



Arab American Association of Engineers & Architects

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## JOINT DINNER MEETING

### ARAB AMERICAN ASSOCIATION OF ENGINEERS AND ARCHITECTS (AAEA) ASCE ILLINOIS SECTION - STRUCTURAL GROUP

### INSPECTION, LOAD TESTING AND RATING OF IN-SERVICE BRIDGES

By

**Moussa A. Issa, Ph.D., P.E., S.E.**

Chief Structural Engineer

HBM Engineering Group, LLC

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This presentation will discuss the procedure of load rating existing bridges through non-destructive load testing, and the utilization of existing Finite Element Analysis (FEA) software packages to evaluate the load carrying capacity of in-service bridges.

Many of our nation's bridges are, or suspected to be, structurally deficient. In many cases, the proper rating of a bridge cannot be achieved by present methods of analysis. Bridges of questionable strength that are posted for lower loads or are scheduled to be replaced can be examined through a load test. The information collected from such a test can be analyzed to evaluate the true strength of the structure. This information can be used in making decisions on the future of such bridge. The Federal Highway Administration (FHWA) requires states to consider all possible alternatives, including rehabilitation, before approving bridge replacement. In spite of all attempts to police loads, overweight vehicles do use our roads and bridges everyday. Furthermore, higher loads are expected in the future. Therefore, we need to know actually what loads our bridges can carry safely. Bridge load testing will allow a satisfactory overall strength evaluation of any bridge under question.

The objectives of these bridge tests are (a) to rate existing bridges; (b) to design and evaluate the repairs of damaged bridges; and (c) to diagnose the bridge behavior for some special issues, such as live load distribution and dynamic impact factors. These field measurements and FEA are invaluable sources for checking the design code specifications.

The information collected from such testing is analyzed to evaluate the true strength of the bridges and to arrive at proper ratings. Proper load rating eliminates some unnecessary retrofitting/demolishing and identifies unsafe conditions. The experience gained from these field tests has consistently indicated that structures have greater residual strength than indicated by analysis or design.

### **Bio.:**

Dr. Issa has over 25 years of engineering experience in the field of structural design and analysis of bridge/building structures, construction problems, personnel management and as university professor. He conducted full-scale static/dynamic bridge load testing/rating to identify and solve serviceability and load capacity problems of old and new bridges by using traditional and advanced composite materials. He performed destructive/nondestructive testing of concrete and steel structures, applied research on structural and high performance materials, bridge/building inspection and maintenance, prestressed concrete, short/long term instrumentation and data acquisition, and linear/nonlinear modeling of structures using finite element analysis and engineering mechanics. He is a registered Structural Engineer and Professional Engineer in the states of Illinois and Florida. Dr. Issa has published several refereed papers in professional journals and technical reports in his field.

Date: Wednesday, February 28, 2007

Time: 5:30 p.m. Social

6:00 p.m. Dinner

7:00 p.m. Presentation (PDH: 1 Hour)

Place: University of Illinois at Chicago (UIC)

ERF "Engineering Research Facilities"

842 West Taylor Room # 1047, Chicago UIC

Cost: \$15 / \$5 Students – RSVP before COB Tuesday, February 27, 2007

\$20.00 – at Door

RSVP: Via e-mail or phone by Tuesday, February 27, 2007

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