Using an oversampling-based classification method and taking bridge structure movement into account, the accident risk variables of a typical long-span bridge were assessed.

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Introduction

Major transportation corridors, including long-span bridges, connecting core cities in coastal areas have played an important role in lowering highway traffic mileages, enhancing city cooperation and exchanges, easing traffic congestion, and supporting regional economic development. However, as traffic volumes and truck proportions increase, the risk of serious accidents on long-span bridges has increased dramatically in China. According to data, the number of traffic accidents on typical long-span bridges in China has increased significantly in recent years.

Due to large truck percentages, inclement weather conditions, and especially the physically dynamic bridge structures, which is one of the unique factors of long-span bridges, traffic accidents on long-span bridges have associated specific characteristics when compared to traffic accidents on ordinary highways. Furthermore, when a significant accident happens on a long-span bridge, emergency crews find it extremely difficult to carry out rescue missions, increasing the risk of more catastrophes. Numerous research have been conducted in connection to road crashes; nevertheless, despite the pressing need to lower the accident rate on long-span bridges, correlational studies are still limited due to the limitations of bridge characteristics monitoring systems and the lack of collision data on bridges.

More research on the causes contributing to bridge accidents, particularly the unique features of bridge wrecks, is needed in order to develop more effective safety management measures. The majority of China's long-span bridges have recently been fitted with advanced structural health-monitoring and information management systems. It is now simpler to gather real-time and fine-scale data on bridge structure movement and traffic accidents, making it possible to undertake more thorough safety-related research on long-span bridge incidents. The major goal of this study, based on the current data, is to add to the literature on the evaluation of risk variables associated with the potential of a crash using data from a typical long-span bridge (Jiashao Bridge, China). Weather, traffic volume, alignment features, and notably bridge vibration are all potential influencing factors. It should be mentioned that road accidents are uncommon occurrences. An oversampling-based classification system is created for greater accuracy in order to solve the issue of rarely available accident data.

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