

UNIVERSITY OF MACAU  
FACULTY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT of  
CIVIL AND ENVIRONMENTAL ENGINEERING

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**"Cold-formed high strength tubular sections of steel  
grade up to 1100 MPa"**

by

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## Abstract

This paper presents the experimental investigation of cold-formed high strength carbon steel tubular stub columns and beams. The nominal 0.2% proof stress of the specimens ranged from 700 to 1100 MPa. The experimental program focuses on the square hollow sections (SHS), rectangular hollow sections (RHS) and circular hollow sections (CHS). The material properties were first measured through tensile coupon tests. A new stress-strain model for high strength steel materials is proposed. The residual stress distributions were also presented for SHS and CHS. The compressive behaviour at cross-section level was studied through testing 25 stub columns. The test results including modulus of elasticity, 0.2% proof stress and ultimate strength for the complete sections were also determined. The cross-sectional flexural behaviour were investigated through 25 four-point bending tests. The load-deformation histories and failure modes of the stub columns and beams were analyzed. The experimental results were compared against design values calculated from the European, Australian and North American standards. The compactness criteria of tubular sections were assessed by comparing the section slenderness to the slenderness limits in the standards. Suggestions on the modification of section slenderness limits in design recommendations are given in this study.

## Biography

Professor Ben Young is currently working in the Department of Civil Engineering, the University of Hong Kong, and he is the Deputy Head of the Department. He is also the Associate Dean of the Graduate School at the University of Hong Kong. Professor Young received BSc, BEng and PhD degrees from the University of Sydney. His research interests include cold-formed steel structures, testing and design of steel structures, stainless steel structures, aluminium structures, and fire resistance of metal structures as well as engineering education. He is currently an editor of the Journal of Constructional Steel Research and also serving as members of editorial board for ten other journals, such as the Journal of Thin-Walled Structures, Journal of Advanced Steel Construction, and so on. Professor Young has published over 350 International journal and conference papers. He is the Vice President of the Hong Kong Institute of Steel Construction. Professor Young is one of the code writers of the "Hong Kong Code of Practice for the Structural Use of Steel" for the Buildings Department, The Government of the Hong Kong Special Administrative Region.

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