



Standardization of structural performance monitoring: existing documents and open questions

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Abstract

Structural Performance Monitoring is usually carried out using indicators to assess the current (diagnosis) or future (prognosis) structural performance concerning specified limit states. The assessment requires the definition of threshold values of the indicators that correspond to the considered limit states. Traditionally, the identification of indicators of the structural condition through continuous and autonomous measurements is addressed as Structural Health Monitoring (SHM). In this paper, a critical review of the existing documents on structural monitoring standardization is carried out, and open research issues and practical hurdles related to the standardization are discussed. The review shows that most of the SHM guidelines and technical codes published in several countries worldwide before 2010 only tackle the diagnostic process. More recent documents explicitly include also the decision-making for integrity management. This evolution in the monitoring purpose reflects a change in integrity management objectives, increasingly driven by the optimization of resources allocation rather than by safety requirements. Further to this, digitalization, and the availability of large volumes of monitoring information, open research avenues related to their use as decision support tools for asset integrity management.

Keywords: SHM, performance monitoring, standardization, guidelines, information.

1 Introduction

Structural Performance Monitoring (SPM) is intended as the process that continuously extracts information about structural performance. The objective of SPM is to support decision-making for asset integrity management and is usually carried out using indicators to describe and assess the current (diagnosis) or future (prognosis) structural performance concerning specified limit states. Whereas condition monitoring can be carried out with data-driven approaches, the forecast of the structural performance needed for prognosis requires the development of performance models, able to forecast the evolution of the structural state and its indicators under future loadings and

degradation processes. The reliability of performance models using monitoring information to adjust them. Structural Health Monitoring is Traditionally, the diagnosis is addressed as Structural Health Monitoring (SHM). In the last 20 years, SHM guidelines and technical codes have been published in several countries worldwide. Most of the documents published before 2010, only tackle the diagnostic process. More recent documents explicitly also include the prognosis and the decision-making for integrity management. This evolution demonstrates not only a shift in the monitoring purpose but a more profound change in the integrity management objectives, increasingly driven by the optimization of resources allocation more than by safety requirements. Further to this, digitalization and the consequent availability of