CONTRIBUTION OF INNOVATIVE TECHNIQUES FOR CONDITION ASSESSMENT OF HISTORICAL AND ICONIC STRUCTURES

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SUMMARY

Owing to ageing and environmental changes issues, condition assessment of historical and iconic structures contributes defining relevant maintenance programmes, adapted retrofitting actions. Their results also constitute essential long-term structural and architectural records. Here, we illustrate how innovative techniques address these important issues taking into account accessibility and operation constraints as well as specific structural and aesthetical features.

In this frame, three real cases are presented in this paper: a drone inspection of inaccessible structural elements of Mirabeau Bridge built towards the end of the XIXth century over the Seine River in Paris, a structural condition assessment using three-dimensional laser scanners triggered by a fluvial barge shock on Sully Bridge, a 143 years-old metal bridge over the Seine River in Paris, and the SHM (Structural Health Monitoring) system implanted since 1989 in the iconic Louvre Pyramid in Paris.

Keywords: Historical and iconic structures, 3D laser scanner and drones, Structural Health Monitoring.

1. MIRABEAU BRIDGE

1.1. Context

The Mirabeau Bridge, built towards the end of the XIXth century using similar construction techniques and materials as the Eiffel Tower, crosses the Seine River in Paris. Since then, Mirabeau Bridge had to adapt to a constant evolution of fluvial and road traffic as well as to changes of environmental conditions.



Fig. 1. Overviews of Mirabeau Bridge.

In 2017, in the frame of its preventive and corrective maintenance programme for bridges, Paris City Authority ordered a preliminary retrofitting project for Mirabeau Bridge. This project, managed by a France Heritage