

The background of the entire page is a photograph of a modern highway bridge. The bridge has a concrete overpass on the left and a metal mesh safety barrier on the right. The road surface is dark asphalt with white lane markings. The sky is blue with some white clouds. A tall street lamp is visible on the left side of the bridge.

WESTERN SYDNEY
UNIVERSITY



Centre for Infrastructure
Engineering

**BRIDGE ENGINEERING
AND ASSET MANAGEMENT
(BEAM)**



Bridge Engineering and Asset Management (BEAM) at the Centre for Infrastructure Engineering (CIE) is a world class facility at the leading edge of bridge infrastructure. BEAM has expanded engineering research into the highly specialised areas of:

- Life cycle management of bridges
- Health monitoring and remediation planning.

BEAM offers highly specialised engineering consulting and research capabilities aimed at identifying practical and efficient solutions to clients' needs in the field of bridge engineering and management. This includes:

- Inspection
- Condition assessment
- Structural analysis
- Health monitoring
- Maintenance and rehabilitation
- Planning and priority ranking.

This expertise is delivered to corporate, government and community clients.

THE BEAM TEAM OF HIGHLY SPECIALISED EXPERTS

BEAM has professional and dedicated team members who have a strong theoretical background and practical expertise in structural analysis, condition assessment, health monitoring and rehabilitation planning.

PROF. BIJAN SAMALI

Prof. Bijan Samali is a Professor of Structural Engineering and received his Doctor of Science from the George Washington University in 1984 in the area of Structural Dynamics. With over 32 years of academic and consulting experience, Prof. Samali was instrumental in securing a \$95,000 grant awarded by the RTA (now RMS) of NSW and AUSTRROADS for research on development of assessment technologies for management of bridge assets complemented by a further \$120,000 grant from Institution of Public works Engineering Australia to continue the work on developing cost effective techniques in maintaining and managing timber bridge assets. This work led to winning two major local government awards. Over the period 2008 - 2010 Prof. Samali also secured a \$286,000 grant from the RTA (now RMS) of NSW to develop a model for the assessment of the future condition of bridges. Prof. Samali has been involved in testing and analysis of over 300 timber, concrete, steel and composite bridges in NSW amounting to 600 spans. The work was commissioned by over 30 local governments in NSW.

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BRIDGE ENGINEERING AND ASSET MANAGEMENT (BEAM)



Left to right: Dr Mirza, Prof Samali, Dr Ancich, Dr Rashidi, Dr Zhu

DR. ERIC ANCICH

Dr. Eric Ancich PhD, FIEAust, CPEng, MIABSE has over 15 years' experience in structural dynamics, bridge rehabilitation and technically unique bridge projects, with much of this work being related to fatigue in steel bridges. Dr. Ancich pioneered the application of experimental modal analysis techniques coupled with dynamic strain gauge measurement and finite element modelling in RMS for the investigation of bridge fatigue issues. During his time with RMS, he directed the dynamic (load) testing of a number of steel and concrete bridges, including but not limited to; Peats Ferry (Hawkesbury), Anzac, Hunter Expressway, and Mooney Mooney Creek. Over the last 15 years, Dr. Ancich has been at the forefront of bridge technology and innovation and this has been reflected in four of his projects being finalists in the Engineers Australia Sydney Engineering Excellence Awards (2004, 2005, 2006 & 2009). In addition, as a member of the Hunter Expressway Project Team, he was the recipient of a 2014 NSW Government Transport Award in the Delivering Innovative Solutions Category.

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DR. OLIVIA MIRZA

Dr. Olivia Mirza is internationally recognised in shear connection for composite steel and concrete structures. Currently the Chief Investigator for an ARC Discovery Project looking at the use of innovative anchors for the achievement of composite action for rehabilitating the existing and deployments in constructability and sustainability of steel structures. Dr Mirza consistently works with local government and private sectors in the area of composite concrete and steel bridge girders. Through collaboration with Transport for New South Wales, and RMS Dr Mirza as team leader is currently looking at repairing, rehabilitating and retrofitting the existing bridges in NSW. Her role is to lead a research group to further develop the shear connections technology and its promotion to industry, and to provide professional advice to industries, with the proposed projects having an immediate application to bridges for industry and government authorities. One such project in 2014 was to replace timber transom with an innovative design on Sydney Harbour Bridge, this project went on to win the Engineering Student of the Year Sydney Engineering Excellence Award 2014.

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DR. XINQUN ZHU

Dr. Xinqun Zhu has extensive experience in Bridge Weigh-In-Motion and Bridge Health Monitoring, and was a chief investigator of the ARC Discovery project: "The use of innovative anchors for the achievement of composite action for rehabilitating existing and deployment in demountable steel structures". Dr. Zhu was also the Partner Investigator of three National Science Foundation China projects and one Hong Kong Research Grant Council project on condition assessment of bridges. Part of his work as a Research Fellow at the University of Western Australia involved the ARC Linkage Project with Main Roads WA. This gave him practical experience in dealing with structural condition assessment related problems. Currently, Dr. Zhu is the leading chief investigator of the ARC Discovery project "Development of a novel mobile sensory system for bridge health monitoring", this research is to provide a rapid and cost-effective screening evaluation of a large population of bridges using data collected from a purpose-built vehicle equipped with sensors.

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DR. MARIA RASHIDI

Dr. Maria Rashidi is an expert in structural engineering and asset management, with her recent research focused on life cycle management of bridges. She has developed a Decision Support System for Remediation of Concrete Bridges (named as CBR-DSS), which enables bridge engineers and asset managers in priority ranking of bridges for budget allocation. The system is also capable of proposing the best remediation strategy at both project and network levels. The developed bridge management system has been validated through real cases and been introduced to more than thirty public and private transportation agencies. Dr. Rashidi has also carried out research on application of Fiber Reinforced Polymer (FRP) for strengthening and rehabilitation of reinforced concrete structures. Her continuing research effort is on the development of decision support systems for asset management of timber and steel bridges.

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WORLD CLASS TESTING FACILITIES

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Elevated Temperature Test Rig
(Up to 900°C, 200 tonne)



Hongshan 1000 tonne Multipurpose
Testing Machine



Strong Floor 8m x16m and associated
Testing Rigs

SERVICES AND CAPABILITIES

Relying on the extensive resources and competencies, BEAM is capable of providing services in the following areas:

- Load Bearing Capacity Assessment
- Static & Dynamic Testing
- Experimental Modal Analysis
- Numerical Modelling
- Damage Identification
- Finite Element Model Updating
- Condition Rating
- Bridge Life Cycle Analysis
- Assessment of Future Condition of Bridges
- Priority Ranking for Budget Allocation
- Remediation Planning
- Decision Support Systems for Bridge Asset Management
- Health Monitoring

ADVANCED FACILITIES

The Structural Research and Testing Laboratory at BEAM is one of the best testing and research facilities in Australia. It includes several multi-purpose structural testing and sensor technology laboratories.

Some of the major testing and monitoring facilities at BEAM include:

- Hongshan 1000 tonne Multipurpose Testing Machine
- Elevated Temperature Test Rig (Up to 900°C, 200 tonne)
- Strong Floor 8m x16m and associated Testing Rigs
- Advanced Materials Testing machines
- An Automated Microwave Imaging System