



Portal and cantilever sign/signal gantries – Inspection and retrofitting

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Abstract

This paper presents an experimental work about the condition and maintenance ratings of portal and cantilever sign gantries in Portugal, in which an extensive inspection campaign (about 1500 structures) was carried out. According to the results obtained, approximately 35% of the sign structures present insufficient condition rating, requiring priority repair works. The critical anomalies registered were lack of tightening/absence of connection elements, incorrect geometry of connection system and structural collapse of steel plates and profiles. Additionally, an inventory campaign was carried out, allowing to perform a structural design verification of approximately 80% of the inspected structures. Based on the structural analysis performed, a significant part of the existing portal and cantilever frames present structural strengthening or replacement needs and, consequently, these of structures require monitoring actions.

Keywords: Sign/signal gantries; Steel structures; Inspection; Structural design verification.

1. Introduction

In Portugal, the management of road and highway structures is primarily focused on the most important and valuable assets, such as bridges and carriageways. This type of asset management system is also used in many other countries. In opposition, the management of sign structures in Portugal has been done in a reactive manner, presenting low level of data systematization and poor asset management systems.

Presently, portal and cantilever sign gantries have been designed mainly taking into account its use and, in practical terms, the implementation of design aspects is frequently done in a less strict manner. Also, it should be noted that the condition rating of sign structures is not systematically monitored (*i.e.*, generally unknown). Consequently, recent structural collapses of portal and cantilever frames have been reported as a result of insufficient condition

and maintenance ratings and unexpected wind actions.

With the purpose of avoiding this type of problems, a significant inventory and inspection campaign was carried out, which was complemented by structural design verification. This paper presents a general assessment of the condition and maintenance ratings in a significant part of existing sign structures in Portugal.

In this context, it can be affirmed that Betar presents remarkable background knowledge about sign structures, supported by more than ten years of inspection works in Portugal and Spain (more than 2000 structures) and an even longer experience in asset management. In this context, it should be mentioned that the present paper is based on approximately 1500 portal and cantilever frames, located in 14 different roads all over Portugal.