



## Framework for the Management of a Large Stock of Earth Retaining Structures

**João Amado, Luís Freire**

*Infraestruturas de Portugal, Lisboa, Portugal*

**Filipe Amarante dos Santos**

*CERIS, ICIST and Faculdade de Ciências e Tecnologia da Universidade NOVA de Lisboa, Caparica, Portugal*

**Contacting author:** [joao.amado@infraestruturasdeportugal.pt](mailto:joao.amado@infraestruturasdeportugal.pt)

### Abstract

With a view to the development of a life-cycle approach to earth retaining walls, as well as an optimal management of the road assets as a whole, this paper presents a novel framework for the assessment of a large stock of earth retaining structures in a context of limited financial and human resources. In order to adequate the system for the number of structures to be managed a large inventory campaign was previously conducted. These results and how they helped to shape the framework are briefly discussed. Being a proposal for a systematic management of infrastructure assets it was developed according to Business Process Management discipline, namely the Business Process Model and Notation, as specified in the standard ISO/IEC 9510:2013. The developed framework is considered as a management process, with specific intervenient, interrelated activities, specific inputs, and standard outputs.

**Keywords:** Earth retaining structures, quality control plans, business process model, inspection, assessment, infrastructure management systems.

### 1. Introduction

Bridge Management Systems and quality control plans for bridge assessment are widely known, available and used worldwide. However, concerning earth retaining structures, few management systems are known and the literature related to this specific topic is scarce. Infraestruturas de Portugal (IP) is the state-owned Portuguese general concessionaire for roadways and railways, managing over 5.300 roadway bridges and more than 13.000 kilometres of motorways. Despite bridge and road pavements management systems have been implemented for several years with significant results, the

management of earth retaining structures (ERS) remains as a reactive approach, instead of the preventive approach made possible by the implementation of periodic assessments and long-term planning [1].

In view of the development of a quality control plan and a management system (MS) for this type of assets, Estradas de Portugal, S.A., the former general concessionaire for roadways, performed an inventory campaign along more than 13.000 kilometres of highways and motorways. Several concepts and definitions were necessary to establish the terms of a detailed and standardized inventory. These concepts and criteria were developed prior to the inventory campaigns and