves, which have a radius that varies throughout the curve, were found to be safer than circular or near-circular curves. A steeper slope of a vertical grade before a curve is associated with fewer accidents.

**Keywords:** accident prediction model, horizontal curve, negative binomial regression

## 1 Introduction

Horizontal curves are found on all roads, although they may be sharper and more numerous on some roads than on other roads. The association between the number of

accidents and the radius of horizontal curves has been studied in many previous studies, but it is not clear how any of the studies have examined factors that are potentially influential for accidents. This paper presents a study of horizontal curves on rural two-lane roads in Norway. Accident prediction models including horizontal curves that were not used in any previous study were developed. Most of the variables were found to be related to the number of accidents. Most coefficients were consistent with previous studies, but some findings were surprising. Compound curves, which have a radius that varies throughout the curve, were found to be safer than circular or near-circular curves. A steeper slope of a vertical grade before a curve is associated with fewer accidents.