

宁波大学力学学术报告

Stone beams and the Fujian megalithic bridges

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报告题目: Stone beams and the Fujian megalithic bridges

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报告简介

In all ancient monuments stone beams and architraves have unsupported spans that seldom reach 7 m, while ordinary spans are usually much less. These structural elements were and still are believed to be prone to failure, so that several relieving systems (arches, chambers, gaps) were adopted through history to prevent collapse. The perception that stone beams could not exceed a certain span is coherent with the so-called size-effect theory of rock and concrete, which predicts that large elements are proportionally weaker than small ones. While the rest of the world started using architectural design to avoid these problems, in the Fujian region of China (near Xiamen) from the XI to the XII century megalithic stone beam bridges with spans of up to 21 m were being built. These bridges have resisted over the centuries. A spectacular example of these bridges, tending to disprove the size-effect theory and challenging all previous ancient constructions, is the Jiangdong bridge, of which only a part survives, but which should be restored, preserved, and declared human heritage monument.



Figure 1: Ancient granite stone beams of the Guangji bridge (number 12), preserved in a park near the bridge. The spans range between 10 and 14 m.

Prof. Davide Bigoni holds a full professor position at the University of Trento (Italy), where he is leading a very active group in the field of Solid and Structural Mechanics. He has authored or co-authored more than 150 journal papers and has written a book published by Cambridge University Press. He was elected in 2009 Euromech Fellow (of the European Mechanics Society), received in 2012 the Ceramic Technology Transfer Day Award (of the ACIMAC and ISTECCNR), and in 2014 he was awarded the Doctor Honoris Causa degree at the Ovidius University of Constanta. He has received the Panetti and Ferrari Award for Applied Mechanics (from the Accademia delle Scienze di Torino), in 2018 he was Guest Lecturer for the Midwest Mechanics Seminars, in 2019 he was nominated Fellow of the Istituto Lombardo, Accademia di Scienze e Lettere, he was awarded a 60th Anniversary Issue of the Journal of the Mechanics and Physics of Solids. His research has been featured on 7 covers of International Journals. He has coordinated and has been involved in 3 European grants between academia and industry. He has been awarded 2 ERC advanced grants awarded by the European Research Council, the first in 2013 and the second in 2021. He is co-editor of the Journal of Mechanics of Materials and Structures, is associate Editor of Mechanics Research Communications and member of the editorial boards of: Archives of Mechanics, International Journal of Solids and Structures, Journal of Elasticity, Journal of the Mechanical Behavior of Materials, Acta Mechanica Sinica, and International Journal of Applied Mechanics. He is reviewer for more than 150 international journals. He was vice chair of the panel PE8 for the European Research Council Starting Grants.

More details can be found at <https://bigoni.dicam.unim.it/>