报告题目 Title：Research and trends in lightweight bridge decks

轻质桥面板的研究与发展

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报告时间：2017 年 3 月 16 日（星期四）上午 10:00 -12:00

报告地点：浙江大学紫金港校区安中大楼 3 楼 A322 会议室，

Anzhong Building A322 meeting room

欢迎各位参加。**根特大学**是欧洲的一所著名理工科大学，我校与该校有合作备忘录，这次由该校的结构工程系主任 Luc Taerwe 教授带队共有 3 位教授（其中一位为结构工程领域、另一位为建筑规划的教授）来我院访问和交流。

Abstract: Lightweight bridge decks are sometimes subject to severe loading conditions as they may be loaded by concentrated axles, but lack the favorable load spreading in surfacing and plate. In the case of orthotropic bridge decks, it is known that the combination of these loading conditions and the quantity of required welds may not allow for a durable and still cost-effective solution with this type of deck in the future. Nevertheless, still progress is made in the analysis and specifications, but the efforts are large and the profits are moderate. Consequently, a search for alternatives for the future is valuable, and probably even necessary. The presentation gives the current state of the art regarding design methods and fatigue assessment for orthotropic decks, as well as information on the efficiency of solutions for renovation. A possible alternative is a steel – concrete sandwich solution, developed by the presenter. In this solution, a cellular concrete grid is injected between two steel plates, resulting in a non-welded and more isotropic rather than orthotropic deck behavior. For this purpose high strength self-compacting concrete is to be used. Challenges in the design and manufacture are in this case, the SCC mix, the steel to concrete adhesion, and the shear capacity, rather than the fatigue design. Another alternative are fiber reinforced polymer decks. Such decks can be manufactured by pultrusion as well as by vacuum infusion. Commonly used materials are glass fiber in combination with polyester, although efforts are made to use more bio-based materials. The presentation will give an overview recent projects using FRP in bridge decks and research in this field.

报告人简介（CV）：

Dr. Wouter De Corte is currently an Associate Professor Civil and Structural Engineering at Ghent University. He received his M. Sc. degree in civil engineering at Ghent University, in 1998, and his Ph.D. degree in civil engineering at Ghent University, in 2005. He worked at TU Delft, The Netherlands as a Guest Researcher in 2006, at University College Ghent as an Assistant Professor in 2007-2012, and at Ghent University as an Assistant Professor in 2012-2015. He is an Associate Professor Civil and Structural Engineering from 2015. His primary research areas include civil and structural applications of steel, concrete and FRP, and multi constraint shape optimization. Dr. Wouter De Corte has published over 100 articles related to civil and structural engineering, with more than 20 articles indexed in Thomson Reuters Web of Science.

轻质桥面板有时会受到严重的荷载作用,如在桥面板表面等没有有效分布的集中荷载轴载。众所周知，对正交异性桥面板，当这些荷载作用与所需焊接数量的组合作用时也许并未考虑到未来耐久和经济有效的解决方案。然而，现在在分析和规范方面仍然取得了一些进展，研究探讨未来的桥面系是很有意义，而且必要。

本报告给出了目前正交异性桥面板的设计方法和疲劳评估的研究进展，以及进行修复的相关信息，同时提出一个可能的替代方法——钢-混凝土夹层板。在钢-混凝土夹层板中，将小箱式混凝土格子放置在梁钢板之间，结果是无需焊接，更趋各向同性，而不是正交异性桥面板的行为。为此，要使用高强度自密实混凝土，在这种情况下，设计和制造面临的挑战主要是钢和混凝土的拌合及粘附，以及抗剪切能力，而不是抗疲劳设计。另一种替代方案则是用纤维增强聚合物加劲桥面板。这种桥面板可以用拉挤成型和真空灌注生产。尽管对使用生物材料作了更多的努力，但常用的材料是玻璃纤维与聚酯相结合。最后，介绍了纤维加劲复合材料用于桥面系及相关研究的工程案例。

浙江大学建筑工程学院

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2017 年 3 月 12 日