ISTS15 Rio

15th International Symposium on Tubular Structures

27-29 May 2015

SYMPOSIUM

PROGRAMME

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Organization

COPPE/UFRJ – Federal University of Rio de Janeiro
UERJ – State University of Rio de Janeiro
IIW – International Institute of Welding
ABCEM – Associação Brasileira de Construção Metálica

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Eduardo Batista
Pedro Vellasco
Luciano Lima

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Introduction

This booklet contains the program schedule of papers to be presented at the 15th International Symposium on Tubular Structures (ISTS15) held in Rio de Janeiro, Brazil, from May 27th to 29th, 2015. The Symposium, now regarded as the key international forum for the presentation and discussion of research, developments and applications in the field of tubular structures, is organised by Federal University of Rio de Janeiro and State University of Rio de Janeiro in collaboration with the International Institute of Welding Sub-commission XV-E. The fourteen previous symposia, held between 1984 and 2012, are described in the "Publications of the previous symposia on tubular structures" section of the book of Proceedings. Throughout its 31-years history the frequency, location and technical content of all the symposia has been determined by the IIW Sub-commission XV-E on Tubular Structures.

A total of 85 technical papers, each of which has been reviewed by international experts in the field, are included in the Proceedings. One of these papers relates to the invited 'Kurobane Lecture', given, at this Symposium, by Prof. Yoo Sang Choo from the National University of Singapore, Singapore. Prof. Choo was selected by the IIW Sub-commission XV-E. The Kurobane Lecture is the International Symposium on Tubular Structures Keynote Address which was inaugurated at the ISTS8 in 1998.

The editors would like to express their sincere gratitude to the reviewers of the papers for their hard work and expert opinions. The editors also wish to thank the International Programme Committee and the Local Organizing Committee. Particular thanks are owed to Vallourec, ABCEM, & CrEAct.eve for their much appreciated support and efforts.

The editors hope that the contemporary applications, case studies, concepts, insights, overviews, research summaries, analyses and product developments presented in ISTS15 provide some inspiration to architects, developers, contractors, engineers and fabricators to build ever more innovative and competitive tubular structures.

The archival volume of the current "state of the art" incluted in the ISTS15 Proceedings will also serve as excellent reference material to academics, researchers, trade associations and manufacturers of hollow sections in the future.

Finally, the Editors would like to express their recognition to the main sponsors of ISTS15, Vallourec, ABCEM, FAPERJ & UFRJ.

Editors

Eduardo Batista *Federal University of Rio de Janeiro*

Pedro Vellasco & **Luciano Lima** *State University of Rio de Janeiro*

Rio de Janeiro, May 2015

Social Program

The **Welcome Reception** will be held at the ISTS15 venue, Pestana Hotel, in Copacabana.

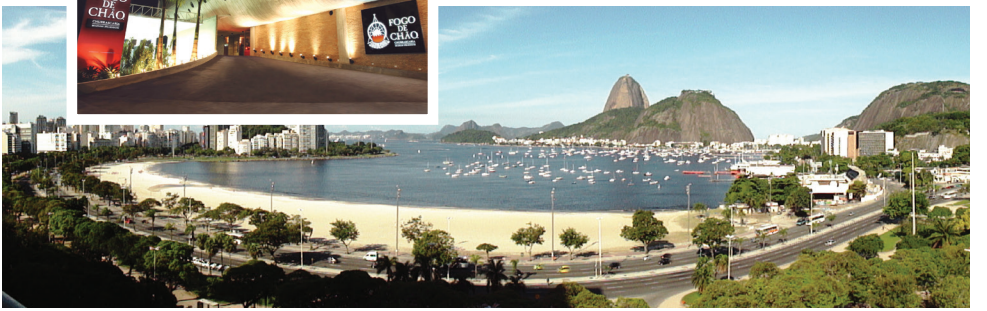
Date: **May 27th 2015**

Time: **18:00h - 19:30h (6PM - 7:30PM)**

The **Conference Dinner** will be held in the *Fogo de Chão Steakhouse* located in the *Guanabara Bay*. The Conference Organization will provide coaches that will depart from Hotel Pestana at 7:45PM.

Date: **May 28th 2015**

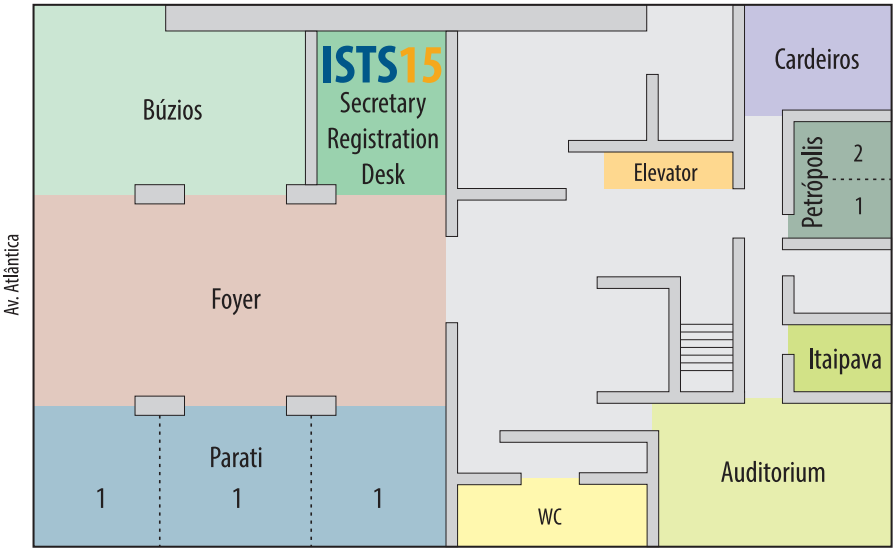
Time: **20:00h - 23:00h (8PM - 11PM)**



Registration Desk

The Registration Desk will be opened on Tuesday, May 26th from 16:00 to 18:00h (4PM to 6PM).

Pestana Rio Atlantica Convention Center



Hotel Pestana

Avenida Atlântica, 2964

Copacabana

Rio de Janeiro, Brasil

Global Symposium Programme

May 26th - Tuesday - Registration Desk - 16h to 18h (4:00PM to 6:00PM)

May27th - Wednesday			**May 28th** - Thursday			**May 29th** - Friday		
8h - 9h	Registration		**9h - 10h15**	Connections C	Stainless and HSSS B	**9h - 10h45**	Architecture	Sections/ Members B
9h - 10h15	Welcome and ISTS15 Kurobane Session							
10h15 - 10h45	*Coffee-break*		**10h15 - 10h45**	*Coffee-break*		**10h45 - 11h15**	Closing session	
10h45 - 12h	Connections A	Composite A	**10h45 - 12h15**	Connections D	Offshore/ Earthquake			
12h - 13h45	*Lunch*		**12h15 - 14h**	*Lunch*		**11h30 - 11h45**	ISTS15 balance meeting	
13h45 - 15h15	Sections/ Members A	Composite B	**14h - 15h45**	Connections E	Fire/Impact/ Blast	**11h45 - 13h**	IIW XV - E meeting	
15h15 - 15h45	*Coffee-break*		**15h45 - 16h15**	*Coffee-break*				
15h45 - 17h15	Connections B	Stainless and HSSS A				**15h30 - 19h30**	Technical Tour - Museum of Tomorrow	
18h - 19h30	Welcome Reception		**20h - 23h**	*Conference Dinner*				

May 27th - Wednesday

8h - 9h	**Registration**	
9h - 9h15	**Welcome Session**	
9h15 - 10h15	ISTS15 Kurobane Session Tubular joints – NUS research and applications *Y. S. Choo*	
10h15 - 10h45	***Coffee-break***	
	Connections A Paraty Room L. Borges & N. Boissonnade	**Composite A** Buzios Room M. Bradford & Y. Y. Chen
10h45 - 11h	Experimental evaluation of the directional strength increase for fillet welds to rectangular hollow sections *J. A. Packer, M. Sun, P. Oatway & G. S. Frater*	Study on the cracking behavior of concrete filled steel tubes (CFST) for tall bridge piers subjected to horizontal cyclic loading *M. Zhou, X. G. Liu, J. S. Fan & J. G. Nie*
11h - 11h15	Investigation of weld effective length rules for RHS overlapped K-connections *K. Tousignant & J. A. Packer*	Circular double-tube concrete-filled tubular columns with ultra-high strength concrete *M. L. Romero, A. Espinós, A. Hospitaler, J. M. Portolés & C. Ibañez*
11h15 - 11h30	Experimental investigation of built-in replaceable links in external diaphragm connection between steel I-beam and CHS column *M. Khador & T. M. Chan*	Experimental study of beam to concrete filled elliptical steel column connections *T. Sheehan, J. Yang, X. H. Dai & D. Lam*
11h30 - 11h45	Structural behaviour of T RHS joints subjected to chord axial force *A. Nizer, L.Lima , P. Vellasco, S. Andrade, E. Goulart, A. Silva & L. Neves*	Beam to concrete-filled rectangular hollow section column joints using long bolts *V. L. Hoang, J. F. Demonceau, & J. P. Jaspart*
11h45 - 12h	Symposium official photo	
12h - 13h45	***Lunch***	

May 27th - Wednesday

	Sections/Members A Paraty Room J. Packer & S. Herion	**Composite B** Buzios Room R. Fakury & Y. S. Choo
13h45 - 14h	Assessment of Eurocode 9 slenderness limits for elements in compression *M. Su, B. Young & L. Gardner*	Influence of outer diameter in confinement effect of CFT sections under bending *A. A. Valls & J. M. Carreras*
14h - 14h15	Design strength of LDSS flat oval stub column under pure axial compression *K. Sachidananda & K. D. Singh*	Casting of composite concrete-filled steel tube beams with selfconsolidating concrete *J. M. Flor, R. H. Fakury, R. B. Caldas, F. C. Rodrigues, A. H. M. de Araújo*
14h15 - 14h30	A new design method for hollow steel sections: the Overall Interaction Concept *J. Nseir, E. Saloumi, M. Hayeck & N. Boissonnade*	Analytical behaviour of concrete-encased CFST column to steel beam joints *W. Li, W. W. Qian, L. H. Han & X. L. Zhao*
14h30 - 14h45	Experimental characterization of the rotational capacity of hollow structural shapes *E. Saloumi, M. Hayeck, J. Nseir & N. Boissonnade*	Composite columns made of concrete filled circular hollow sections in fire case and with restrained thermal elongation – numerical and experimental analysis *T. A. C. Pires, J. P. C. Rodrigues & J. J. R. Silva*
14h45 - 15h	Effects of Cyclic Loading on Occurrence of Brittle Fracture in Notched Specimens *T. Iwashita & K. Azuma*	Buckling resistance of concrete-filled steel circular tube columns composed of high-strength materials *M. Karmazínová*
15h - 15h15	On the first order and buckling behaviour of thin-walled regular polygonal tubes *R. Gonçalves & D. Camotim*	Time-dependent response of three-hinged CFST arches *M. A. Bradford & Y. - L. Pi*
15h15 - 15h45	***Coffee-break***	

May 27th - Wednesday

	Connections B Paraty Room O. Fleischer & P. Vellasco	Stainless and HSSS A Buzios Room B. Young & T. M. Chan
15h45 - 16h	Influence of tensile chord stresses on the strength of CHS X-joints – Experimental and numerical investigations *A. Lipp & T. Ummenhofer*	Low cycle fatigue of high-strength steel tubes with longitudinal attachments *J. Hrabowski, S. Herion & T. Ummenhofer*
16h - 16h15	Tension testing of welds for X-joints with CHS branches to SHS chord *W. Wang, Q. Gu & J. J. Wang*	Local and local-overall buckling behaviour of welded stainless steel box section columns *H. X. Yuan, X. X. Du, Y. Q. Wang, Y. J. Shi, L. Gardner & L. Yang*
16h15 - 16h30	Influence of the vent hole shape on the strength of RHS K-joints in galvanized lattice girders. A numerical study *M. A. Serrano-López, C. López-Colina, J. Díaz-Gómez, F. López-Gayarre & G. Iglesias-Toquero*	Experimental investigation of cold-formed high strength steel tubular sections undergoing web crippling *H. T. Li & B. Young*
16h30 - 16h45	Design of hollow section joints using the component method *J. P. Jaspart & K. Weynand*	Behaviour of eccentrically loaded ferritic stainless steel stub columns *O. Zhao, L. Gardner, B. Rossi & B. Young*
16h45 - 17h	Numerical study of through plate-to-CHS connections *A. P. Voth & J. A. Packer*	CFRP strengthened cold-formed stainless steel tubular sections subjected to concentrated loading under ITF loading condition *F. Zhou, P. Huang & H. Peng*
17h - 17h15	A new design equation for side wall buckling of RHS truss X-joints *J. Becque & T. Wilkinson*	
18h - 19h30	**Welcome Reception**	

May 28th - Thursday

	Connections C Paraty Room M. Serrano-López & L. Lima	Stainless and HSSS B Buzios Room L. Gardner & P. Vellasco
9h - 9h15	Performance of non-diaphragm joint of H-beam to RHS column with partially thickened wall *Y. Chen, L. Zhang & W. Jiao*	Tests on ferritic stainless steel simply supported and continuous SHS and RHS beams *I. Arrayago, E. Real & E. Mirambell*
9h15 - 9h30	Analysis of the possible failure modes in CSH bolted sleeve connections *L. R. Amparo, A. M. Sarmanho, A. H. M. de Araújo & J. A. V. Requena*	Compressive behavior of innovative hollow long fabricated columns utilizing high strength and ultra-high strength tubes *F. Javidan, A. Heidarpour, X. L. Zhao & J. Minkkinen*
9h30 - 9h45	RHS beam-to-column connection: experimental analysis of innovative bolted typology *G. B. dos Santos, E. de M. Batista & A. H. M. de Araújo*	Innovative corrugated hollow columns utilizing ultra high strength steel tubes *M. Nassirnia, A. Heidarpour, X. L. Zhao & J. Minkkinen*
9h45 - 10h	Finite element simulations of 450 grade cold formed K and N joints *M. Mohan & T. Wilkinson*	New experimental determination of fatigue strength of tubular truss joints in steel grades up to S690 *S. Herion, T. Ummenhofer, M. Veselcic, F. Zamiri & A. Nussbaumer*
10h - 10h15	Axially loaded K joints made of thin-walled rectangular hollow sections *O. Fleischer, R. Puthli, T. Ummenhofer & J. Wardenier*	Reconstruction of a school building in Wolfsburg (Germany) and some studies of welding stresses *H. Pasternak, M. Moradi Eshkafti & T. Krausche*
10h15 - 10h45	***Coffee-break***	

May 28th - Thursday

	Connections D Paraty Room J. P. Jaspart & L. W. Tong	Offshore/Earthquake Buzios Room M. Lefranc & R. Fakury
10h45 - 11h	T joints with chords made of triangular hollow sections *O. Fleischer, S. Herion, T. Ummenhofer, D. Ungermann, B. Brune & P. Dissel*	Tubular based support structures for offshore wind turbines *J. Müglitz, S. Weise, J. Hermann, U. Mückenheim & K. A. Büscher*
11h - 11h15	Reduction of fillet weld sizes *O. Fleischer & S. Herion*	Stinger design for Pioneering Spirit - the world's largest pipelay vessel *Y. Yu, J. van der Sman & J. van Lammeren*
11h15 - 11h30	Welding simulation of tubular K-joints in steel S690QH *F. Zamiri, J. - M. Drezet & A. Nussbaumer*	Comparative assessment of the design of tubular elements according to offshore design standards and Eurocode 3 *T. Manco, J. P. Martins, L. S. da Silva & M. C. Rigueiro*
11h30 - 11h45	Experimental investigation of the static capacity of grade C450 RHS K and N truss joints *Z. Yao & T. Wilkinson*	Elliptical-hollow-section braces under cyclic axial loading *Y. M. Huai, T. M. Chan & W. Wang*
11h45 - 12h	Through-bolts to control ovalization of CHS T-joints under brace member compressive loads *M. A. Mohamed, A. A. Shaat & E. Y. Sayed-Ahmed*	Seismic response and damage distribution of concrete filled steel tube frame *K. Goto*
12h - 12h15	Experimental study on static behavior of multi-planar overlapped CHS KK-joints *X. Z. Zhao, S. S. Han, K. H. Hu, Y. Y. Chen & A. H. Wu*	Seismic Design of Partially Concrete-filled Steel Tubular Columns with Enhanced Ductility *I. H. P. Mamaghani*
12h15 - 14h	***Lunch***	

May 28th - Thursday

	Connections E Paraty Room A. Nussbaumer & L. Lima	Fire/Impact/Blast Buzios Room Y. Wang & A. Heidarpour
14h - 14h15	Tubular joints with welder-optimized CJP-equivalent welds under highcycle fatigue loading *X. Qian & P. W. Marshall*	Optimal economic design of unprotected circular concrete-filled steel tubular columns at ambient temperature and under fire condition *D. Hernández-Figueirido, A. Piquer, J. M. Portolés, A. Hospitaler & J. M. Montalvá*
14h15 - 14h30	Assessment and representation of ductile fracture failure for welded tubular joints *X. Qian*	Structural analysis of tubular truss in fire *J. A. Diez Albero, T. Tiainen, K. Mela & M. Heinisuo*
14h30 - 14h45	Application of the Weibull stress approach to the prediction of brittle fracture originating from defects at the ends of groove-welded joints *T. Iwashita & K. Azuma*	Effects of truss behavior on critical temperatures of welded steel tubular truss members exposed to fire *E. Ozyurt & Y. C. Wang*
14h45 - 15h	Recent research developments in China on fatigue behaviour of welded joints of concrete-filled tubular trusses *L. W. Tong, K. P. Chen & X. L. Zhao*	Fire performance of innovative slender concrete filled steel tubular columns *A. Espinós, M. L. Romero, E. Serra, V. Albero & A. Hospitaler*
15h - 15h15	Fatigue behavior and detailing of slotted tubular connection *C. Baptista, L. Borges, S. Yadav & A. Nussbaumer*	Experimental and theoretical development for pipe-in-pipe composite specimens under impact *X. Qian & Y. Wang*
15h15 - 15h30	Performance of tube-based moment connections under cyclic loads *D. Wei, J. McCormick, M. Hartigan & M. Fadden*	Field blast testing and FE modelling of RHS members *C. Ritchie, J. A. Packer, M. Seica & X. -L. Zhao*
15h30 - 15h45	Effect of the secondary bending moment on K-joint capacity *T. Björk, N. Tuominen & T. Lähde*	Behaviour of reverse channel tension zone subjected to impact loads *P. Barata, J. Ribeiro, A. Santiago & C. Rigueiro*
15h45 - 16h15	***Coffee-break***	
20h - 23h	***Conference Dinner***	

May 29th - Friday

	Architecture Paraty Room R. Stroetmann & R. Keays	**Sections/Members B** Buzios Room D. Camotim & E. Batista
9h - 9h15	Tensegrity chandeliers for a shopping street in the Hague NL *M. Eekhout*	Considerations in the design and fabrication of tubular steel transmission structures *R. M. Slocum*
9h15 - 9h30	New Velodrome in Medellín (Colombia) *X. Aguiló & J. Gomà*	The continuous strength method for circular hollow sections *C. Buchanan, L. Gardner & A. Liew*
9h30 - 9h45	Structural Design of the Roof Structure for the SwissTech Convention Center in Lausanne *C. Pirazzi, M. Bosso, G. Guscetti, O. Fleischer & S. Herion*	Use of Ramberg-Osgood material laws in the finite element modeling of cold-formed tubes *M. Hayeck, J. Nseir, E. Saloumi & N. Boissonnade*
9h45 - 10h	MyZeil Frankfurt – Design and execution of the architectural building envelope *R. Stroetmann*	Strength and ductility evaluation of steel tubular columns under cyclic multiaxial loading *I. H. P. Mamaghani, B. Dorose & F. Ahmad*
10h - 10h15	Where tubular structures fail – examples from one engineer's experience *R. H. Keays*	Experimental study and associated analysis of inner-stiffened cold-formed SHS steel columns *A. Z. Zhu, H. P. Zhu & Y. Lu*
10h15 - 10h30	PREON box – The speedy tool for industrial hall constructions *N. Genge, C. Remde, K. Weynand & J. Kuck*	The effect of steel strip on the quality of cold-formed hollow sections *P. Ritakallio*
10h30 - 10h45		CFRP strengthened square hollow section subject to pure torsion *J. Sharrock, C. Wu & X. L. Zhao*
10h45 - 11h15	**Closing session**	
11h30 - 11h45	ISTS15 balance meeting	
11h45 - 13h	IIW XV - E meeting	
15h30 - 19h30	**Technical Tour 1 -** Museum of Tomorrow	

May 30th - Saturday

8h30 - 11h30	**Technical Tour 2 -** Maracanã Stadium

Organizers

COPPE UFRJ

UERJ UNIVERSIDADE DO ESTADO DO RIO DE JANEIRO

IIW

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