Novel engineering solutions for incremental launching of bridges on low-friction materials: case studies of Nowra and Sydney Gateway bridges in Australia

Michal Ambor, Laura Farina, Mauro Sartori
Freyssinet Products Company, Milan, ITALY

Nikolaj Pedersen
Freyssinet Australia, Sydney, AUSTRALIA

Contact: michal.ambor@freyssinet.com

Abstract

Bridge erection by sliding or incremental launching is well appreciated when crossing obstacles like heavy-traffic infrastructures that cannot be temporarily closed, difficult-to-access areas such as rivers or deep valleys, or even environmentally protected sites. Thanks to casting or assembling of structure on a dedicated area with good access conditions, it considerably improves workers’ safety.

This article describes the development of novel launching equipment featuring sliding material of fluoropolymer type, vulcanized to engineered rubber components and placed on mechanical articulated supports. Various laboratory tests were performed to validate the solution and define friction factors, which were later confirmed during site operations.

Case studies of application in launching of concrete multi-span double-T deck of Nowra Bridge and steel arch bridges of Sydney Getaway are presented.

Keywords: incremental launching; skidding shoes; heavy loads sliding material; friction test; bearings; extension of lifespan

1 Introduction

1.1 Introduction to launching of structures

The traditional principle of incrementally launched bridges is to build the bridge deck in segments in a casting bed located behind the abutments of the bridge, and gradually push the bridge incrementally until the superstructure is completed [1] [2].

This makes incremental launching a good option when there is limited access under the bridge, for example over water ways or otherwise inaccessible terrain.

The launching technique is used extensively in traditional incremental launching of concrete superstructures, but also used for launching of steel structures.

Sliding of structures using low-friction materials is a key part of construction of bridges in general, but in incremental launching it is key to have precise and reliable of the friction between the sub- and superstructure, to make accurate planning and optimize the launching equipment.