



## **Remote Monitoring of Infrastructure at Risk due to Hydrologic Hazards and Scour**

Eftychia Koursari (1), Stuart Wallace (2), Manousos Valyrakis (3), and Panagiotis Michalis (4)

(1) Amey Consulting, Structures, Glasgow, United Kingdom (Eftychia.Koursari@amey.co.uk), (2) Amey Consulting, Structures, Glasgow, United Kingdom (Stuart.Wallace@amey.co.uk), (3) School of Engineering, University of Glasgow, Glasgow, United Kingdom, (4) Canary Wharf Consulting LTD, London, United Kingdom, (5) Transport Scotland, United Kingdom

Scour and other hydraulic actions can lead to the instability of Highway Structures.

BD 97/12 Standard, “The Assessment of Scour and Other Hydraulic Actions at Highway Structures” is available by the Design Manual for Roads and Bridges (DMRB), advising the assessment of all of Transport Scotland’s Highway Structures crossing or adjacent to watercourses. Reactive Structure Safety Inspections and Special Inspections are carried out for structures identified as particularly at risk of scour to ensure structures remain fit for purpose following rising water levels.

A Scour Management Strategy and Flood Emergency Plan is implemented to safeguard infrastructure at risk and the travelling public against catastrophic scour, as well as uplift on bridge soffits and bridge deck damage caused by hydrodynamic actions, among others. Current practices include the implementation of marker plates on structures, marking the design return period flood levels or the maximum capacity of a structure. In the event of water levels exceeding the permissible level, restrictions of structures and road closures are enforced. At present, the structures are monitored by inspectors conducting site visits during periods of severe weather conditions to identify restrictions required to be applied until water levels have receded.

This study discusses the introduction of an operational sensor-based monitoring system which allows remote monitoring and provides real-time data on water levels at all sites at risk. Such a system will allow the update of current practices, enabling accurate, sensible decision making to restrict structures and implement full road closures, ensuring safety, as well as allowing timely removal of road closures. Furthermore, the implementation of such a monitoring system will minimise the requirement of inspectors being exposed to high-risk environments.

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