VIRTUAL SMART STRUCTURES AND DYNAMICS LAB

EXPERIMENT 4

PHOTOGRAMMETRY FOR DISPLACEMENT MEASUREMENT

OBJECTIVES

This experiment aims to use the photogrammetry technique to determine structural deflections. Photogrammetry relies on image processing to derive meaningful real-life information.

EXPERIMENTAL METHODOLOGY

This experimental setup is shown in Fig. 1. It consists of a simply supported aluminium beam which acts as the structure undergoing deflections. A stationary reference frame with two marks A and B 100 mm apart is fixed above the beam. The reference attached to structure is at the mid point of the beam and marked as C. The beam is loaded at regular intervals of one hour throughout the day with varying loads, resulting in varying deflections. Simultaneously the photographs of the deflected positions of each loading can be taken online using the camera link in the main page of the experiment (http://strlab.iitd.ac.in/SSDL/exp4.html).

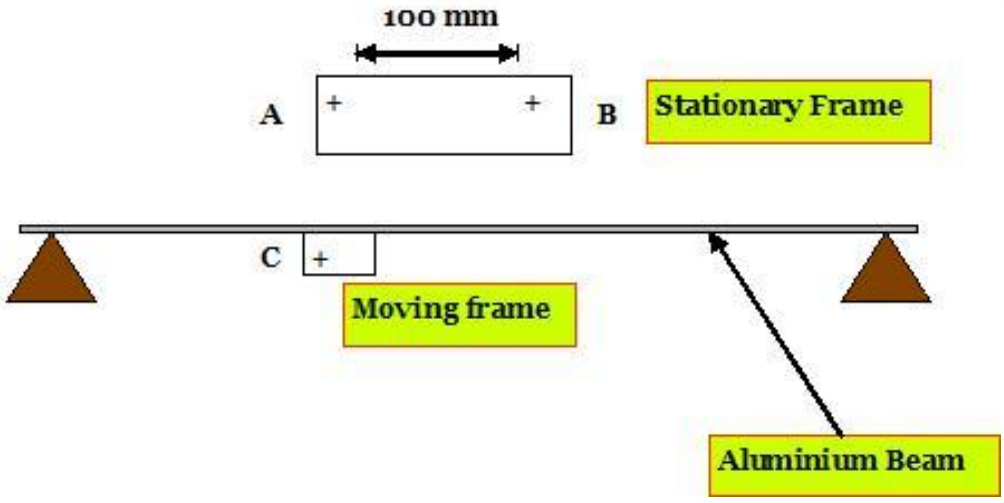

Fig. 1 Experimental set up

The photographs can be analysed for deflections using MS paint or MS word. The pixel reading of the Normal drawn from C to AB can converted into deflections of C in mm, making use of the fact that the real distance between points A and B is 100mm.

The concept can be extended to structural dynamic problems also by taking pictures at a very small interval, say one hundredth of a second, and analysing them using the computer.

REFERENCES

Jauregui, D. V., White, K. R., Woodward, C. B., Leitch, K. R. (2003), "Noncontact Photogrammetric Measurement of Vertical Bridge Deflection", Journal of Bridge Engineering, ASCE, Vol. 8, No. 4, pp. 212-222.