海岸和近海工程国家重点实验室
学术讲堂

题　目： 车辆互制动力及其在桥梁检测的应用
Vehicle-bridge interaction dynamics and applications to monitoring of bridges

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内容简介：

杨永斌，结构力学与动力专家，中国工程院、奥地利科学院、欧盟科学院院士。1984年获康乃尔大学博士后即返回台湾大学土木系服务，历任系主任、台大工学院院长、云林科技大学校长，2014年8月从台大退休。曾任（台湾）国科会土木学门召集人，中华工程教育学会、土木水利工程学会、力学学会、结构工程学会等学会理事长，亚太计算力学学会（APACM）和东亚太结构工程与营建会议（EASEC）主席。现任重庆大学土木学院荣誉院长、台大土木系名誉教授、云林科技大学讲座教授、结构稳定与动力国际期刊（IJSSD）主编。主要从事结构非线性与稳定理论、车桥互制动力理论、列车引致之土壤波动传播、桥梁动态参数之移动车辆扫瞄法等研究，并在上述四个研究领域各出版一本英文专著。曾获国科会杰出研究奖5次、特约研究员2次、教育部教学特优奖、杰出人才基金会讲座、十大杰出青年、美国土木工程师学会（ASCE）会士、国际计算力学学会（IACM）会士等。

Abstract: This presentation provides some key contributions made by the speaker and co-workers since the 1990s. The starting point is the AASHTO (1992) impact formula used to account for the vehicle loads on bridges, which lacks clear physical meaning. To resolve this, effort was made by considering the vehicle-bridge interaction (VBI), the first time ever, and by employing the VBI element derived (Yang and Lin 1995) to establish a new set of physically meaningful impact formulas for bridges (Yang et al. 1995). Next, optimal design rule was firstly proposed for the design of simple beams commonly used in highspeed railways, in that the vibration of the beam will reach the minimum if it has a length equal to 1.5 times of the vehicle length (Yang et al. 1997). Such a rule was globally recognized by engineers in highspeed railways in countries including Europe, China, Japan, and Korea. Inspired by the works on VBI, a moving test vehicle was firstly proposed for scanning the frequencies of bridges (Yang et al. 2004). Such an indirect approach was verified to be feasible in the field test (Lin and Yang 2005) and renamed as the vehicle scanning method (VSM) (Yang et al. 2019). It was also extended to detection of mode shapes (Yang et al. 2014) and other properties of bridges. Recently, the vehicle-bridge contact response was used instead to avoid vehicle's self disturbance (Yang et al. 2018). Field tests were conducted in a number of bridges in Taipei, Chongqing, and Xiamen.