



## Department of Civil Engineering Seminar

### **Principles of Good Infrastructure Management Are Not That Much Different from Those We Apply in the Management of Our Own Health**

Dr. Nenad Gucunski

Professor and chairman of Civil and Environmental Engineering, Rutgers University

**Friday November 1, 2019, 12:45-1:45PM @ Bingham 103**

**Lunch and discussion at 12:00PM at Bingham 102 (Vose Room)**

#### **Abstract**

Effective and economical infrastructure management requires, among others, accurate condition assessment and monitoring on both local and global levels, and preventive maintenance and early intervention. These principles are examined and illustrated in the management of bridges, reinforced concrete decks in particular, a bridge component that in most cases deteriorates the fastest. Faster concrete bridge deck deterioration is primarily due to the direct exposure of decks to traffic and environmental loads, and to them related maintenance activities. At the same time, the complexity of deterioration processes requires application of multiple nondestructive evaluation (NDE) and other technologies to fully and accurately describe the condition, and likely causes of deterioration. Significant advances were made in the ability of NDE technologies to detect and characterize deterioration, and their automation in both data collection, and analysis and interpretation. This enabled more objective description of the current condition, and prediction of deterioration progression in bridge decks. However, it was also shown that, even in cases of bridges of a very close age, similar traffic loads, designs and climatic conditions, there may be significant differences in their performance. There are clearly additional influences that require a complementary use of NDE for local and global assessment, and structural health monitoring (SHM) to provide complete answers regarding those differences. The presentation will provide an overview of the benefits stemming from periodical multi-NDE technology surveys for bridge management, especially from the use of rapid and fully automated data collection and analysis processes. It will also describe ways for further knowledge creation regarding bridge performance through a complementary use of a diverse range of technologies in the recently constructed BEAST (Bridge Evaluation and Accelerated Structural Testing) Facility at Rutgers University. Finally, efforts in the use of robotics in early mitigation of concrete deck delamination will be described.

**About the speaker: Dr. Nenad Gucunski** is professor and chairman of Civil and Environmental Engineering, and Director of Infrastructure Condition Monitoring Program at Rutgers' Center for Advanced Infrastructure and Transportation (CAIT). His primary expertise is in nondestructive testing/evaluation (NDT/NDE) of transportation infrastructure, problems of dynamic soil-structure interaction, and geophysical methods. Dr. Gucunski published more than 300 publications, primarily on various aspects of development of NDE/NDT technologies, and their application and automation. He is/was leading more than thirty important infrastructure related research projects. Dr. Gucunski is an active member of a number of technical committees of several professional societies, and the past chair of the ASCE's Geophysical Engineering Committee. Dr. Gucunski and his team are the recipient of the 2014 ASCE Charles Pankow Award for Innovation for the development of RABIT (Robotics Assisted Bridge Inspection Tool) for bridge decks. Dr. Gucunski received his B.S. degree in civil engineering from University of Zagreb, Croatia, and M.S. and Ph.D. degrees in civil engineering from The University of Michigan.

