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The Performance of Epoxy Asphalt Steel Deck Pavement on a Cable-Stayed Bridge Was Investigated In An Experimental Investigation.

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Introduction

The construction of large-span steel bridges in China has advanced dramatically in the last two decades. There are significant difficulties buried behind the large-scale building of orthotropic steel plate bridges in China in recent years. The most serious issues are fatigue degradation to the orthotropic plate construction and deck pavement durability. The structural anisotropy, complicated construction, and multiple welds of the orthotropic steel bridge deck are all features.

Local tension and deformation are also quite complicated when a vehicle is loaded. In China, the main bridge of a cable-stayed bridge is 2088 metres long. The main span used an orthotropic steel bridge deck with a length of 1088 metres and a width of 35.4 metres. The cable-stayed bridge's steel deck is made of double-layer epoxy asphalt concrete with a total thickness of 5.5 cm. The lower pavement layer has a thickness of 25 mm, while the upper pavement layer has a thickness of 30 mm. Many diseases have emerged in the epoxy asphalt concrete pavement layer over the last ten years, affecting the pavement layer's service life. As a result, it was worthwhile to investigate and assess if the performance of an epoxy asphalt concrete pavement layer can still meet service requirements within the design life in a longterm traffic situation. The majority of studies on the endurance of epoxy asphalt mixtures concentrate on indoor fatigue tests, which mostly comprise indirect tensile and bending fatigue tests.

In 1967, American Metcalf used a composite beam model he built to evaluate bending fatigue on conventional asphalt concrete and epoxy asphalt concrete. The fatigue performance of epoxy asphalt was significantly superior to that of regular asphalt concrete in the service of steel deck pavement. Fondriest investigated the fatigue performance of composite beams with various steel deck thicknesses and pavement materials. The span-to-deflection ratio of the composite beam without damage was used to test the fatigue performance of asphalt concrete. When the temperature was higher than 48°C, there would be no fatigue damage due to the high flexibility of thermoplastic and thermosetting materials. Even though the thickness of epoxy asphalt concrete pavement was only three-quarters that of conventional asphalt concrete, its fatigue failure was still significantly superior. The deflection of composite beams, on the other hand, has changed to some extent, increasing by about 25%. Under fatigue, longitudinal cracks in the steel bridge deck pavement occurred not only at the top of the stiffener, but also in the compressive stress area between the ribs, according to Japanese researcher Hime Kenji. In China, research on evaluating the performance of asphalt pavement during operation is still in its early stages, although there are numerous relevant evaluation test methods and comprehensive equipment.

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