



C-XI: Pressure Vessels, Boilers and Pipelines

Agenda: 76th IIW Annual Assembly C-XI: Pressure vessels, boilers and pipelines

Monday, 17th– Wednesday, 19th July 2023

Day 1 - Session Chair: Professor Su Jun Wu (Chair of C-XI)

Room **Orchid Main 4201AB** – 14:00 ~ 18:00, 17th July

14:00 - 15:00

- Opening of the meeting (Su Jun Wu)
- Identification of C-XI delegates
- Request fellow member volunteer to draft the Minutes of the Meeting
- News from the IIW Secretariat (Dr Elisabetta Sciaccaluga, IIW Technical Manager)
- Setup of the subcommission (Assisted by IIW Technical Manager)
- *Video presentation of 'Welding in the World' status – WitW Editor-in-Chief: John Lippold*

15:00 – 15:30 *Coffee Break*

15:30 – 16:00 Introduction to the Intermediate Meeting-1 organised by Subcommission XI-E. By SC-XI-E Chair Dr Christoph Gerritsen.

16:30 – 17:00 Introduction to the Intermediate Meeting-2 organised by C-XI. By C-XI Vice Chair Dr Xing Sun.

17:00 – 18:00 Discussion of C-XI's AIM & SCOPE, the Term of Reference (ToR), as well as C-XI's future activities.

Day 2 – Session Topic: Performance of Welds for Hydrogen Services

Room **Orchid Main 4304** – 14:00 ~ 18:00, 18th July

Session-1 Chair: Professor Su Jun Wu (Chair of C-XI)



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14:00 – 14:30 Keynote: Hydrogen effects on the cracking and fracture behaviours of welded high pressure pipelines

Professor Wenyue Zheng

National Center for Materials Service Safety, University of Science and Technology Beijing, Beijing 100083, China

14:30 – 15:00 Keynote: Fatigue Performance of Welded Pipeline Material in Pressurised H₂ Gas Environment

Dr Matthew Doré

Materials & Structural Integrity Technology Group, TWI Ltd, Granta Park, Great Abington, Cambridge, CB21 6AL, UK

15:00 – 15:30 Coffee Break

Session-2 Chair: Dr Xing Sun (Vice Chair of C-XI)

15:30 – 16:00 Keynote: Intended in-service welding and weld repair of hydrogen pipelines

Professor Michael Rhode^{a,b}, *Sebastian Kaiser*^a, *Kjell Erxleben*^a, *Arne Kromm*^a, *Thomas Kannengiesser*^{a,b}

^a *Bundesanstalt für Materialforschung und -prüfung (BAM), Division 9.4 - Weld Mechanics, Germany*

^b *Otto-von-Guericke-Universität, Inst. for Materials Science and Joining Technology, Magdeburg, Germany*

16:00 – 16:20 An Exploration of Hydrogen Development in the Real World

Dr Yuxuan Zhang

Director of Business Development for Asia, Logan Energy Limited, UK

16:20 – 16:40 The properties and hydrogen embrittlement sensitivity of the pipeline steel welded joint with different processes



C-XI: Pressure Vessels, Boilers and Pipelines

Dr Guijuan Zhou

National Center for Materials Service Safety, University of Science and Technology Beijing, Beijing 100083, China

16:40 – 17:00 Introduction to EU Project - LH2CRAFT (Safe and efficient storage of Liquid Hydrogen within ships)

Dr Xing Sun

Fatigue & Fracture Integrity Management Section, Materials & Structural Integrity Technology Group, TWI Ltd, Granta Park, Great Abington, Cambridge, CB21 6AL, UK

17:00 – 17:20 Numerical analysis of brittle strength of welded pipelines with corrosion metal loss in transportation of blends of natural gas with hydrogen

Alexey Milenin, Elena Velikoivanenko, Galina Rozyinka, Nina Pivtorak
E.O. Paton Electric Welding Institute of the NAS of Ukraine, Kyiv, Ukraine

17:20 – 18:00 Session-3: Panel Discussion

Topics: Possible Recommendations/Guidelines/Standards for the Welds under Hydrogen Environment and the set-up of a Steering (Advisory) Committee to plan the draft.

Panelist Experts: Dr Andrew Davis (IIW Standards Officer); Professor Wenyue Zheng (China); Professor Michael Rhode (Germany); Dr Matthew Doré (UK);.....

Day 3 – Session Topic: Welding/Inspections/Performance Assessment for PVBPs

Room **Orchid Main 4201AB** – 14:00 ~ 18:00, 19th July

Session-1 Chair: Professor Su Jun Wu (Chair of C-XI)



14:00 – 14:25 Invited: Development of underwater NDT methods for offshore submersible structures

Daniel Cheng Liam Lim¹ and Tat- Hean Gan^{1,2}

¹*TWI Technology (S.E.Asia) Sdn. Bhd, Section U5, Jalan Utarid U5/13, Mutiara Subang, 40150 Shah Alam, Selangor, Malaysia*

²*TWI Limited, Granta Park, Great Abington CB21 6AL, United Kingdom*

14:25 – 14:50 Invited: An insight into development and testing of pipeline steels at ArcelorMittal covering metallurgy, welding & properties testing

Dr Christoph Gerritsen

Applications & Solutions Department, ArcelorMittal Global R&D Gent/OCAS NV

14:50 – 15:15 Invited Surface enhancement of metallic alloys by laser precision engineering

Professor Ying Chunguan

National Engineering Laboratory of Additive Manufacturing for Large Metallic Components. School of Mechanical Engineering and Automation, Beihang University, Beijing, China

15:15 – 15:30 *Coffee Break*

Session-2 Chair: Dr Christoph Gerritsen (Chair of SC-XI-E)

15:30 – 15:50 Detection of hot water boiler tubes inner surface damages an early stage of their development using the metal magnetic memory method

*Anatoly Dubov , Alexander Dubov , Sergei Kolokolnikov, Alexey Yamchuk, Artem Marchenkov
Energodiagnostika Co. Ltd, Moscow, Russia*



C-XI: Pressure Vessels, Boilers and Pipelines

15:50 – 16:10 Research on microstructure and properties of Al - Li alloy by friction stir welding

Dr Yu Qiu, Yuan-song Zeng, Qiang Meng, Ji-hong Dong, Hua-xia Zhao

AVIC Manufacturing Technology Institute, Beijing, 100024, China

16:10 – 16:30 Risk analysis of haz pipe 6” A106 Gr b SCH 40 in flare gas recovery unit (FGRU) cpp gas production at PT X

M Faza Satrio, M. Yudi Masduki Solihin, and Winarto Winarto

*PT. Pusat Pelatihan Kompetensi Mandiri (Welding Study Center), Tlajung Udik, Gunung Putri,
Bogor, West Java, 16962*

16:30 – 16:50 Effect of Co on the Cavitation-Corrosion Resistance of Duplex Stainless Steel Overlay Layer

Yefeng Bao, Haochen Sun, Yu Liu, Yongfeng Jiang, Ke Yang, Qining Song

College of Mechanical and Electrical Engineering, Hohai University, Changzhou 213002, China

16:50 – 17:10 Effect of Co on the Erosion-Corrosion Behavior of Duplex Stainless Steel Surfacing Layer

Yefeng Bao, Shangzhi Wei, Yu Liu, Yongfeng Jiang, Ke Yang, Qining Song

College of Mechanical and Electrical Engineering, Hohai University, Changzhou, 213002, China

17:10 – 18:00 Session-3: Panel Discussion

Topics: Possible Recommendations/Guidelines/Standards for the Welds under Extreme Environment and the Proposal for set-up of a Subcommittee: High Temperature Boilers and Pipelines.

Panelist Experts: Professor Tat-Hean Gan (TWI UK); John Procaro (Lincoln Electric, USA); Professor Lianyong Xu (China); Professor Wenyue Zheng (China);

