



INTERNATIONAL INSTITUTE OF WELDING

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Doc. X-2056-2024

Annual Assembly 2024

Rhodes, Greece

Draft Agenda

C-X: Structural Performance of Welded Joints – Fracture Avoidance

July 8-9, 2024

Room@ Nafsika A and B

Chair: Mitsuru Ohata (Japan)

Monday, 8th July – Room@Nafsika A, Level 0 (9:00 – 13:00)

1. Preliminary Items

9:00 – 9:05

- (a) Welcome address (Prof. M. Ohata, C-X Chair, Osaka University, Japan)
- (b) Approval of agenda (X-2056-24)
- (c) List of C-X documents (X-2055-24)

2. Review of C-X Meeting, 2023–2024 (Prof. M. Ohata)

9:05 – 9:15

- (a) Approval of draft minutes of C-X meeting at Annual Assembly in Tokyo, 2022 (X-2015-22)
- (b) Approval of draft minutes of C-X intermediate meeting at TWI, Cambridge, 2023 (X-2023-23)
- (c) Terms of reference and Operational plan of C-X (X-1998-22)
- (d) Status of C-X papers in Welding in the World (WitW)

3. Technical presentation

S1: Advancement of FFS –Fracture toughness evaluation

9:15 – 9:35 X-2057-2024

Review of temperature control based on heat-transfer analysis in fracture toughness test

Takumi Ozawa (National Maritime Research Institute, Japan)

Tomoya Kawabata, (University of Tokyo, Japan)

Yoshiki Mikami (JWRI, Osaka University, Japan)

9:35 – 9:55 X-2061-2024

Comparison of Local Compression Methods and their Effects on Fracture Toughness
Yin Jin Janin, Henryk Pisarski (TWI, UK)

9:55 – 10:15 X-2077-2024

Fracture properties of power beam welded 20MnCr5 heat-treatable steel
Lorenz Uhlenberg, Tamás Tóth, Klaus Dilger (Technical University of Braunschweig, Germany)

10:15 – 10:35 X-2067-2024

Investigation of the toughness behaviour in cold-formed and welded high-strength steels using fracture mechanics concepts
Tom Werner (Technical University of Braunschweig, Germany)

10:35 – 10:45 "Re-newal of Chair"

----- **Coffee break (10:45 – 11:15)** -----

S2: Advancement of FFS –Defect assessment

11:15 – 11:35 X-2079-2024

Application of the strain-based FAD to mismatch weld geometries
Igor Varfolomeev (IWM, Freiburg, Germany)

11:35 – 11:55 X-2080-2024

Assessing Defects in Pressure Equipment and Pipelines : Focus on Local Thinned Areas (LTA)
Fikri Basar Yalciner, Mustafa Koçak (Istanbul Gedik University, Turkey)

S3: Advancement of FFS –Seismic loading

11:55 – 12:15 X-2064-2024

Fracture behaviour of a spiral weld in the welded API5L structural column under seismic load
A.F. Hobbacher (Germany)
M. Karpenko, A. Fussell (HERA House, New Zealand)

12:15 – 12:35 X-2059-2024

Effect of Tensile / Compressive Loading on Ductile Damage Evolution Behavior just before Fracture for Structural Steel
Hiroto Shoji, Mitsuru Ohata, Kaisei Sasaki (Osaka University, Japan)

S4: Fatigue assessment

12:35 – 12:55 X-2063-2024

Predicting fatigue lives of cruciform welded joints using an improved stress intensity factor solution
Mohamed Alanany, Jan Schubnell, Igor Varfolomeev (IWM, Freiburg, Germany)
Stefanie Röscher, Markus Knobloch (Ruhr-Universität Bochum, Germany)

----- Lunch break (13:00 – 14:30) -----

Monday, 8th July – Room@Nafsika B, Level 0 (14:30 – 18:30)

S5: Advancement of FFS –Welding residual stress

14:30 – 14:50 X-2062-2024

Statistical Analysis of Residual Stresses in Electron Beam Joints
Georgia Schneider, Yin Jin Janin (TWI, UK)

14:50 – 15:10 X-2075-2024

Prediction of transverse weld residual stress considering transverse and bending constraint in butt welding using DNN
Jeongung Park, Gyubaek An (Chosun University, Korea)

15:10 – 15:30 X-2078-2024

A study on the residual stress of seam pipe cutting and girth welding
Ji Sun Roh, Jung Goo Park (Samsung Heavy Industries, Korea)
Myung Hyun Kim (Pusan National University, Korea)

15:30 – 15:50 X-2069-2024

Investigation of stress field with neutron diffraction technique of welds carried out under a temper bead technique
Romain Jeanpierre, Dominique Deveaux, Laurent Jubin, Fabien Lefebvre (Cetim, France)
Sébastien Rouquette, Frédéric Deschaux-Beaume, Fabien Lefebvre (University of Montpellier, France)

S6: Multi-material application

15:50 – 16:10 X-2066-2024

Energy release rate solutions to bi-material interface crack problems in multi-material lightweight structures
Yuning Zhang, Pingsha Dong (University of Michigan, USA)

----- Coffee break (16:15 – 16:45) -----

S7: Environment induced fracture –High temperature

16:45 – 17:05 X-2081-2024

Study on P91 steel weld joints fatigue strength reduction factors under various load control regimes at high temperature
Lei Zhaoa, Lianyong Xua, Yongdian Han (Tianjin University, China)

S8: Fracture assessment –Cryogenic temperature

17:05 – 17:25 X-2074-2024

Comparative study for CTOD values of cryogenic materials: ISO standard 2018 vs. 2021
Myung Hyun Kim, Ji Hoon Kim (Pusan National University, Korea)

Young Cheon Jeong, Dong Pil Cho (Samsung Heavy Industry, Korea)

17:25 – 18:05 X-2073-2024

Evaluation of fracture toughness with Cryogenic steels at Cryogenic Temperature
Gyubaek An, Daehee Seong, Jeong-ung Park (Chosun University, Korea)
Jung Goo Park (Samsung Heavy Industries, Korea)
Ilwook Han (POSCO, Korea)

18:05 – 18:30 X-2076-2024

W/G Interim Report (Fracture Toughness Test at Cryogenic Temperature)
Jung Goo Park (Samsung Heavy Industries, Korea)
Gyubaek An (Chosun University, Korea)

Tuesday, 9th July – Room@Nafsika A, Level 0 (14:30 – 18:30)

S9: Environment induced fracture –Hydrogen

14:30 – 14:50 X-2068-2024

Systematic review of factors influencing the integrity of pipeline girth welds exposed to hydrogen
Judit Kovács, János Lukács (University of Miskolc, Hungary)

14:50 – 15:10 X-2082-2024

Research on Hydrogen Induced Damage Mechanism of X65 Welded Pipeline Steel in Hydrogen Blended Gas Environment
Yongdian Han (Tianjin University, China)

15:10 – 15:30 X-2072-2024

Basic study on the effect of hydrogen embrittlement on fracture toughness with cryogenics steels
Daehee Seong, Juseong Moon, Jeong-ung Park, Gyubeak An (Chosun University, Korea)
Jisun Roh (Samsung Heavy Industries, Korea)

S10: Mechanism for fracture

15:30 – 15:50 X-2070-2024

Strengthening and toughening mechanism of high strength bainite weld metals
Rui Cao, Gaojun Mao, Xili Guo, Yong Jiang (China)

S11: AM (Additive Manufacturing)

15:50 – 16:10 X-2071-2024

Research on Additive and Equal Material Fusion Manufacturing Method Based on Friction Stir Processing
Tao Yuan (Beijing University of Technology, China)

----- **Coffee break (16:15 – 16:45)** -----

S11: AM (Additive Manufacturing) - continued

16:45 – 17:05 X-2065-2024

A physically consistent 2D residual stress model for approximating 3D effects in welding and additive manufacturing

Zetao Jin, Pingsha Dong (University of Michigan, USA)

17:05 – 17:25 X-2058-2024

Analysis and measurement of 3D residual stresses in wire-arc additive manufactured wall and tube with low transformation temperature welding material

Ninshu Ma, Wenjia Huang, Qian Wang, Kunio Narasaki (JWRI, Osaka University, Japan)

Houichi Kitano (National Institute for Materials Science, Japan)

17:25 – 17:45 X-2060-2024

Analysis of Charpy impact toughness of wire arc additive manufactured carbon steel components

Kazuma Shimizu, Mitsuru Ohata, Ryo Kinugawa, Hiroto Shoji (Osaka University, Japan)

Mustafa Koçak, Ugur Gürol (Istanbul Gedik University, Turkey)

17:45 – 18:15 X-2083-2024

Proposal : SC X-AM “Fracture Avoidance in Additively Manufactured (AM) Components”

Mustafa Koçak (Istanbul Gedik University, Turkey)

Fikri Bashar Yalciner (NMDC Energy Abu Dhabi, Istanbul Gedik University, Turkey)

4. Resolutions

18:15 – 18:25

- (a) Recommendation of documents to Welding in the World
- (b) Set up Sub-Commission

5. Next Meeting

18:25 – 18:30

- (a) Intermediate meeting:

Date : xx^h and xxth of February, 2025

Place : xxx, xxx

- (b) Meeting at 78th Annual Assembly

Date : xxth (x) to xxth (x), July 2025

Place : xxxx, Italy

- (c) Any other business

6. Closing