

DAYANANDA SAGAR COLLEGE OF ENGINEERING

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DEPARTMENT OF CIVIL ENGINEERING



CERTIFICATE

This is to certify that Mr.ASHWIN.V.A (USN: 1DS08CV016),
Mr.CHETHAN KUMAR.K.L (USN: 1DS08CV024),
Mr.HARISH.J (USN:1DS08CV034), and
Mr.NANDISH.S.K (USN: 1DS08CV065) has
successfully completed the dissertation work entitled “**DETECTION OF
DAMAGE IN STEEL STRUCTURES USING SMART MATERIALS
(PIEZOELECTRIC SENSORS) AND WIRELESS NETWORKS
(TELOS-B MOTE)**” in partial fulfillment of the requirements for the award of
the degree of **BACHELOR OF ENGINEERING in CIVIL ENGINEERING**
of **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM**, during
the academic year 2011-2012.

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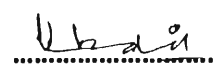
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Name of the examiners:

Signature with Date

1.  8/6/2012

 12/06/12

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ABSTRACT

Civil infrastructure systems deteriorate generally in an uncontrollable speed. Inadequate Operation, physical aging, and natural as well as manmade hazards threaten the safety and functionality of these systems. To assess the short-term impact due to hazards (earthquakes, Tsunami, blast etc) and the long-term deterioration process due to physical aging and routine operation, continuous condition assessment and performance-based maintenance of civil infrastructure systems are necessary. Structural health monitoring (SHM) has been introduced into the regime of civil engineering as a potential and effective methodology for such an assessment. The fundamental principle of the method is that the existence of damages results in the changes in structural properties, such as mass, damping, and stiffness. These changes will alter both static and dynamic behaviors of structures and thus can be detected by measurements through distributed sensors.

There is ample evidence that the state-of-the practice is not sufficiently qualified to address daunting problems related to the safe and efficient performance of infrastructures with current approaches to feasibility analysis, financing, design, construction, operation, protection, inspection, maintenance and renewal. Study realizes the importance of multidisciplinary research and education initiative that will be “field-centered”, i.e., ground on the reality of actual operating infrastructures. Especially, concerns related to protecting infrastructures against hazards have been further emphasized. CIVIONICS is a new term coined from the integration of Civil-Electronics, which is derived from the application of electronics to civil structures.

In the present work the structural elements like cantilever beam and portal frame are considered for monitoring . Both the structural elements are analysed through the experimental tests for both healthy and damaged conditions . the healthy structure is connected to TELOS-B MOTE through piezoelectric sensor . The structure is subjected to free vibration and the data is collected , then the structure is damaged by creating crack in the structure and experiment is repeated and the data is collected . Graphs are plotted for healthy and damaged conditions , comparisons are made and conclusions are drawn.

The same methodology can be adopted for mega structures to detect damage in the structure to analyze their behaviour and to monitor them in an accurate and cost effective manner.