



Expansion joints subjected to extreme movement conditions - the particular challenges

Thomas SPULER

Civil Engineer, BSc
mageba Switzerland
tspuler@mageba.ch

Thomas Spuler, born in 1956, received his civil engineering degree from the Polytechnic of Brugg, Switzerland.

Today, he is the General Manager of mageba with headquarters in Switzerland. He is a member of the European expert team for Road Bridge Expansion Joints (EOTA).

Gianni MOOR

Civil Engineer, MSc, MBA
mageba Switzerland
gmoor@mageba.ch

Gianni Moor, born in 1968, received his civil engineering degree from the Swiss Institute of Technology in Zurich, Switzerland (ETHZ). Further, he received an MBA degree from the Business School IESE (Barcelona, Spain). Today, he is Deputy General Manager of mageba (Switzerland).

Thomas BRÜGGER

Civil Engineer, BSc
mageba Switzerland
tbruegger@mageba.ch

Thomas Brügger, born in 1967, received his civil engineering degree from the University of Regensburg. After having worked as engineer and project manager in various industry sectors in both Germany and New Zealand, he is now a senior project manager at mageba (Switzerland).

Summary

The paper gives a brief introduction into the world of large bridge expansion joints, their special needs and the particular challenges they present.

A special focus is given to the experience gained when designing, manufacturing, shipping and installing modular expansion joints for the Run Yang Bridge, China's largest and the world's third largest suspension bridge. With its 27 cells, the larger of the bridge's modular expansion joints facilitates longitudinal movement of 2,160mm, at the time the largest ever installed, anywhere in the world.

Keywords: Expansion joint, design, fatigue, load cycle, movement characteristics, lifetime, traffic safety, performance, life cycle cost

1. Introduction

Large bridges require expansion joints which can facilitate correspondingly large movements of the bridge deck relative to its abutments, and as the field of bridge engineering develops, with ever-increasing spans, the demands on expansion joints for such bridges continue to increase. Figure 1 illustrates how bridge spans have increased in recent decades, resulting in greater demand for expansion joints which can facilitate extreme movements.

Modular expansion joints are often best suited to satisfy these demands, but face a number of particular challenges due to scale in the case of very large bridges. This paper investigates these challenges, and describes the project to provide the world's largest expansion joints for the Run Yang Bridge in China.

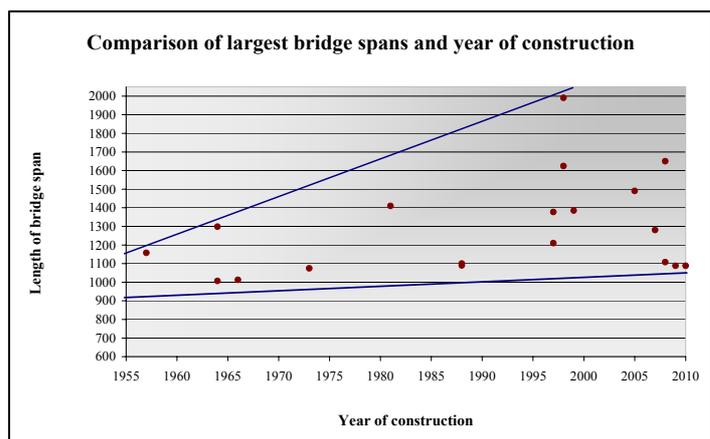


Figure 1: Representation of increasing spans of bridges in recent decades.