CENTER FOR INFRASTRUCTURE ENGINEERING STUDIES

Acquisition of Integrated Testing System for Civil Construction Materials and Structures Phase I & II

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UTC
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16. Abstract

The new state-of-the-art structural engineering research/education laboratory and the requested equipment will benefit students and faculty in the Civil Engineering Department as well as students and faculty from other academic departments such as Aerospace Engineering, Engineering Mechanics, Electrical Engineering, Mechanical Engineering and Mining Engineering. Faculty in these departments are actively pursuing and conducting interdisciplinary research projects and have been successful in obtaining the support of private industry as well as state and federal agencies. The primary areas of research, research training, and educational activities that will be supported by the proposed equipment are: (i) structural testing of components and subassemblies; (ii) earthquake engineering and intelligent control of smart structures; (iii) use of advanced materials and FRP composites in construction; (iv) repair and rehabilitation of structural components in aging aircraft; (v) behavior of cold-formed steel structures; and, (vi) behavior of reinforced/prestressed concrete structures.

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FINAL REPORT

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The University of Missouri-Rolla (UMR) acquired a state-of-the-art equipment and associated instrumentation to increase access and promote research, research training, and integrated research/education activities primarily in the area of civil infrastructure engineering. The requested equipment will support activities that are in line with the research and educational goals of the University.

The new state-of-the-art structural engineering research/education laboratory and the integrated testing system will benefit students and faculty in the Civil Engineering Department as well as students and faculty from other academic departments such as Aerospace Engineering, Engineering Mechanics, Electrical Engineering, Mechanical Engineering and Mining Engineering. Faculty in these departments are actively pursuing and conducting interdisciplinary research projects and have been successful in obtaining the support of private industry as well as state and federal agencies. The primary areas of research, research training, and educational activities that will be supported by the equipment are: (i) structural testing of components and subassemblies; (ii) earthquake engineering and intelligent control of smart structures; (iii) use of advanced materials and FRP composites in construction; (iv) repair and rehabilitation of structural components in aging aircraft; (v) behavior of cold-formed steel structures; and, (vi) behavior of reinforced/prestressed concrete structures.

The equipment and instrumentation consists of: (1) three hydraulic actuators with servo-controlled valves capable of static, fatigue, dynamic and high-velocity testing; (2) hydraulic service manifolds and hydraulic power pumps; (3) electronic control system; and, (4) high-capacity data acquisition system unit. UMR faculty members are actively pursuing research/education activities at the national and international levels that address some of the world's needs for the development of modern design and repair methodologies for civil infrastructures. These research/education activities demand equipment capabilities that far exceed current levels in the state of Missouri and/or at nearby regional universities. Additionally, the newly constructed and equipped laboratory will allow UMR and its centers of excellence in attracting significant corporate

and government research funding and draw a larger number of graduate and undergraduate students to pursue careers in engineering.