

Case Study of Pathological Manifestations of Neoprene Support Devices in Infrastructure

Felipe R. Gonçalves^{1a}, Lais A. Alves², Assed N. Haddad^{1b} and Elaine G. Vazquez^{1c}

¹ Escola Politécnica, Department of Civil Construction, Universidade Federal do Rio de Janeiro (UFRJ), Technology Center, Av. Athos da Silveira, 149 CT – Sector A, 2^o floor, 21941-909 – Cidade Universitária, Rio de Janeiro, Brazil, felipe.rezende@poli.ufrj.br, assed@poli.ufrj.br, elainevazquez@poli.ufrj.br

² Department of Civil Construction, Federal Center of Technological Education Celso Suckow da Fonseca, Av. Maracanã, 229 Sector E, 2^o floor, 20271-110 - Maracanã, Brazil, lais.alves@cefet-rj.br

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1 Introduction

The culture of inspection and maintenance of road bridges, railroads and viaducts in Brazil is recent, being from the 80's the first studies of pathologies in the structures (Araujo, 2017). There is a specific standard for the inspection work on bridges, viaducts and concrete walkways, ABNT NBR 9452 (2016). A bridge bearing is the structural member to be installed in the connecting portion between superstructure and substructure. Bridge design is based on whole bridge analysis model, which the bearing functions are reflected. When the bearing functions deteriorate, it is possible for structural system of the bridge to be changed and have an effect on functions of superstructure and substructure (Sakano, Shivasaki, 2016).

This paper aims to present approaches towards improving some specific infrastructure maintenance principles, strategies, models and practices, based on a recent study to evaluate the pathological manifestations in neoprene support devices, of the structures currently under maintenance of *MetrôRio*.

2 Methods

In the methodology the following steps were used: survey of the viaducts, elevations and bridges existing in the subway railway; selection of structures to be inspected; selection of criteria used in the evaluation of pathological manifestations; conducting visual inspections based on ABNT NBR 9452 (2016); and suggestions for future interventions.

3 Results – Case Study of Pathological Manifestations, Their Causes and Treatments in Neoprene

The object of case study was the support devices and their surroundings. The elevations between São Cristóvão and the MetrôRio Maintenance Center and between the Triagem and Maria da Graça stations are the oldest in the system, and their construction dates back to the late 1970s, or about 35 years of operation. Elevated TRG -MGR is mostly located between the Triagem (TRG) and Maria da Graça (MGR) stations and starts after leaving the Bernold tunnel next to the Mangueira Olympic village. It was found that most of the support devices (269 units)

inspected at this stage were classified as being in a regular state of conservation (72%). Poorly classified support devices total 78 units (21%), 9 units (3%) were considered in good condition and 5 critical support devices (1%), as shown in Fig. 1.

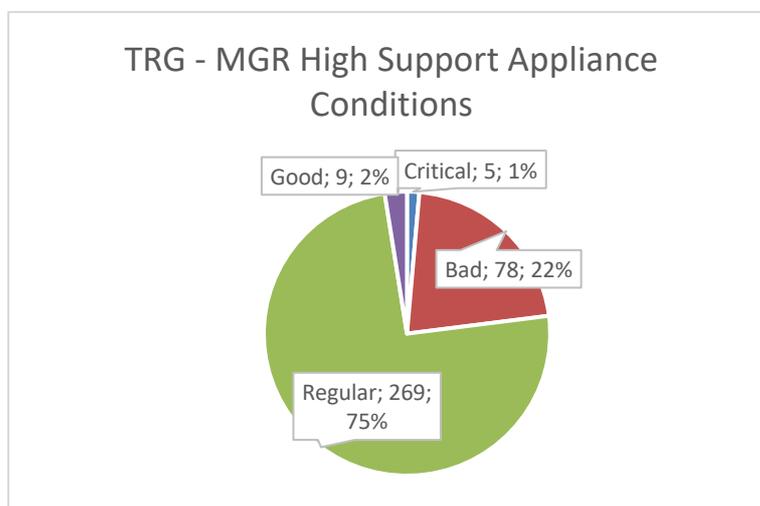


Figure 1. Support Device Conditions - TRG – MGR.

4 Conclusions

The inspection processes took place in accordance with the literature found, allowing great inputs for subsequent decision making. Thus, the pathological manifestations were quite explicit. Even with breakage and charring exposed in the corrosion process, the devices can still perform satisfactorily without causing movement restriction of the part. But in these cases, annual monitoring is essential to follow up on a case-by-case basis to make sure that the performance and operation of the chartered neoprene parts is still adequate.

With the definition of the pillars that concentrated the largest number of critical devices, aiming at a better use of the operation, the decision was made to replace 12 units, from the perspective of urgent replacement. Tables 6 to 10 present a summary of the main pathological manifestations, degree of risk, possible cause and indicated treatment.

ORCID

Lais Alves: <https://orcid.org/0000-0003-0543-2374>

Assed Haddad: <https://orcid.org/0000-0002-4793-0905>

Elaine Vazquez: <https://orcid.org/0000-0002-7262-6753>

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