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# The Economic Case for Extension Using Service Life SHM

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The economic case for extending the service life of structures using the combination of testing and structural health monitoring (SHM) is very strong. In the US it is estimated there are 70,000 structurally deficient bridges [1]. Surprisingly, 12,000 have no deficiency other than a low load rating, with only 6 reported to have a rating based on load testing [2]. Bridges that are load tested are often, but not always, found to have higher load capacity than estimated by analysis [3-6]. The underestimate of capacity may stem from the careful application of safety margins due to uncertainty about materials and construction. It may also stem from over simplified structural analysis, inaccurate modelling of boundary conditions and the load bearing capacity of "non-structural" elements, as observed in the Swiss bridge system [6]. However, once results from testing are available, it is the updated estimate of the capacity that is the most appropriate to use. It can also be argued that testing and monitoring could be used for deficiencies other than load capacity, such as fatigue damage. Therefore, one can conclude that the service life of many structures could be extended through testing to ensure capacity and the application of monitoring to ensure ongoing capacity and safety. The economic return of extending service life in this manner is very high as the yearly borrowing cost for even modest structures significantly exceeds the cost of typical SHM system. In this talk several examples of the applications of this principle will be given. In addition there will also be a discussion of the research needs to broaden the application of SHM for service life extension.

Доклад. Конференция по мониторингу технического состояния гражданских сооружений (CSHM-4), «Системы мониторинга технического состояния сооружений, обеспечивающие продление срока службы сооружений». Ноябрь, 2012. Берлин. Германия.

**Ключевые слова:**

## Содержание

Abstract

References