



Design of movable scaffolding systems for seismic events – A practical case

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Abstract

It is a common request for Movable Scaffolding Systems (MSS) to be designed to withstand wind loads, despite the site location. In contrast, seismic events aren't frequently considered while designing an MSS. Unlike wind loading, seismic events are very rare and with characteristics difficult to predict – therefore, the concept of operational limits or emergency safety devices is not applicable. In case of bridges located in hazardous seismic zones, seismic events should be taken into account while designing the MSS. The most critical phase is the concrete pouring stage, in which the mass is maximum. In this stage, vibration frequencies are largely dependent from the MSS type (overhead or underslung) and the MSS support configuration. This paper is focused on MSS design to withstand seismic events. Considerations on load evaluation, combination criteria and design options are given, based on a practical case.

Keywords: Bridge Construction, Movable Scaffolding Systems, Seismic Design.

1 Introduction

It is a common request for Movable Scaffolding Systems (MSS) to be designed to withstand wind loads, despite the site location. Normally, two different types of wind speeds are considered, resulting in different loading scenarios:

i) Extreme events, in which the wind speed is evaluated with a given return period and considering environmental factors such as regulatory zones, orography, roughness and bridge height. Extreme events are usually predictable with some days of anticipation, enabling the possibility of installing safety devices such as additional bracings, if necessary.

ii) Operation scenarios, in which an operational limit is established for the wind speed (normally 40km/h average wind speed) – special operations such as concrete pouring or MSS launching are forbidden when wind forecast indicates that wind speed is likely to surpass operational limits.

In contrast, seismic events aren't frequently considered while designing an MSS. Unlike wind loading, seismic events cannot be adequately predicted in advance – therefore, the concept of operational limits or emergency safety devices is not applicable.