



The durability of Finger Type expansion joints for Penang Second Bridge with Comparison studies based on expansion joints for bridges in Malaysia & around the world

Dato' Thomas Chong Seng Shia

Managing Director – Hercules Group of Companies, Selangor, MALAYSIA

Contact: info@hercules-engineering.com

Abstract

The cost of maintenance & replacement of movement joints in bridges around the world have been a major concern for all government authorities and highway operators. Damaged movement joints not only impaired serviceability of roads & bridges, it also causes losses of income to the government authorizes / operators and most critically, legal suits by the public due to failure to provide public safety.

This paper is aimed to provide more technical information for further improvement in the quality & durability of movement joints. The various types of movement joints installed in bridges in Malaysia and around the world will be presented. The causes of failures will be analyzed together with replacement cost comparison. A case study using the example of Penang Second Bridge will also be presented.

Keywords: Bridge, expansion joint, finger joint, joint failure

1 Introduction

Bridge joints play a critical role in the overall performance of a bridge structure. The type of deck joint selected for a bridge structure is generally dependent on the type and magnitude of motion of the joint is required to accommodate. Bridge joint can be designed to provide for longitudinal and transverse movement as well as the rotation caused by the thermal expansion and contraction, shrinkage and creep, and other loading conditions.

2 The common types of bridge joint in Malaysia

- Asphaltic Plug Joint
- Elastomeric Bridge Joint
- Strip Seal Joints
- Finger or Saw-tooth Type
- Modular Joint

The most common type of bridge joint in Malaysia is the elastomeric type with bolted connections. Opinions vary as much on this type of bridge joint. Like so many other details in a highway bridge, the decisions on which type of joint to be used based, to a great extent, on subjective rather than functional issues. Some bridge authorities such as Singapore Land Traffic Authority completely removed the usage of this joint from their standard specification due to maintenance nightmare whereas the Malaysian Public Works Department - JKR specification still believes this type of joint as economical and therefore installed in most of the bridges in Malaysia.

Owner and the design engineer who must decide which type of joint best suited for the particular operation. Although they are often relegated to only part of the final drawing, the deck joints play a significant role in the overall performance of a bridge and highway. In making this decision, bridge