

C-XII Arc Welding Processes and Production Systems

72nd IIW Annual Assembly and International Conference 2019, Bratislava, 7–12 July 2019

Monday, 8 July 2019, 14:15 – 18:25 @ Room “AUSTRIA TREND Morava”

1. Opening

2. Agenda

3. Minutes of previous meeting

4. Brief report on intermediate meeting at INP in Greifswald, Germany on March, 2019

5. Presentation of documents:

(Session chairman: Mr. Egerland, Chairman of Sub-Comm.B)

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|------|--|
| [J1] | Investigation of Welding Condition for Narrow Gap Submerged Arc Welding
Yohei ABE, Mitsuyoshi NAKATANI, Takahiro FUJIMOTO, Masaya SHIGETA, Manabu TANAKA (Japan)
Doc. XII-2342-19 |
| [J2] | Submerged arc welding process peculiarities in application for Arctic structures
Pavel Layus, Eric Mvola Belinga, Paul Kah, Harri Eskelinen (Finland)
Doc.XII-2433-19 |
| [J3] | A Technique for Preventing Solidification Cracking at the End Part of a Weld Joint in One-side Submerged Arc Welding
H. Yokota, M.Komura, Y. Yamashita, M. Shibahara (Japan)#
Doc. XII-2340-19 |
| [J4] | Application of Solidification Cracking Prevention Technique in One-Side Submerged Arc Welding
Shunsuke TANIOKA, Masayuki KIKKAWA, Takuya KUSABA, Noboru KIJI (Japan)
Doc. XII-2343-19 |
| [J5] | High productive Electroslag welding process for thick corner joint of built-up BOX column
T. Tsuyama, S. Nanbu, T.Tsuji,Y.Ogino, S.Asai (Japan)
Doc. XII-2439-19 |
| [J6] | WelDX - towards a common file format for open science in arc welding
Cagtay Fabry, Andreas Pittner, Michael Rethmeier (Germany)
Doc. XII-2348-19 |

Coffee Break (16:15– 16:35)

(Session chairman: Dr. Kautz, Chairman of Commission I)

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| [J7] | In-situ Defect Detection System Using Laser Ultrasonic for Welding Robot
Satoru Asai, Kazufumi Nomura, Taketo Matsuida, Satoshi Otaki (Japan)
Doc. XII-2341-19 |
| [J8] | Development of In-process Welding Torch Position Control System using AI Technology
Y. Tsujimura, T. Ogawa, T. Sakai, M. Horie (Japan)
Doc. XII-2438-19 |
| [J9] | Study on the monitoring of porosity defects in weld using artificial intelligence algorithm in GMAW process
Seungmin Shin, Sehun Rhee (Korea)
Doc. XII-2434-19 |
| [J10] | In-process monitoring of weld quality in thin plate lap welding by using image sensing
Seiya Nitta, Yosuke Ogino, Satoru Asai (Japan)
Doc. XII-2437-19 |
| [J11] | Deep learning algorithm-based prediction of keyhole status/penetration in PAW
Guokai Zhang, Xinfeng Liu, Chuanbao Jia, ChuanSong Wu (China)
Doc. XII-2347-19 |



Joint Meeting of Comm.I, Comm.IV, Comm.XII and SG212

“Welding/joining and additive manufacturing technology”

Tuesday, 9 July 2019, 8:15 -18:35 @ Room “CP London I & II”

Morning Session, 8:15-12:35

1. Opening: Prof. Asai, Chairman of Commission XII

2. Presentation of document

(Session chairman: Prof. Asai, Chairman of Commission XII)

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| [J1] | Arc-welding based additive manufacturing for body reinforcement in automotive engineering
Ann-Christin Josten (Germany)
Doc. XII-2428-19/ I-1425-19/IV-1451-19/212-1641-19 |
| [J2] | Optimization of the controlled short circuit GMAW metal transfer process for the deposition rate increasing in Wire Arc Additive Manufacturing
D. Kurushkin, I. Mushnikov, A. Popovich, O. Panchenko (Russia)
Doc. XII-2352-19/ I-1426-19/IV-1452-19/212-1642-19 |
| [J3] | Increasing the manufacturing efficiency of WAAM by advanced cooling strategies
Uwe Reisgen, Rahul Sharma, Samuel Mann, Lukas Oster (Germany)
Doc. XII-2357-19/ I-1427-19/IV-1453-19/212-1643-19 |
| [J4] | Arc Characteristics and Metal Transfer Mode in Super-TIG Welding of Thick Wall Metal Additive Manufacturing
S.M. Cho, G.J. Seo, J.H. Park, M. Cheepu (Korea)
Doc. 212-1625-19/ I-1428-19/XII-2363-19/212-1644-19 |
| [J5] | Multi Signal Sensing, Monitoring and Control in Wire Arc Additive Manufacturing
S.F. Goecke, G.F. Gottschalk, A. Babu and M.J.M Hermans (Germany)
Doc. 212-1639-19/ I-1429-19/IV-1454-19 /XII-2364-19 |
| [J6] | Characterisation of heat transfer in wire arc additive manufacturing (WAAM)
Philipp Henckell, Yarop Ali, Jan Reimann, Jean Pierre Bergmann (Germany)
Doc. I-1417-19/IV-1455-19/XII-2365-19/212-1645-19 |

Coffee Break (10:15– 10:35)

(Session chairman: Dr. Kautz, Chairman of Commission I)

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| [J7] | Microstructural development during wire arc additive manufacturing of copper based components
Justin Baby, Murugaiyan Amirthalingam (India)
Doc.XII-2353-19/ I-1430-19/ IV-1456-19/212-1646-19 |
| [J8] | Wire arc additive manufacturing of high strength Al-Mg-Si aluminum alloys using similar filler wires with additional grain refiner
René Winterkorn, Andreas Pittner, Robert Lahnsteiner, Michael Rethmeier (Germany)
Doc. I-1410-19/IV-1457-19/XII-2366-19/212-1647 -19 |
| [J9] | Mechanical properties of Wire Arc Additive Manufactured Components of Ti-6Al-4V
H. Staufer, Grunwald R. (Austria)
Doc. IV-1434-19/ I-1431-19/ XII-2367-19/212-1648-19 |
| [J10] | In situ synthesis of a novel Si-containing FeCoCrNi high-entropy alloy fabricated by selective laser melting
Danyang Lina, Lianyong Xua, Hongyang Jinga, Yongdian Hana, Lei Zhaoa (China)
Doc. XII-2354-19/ I-1432-19/ IV-1458-19/212-1649-19 |
| [J11] | Streamlining parameter development and minimizing material costs in laser powder bed fusion
Colt Montgomery (USA)
Doc. I-1403-19/IV-1459-19/XII-2368-19/212-1650-19 |
| [J12] | Multifunctional Large-Scale Machine for Additive Manufacturing – LASIMM
E. Assunção, F. Barros, D. Barbosa (Belgium)
Doc. XII-2435-19/ I-1433-19 /IV-1460-19/212-1651-19 |



Afternoon Session, 14:00-18:35

(The current status and future plans regarding Welding in the World: Prof.Lippold)
(Session chairman: Dr. Staufer, Chairman of Commission IV)

[J13]	The effect of oxygen on the gas tungsten arc weldability of laser-powderbed fusion fabricated 304L stainless steel Devon S. Gonzales, Stephen Liu, Daniel Javernick, Matthew Johnson (USA) Doc. I-1405-19/IV-1461-19/XII-2369-19/212-1652-19
[J14]	Bridging the "valley of death" in laser based metal additive manufacturing R. Bola, E. Assunção, L. Quintino (Portugal) Doc.IV-1432-19/ I-1445-19/ XII-2370-19/212-1653-19
[J15]	Innovative Laser Beam Joining Technology for Additive Manufactured Parts B.Gerhards, M.Schleser, C.Otten, A.Schwarz, A.Gebhardt (Germany) Doc. IV-1449-19/ I-1434-19/ XII-2371-19/212-1654-19
[J16]	Laserbeam-Hybrid-Welding – current results and prospect J. Brozek, S. Keitel (Germany) Doc. IV-1431-19/ I-1436-19/ XII-2373-19/212-1656-19
[J17]	Experimental and numerical study of the influence of the Laser hybrid parameters in partial penetration welding on the solidification cracking in the weld root N. Bakir, Ö. Üstündag, A. Gumenyuk, M. Rethmeier (Germany) Doc. IV-1441-19/ I-1437-19/ XII-2374-19/212-1657-19
[J18]	Laserbeam Submerged Arc Hybrid Welding – A novel hybrid welding technique for thick plate applications. U. Reisgen, S. Olschok, O. Engels (Germany) Doc. IV-1446-19/ I-1438-19/ XII-2375-19/212-1658-19

Coffee Break (16:15– 16:35)

(Session chairman: Prof. Tanaka, Chairman of SG212)

[J19]	Assessment of thermal cycles by combining thermo-fluid dynamics and heat conduction in keyhole mode welding processes A. Artinov, V. Karkhin, P. Khomich, M. Bachmann, M. Rethmeier (Germany) Doc. 212-1607-19/ I-1439-19//IV-1461-19/XII-2376-19
[J20]	Numerical analysis of weld pool behavior in wire feed laser beam welding with oscillating magnetic field X. Meng, A. Artinov, M. Bachmann, M. Rethmeier (Germany) Doc. 212-1608-19/ I-1440-19/IV-1462-19/XII-2377-19
[J21]	Participatory Design of Laser Keyhole Welding Process using CFD-based Coupled Simulations of Thermal, Metallurgical and Mechanical Behavior S.W. Han, L.J. Zhang, J.X. Zhang, S.J. Na (China) Doc. 212-1612-19/ I-1441-19/IV-1463-19/XII-2378-19
[J22]	Effects of the Shielding Gas Flow on the Blowhole Generation for Aluminum Alloys Laser Welding T. Fujimoto, M. Hirano, E. Fujimoto, Y. Abe, M. Nakatani, M. Shigeta and M. Tanaka (Japan) Doc.212-1613-19/I-1442-19/IV-1464-19/XII-2379-19
[J23]	Numerical modeling of keyhole instability and porosity formation in deep-penetration laser welding on NiCrMoV steel Y. Suna, H.C. Cui, X.H. Tang, F.G. Lu (China) Doc. 212-1623-19/ I-1443-19/IV-1465-19/XII-2380-19
[J24]	The visualization of contamination phenomena and countermeasure performance on vacuum laser beam welding via experimental and numerical approaches Y.K. Lee, J. Cheon, B.K. Min, J.H. Cho and C.L. Kim (Korea) Doc. 212-1628-19/ I-1444-19/IV-1466-19/XII-2381-19

3. Closure: Dr. Kautz, Chairman of Commission I



Wednesday, 10 July 2019, 14:15 – 18:15 @ Room "AUSTRIA TREND Morava"

(Session chairman: Prof. Goecke, Chairman of Sub-Comm.C)

- [12] Estimation of the weld penetration depth by the surface measurement in TIG arc welding
K. Nomura, S. Yamashita, F. Imura, S. Asai (Japan)
Doc. XII-2356-19, Doc.212-1632-19
- [13] Separation of the arc-stabilizing effects of surface heating and metal vapor injection by laser radiation
Kügler, H.; Vollertsen, F. (Germany)
Doc.XII-2345-19
- [14] Development of new AC TIG Welding Power Source and its Improvement of Productivity
Keiji Kadota, Zhongjie Liu, Kento Takada, Tetsuo Era, Tomoyuki Ueyama, Kazufumi Nomura, Satoru Asai (Japan)
Doc. XII-2382-19
- [15] Analysis of metal transfer in hot-wire GTAW with indirect resistive heating
Tim Ungethüm, Erik Spaniol, Martin Hertel, Uwe Füssel (Germany)
Doc. XII-2350-19
- [16] Discovery of High-frequency Effects on Arc Light Radiation in Microplasma Arc Welding with Pulsed Current
J.P. He, H. Zhang, S.L. Lin-Yang, F.X. Wang (China)
Doc. XII-2358-19, Doc.212-1603-19
- [17] Dynamic Variations in Two-peak Distribution of Arc Light Radiation in Pulsed Microplasma Arc Welding
F.X. Wang, J.P. He, A.Y. Wang, Y.T. Yun, S.L. Lin-Yang (China)
Doc. XII-2359-19, Doc.212-1604-19

Coffee Break (16:05– 16:25)

(Session chairman: Dr.Hermans, Vice-chairman of Comm.XII)

- [18] Development of a highly productive GMAW hot-wire process using a two-dimensional arc deflection
Erik Spaniol, Marcus Trautmann, Tim Ungethüm, Martin Hertel, Uwe Füssel, Philipp Henckell, Jean Pierre Bergmann (Germany)
Doc. XII-2351-19
- [19] The importance of sample rate in Heat Input calculation for Waveform Controlled Welding
Judah Henry, Joe Daniel, Teresa Melfi (USA)
Doc. XII-2349-19
- [20] The Effects of Cold Cracking Prevention by the Welding Process for Reducing Diffusible Hydrogen
N. Mukai, Y. Inoue, S. Sasakura, Y. Kinoshita (Japan)
Doc. XII-2344-19
- [21] Numerical simulation of gas flow in a novel welding process for reducing diffusible hydrogen
S. Tashiro, N. Mukai, Y. Inoue, T. Suga, A.B. Murphy and M. Tanaka (Japan)
Doc. XII-2360-19, Doc.212-1617-19
- [22] Technology Development and Automation for Fabrication and Welding of thin walled components for critical application
T.V. Prabhu, R. Lavakumar, G. Nanthakumar, P. Muralidaran (India)
Doc. XII-2436-19
- [23] Wire Arc 3D Printing of Magnesium - a new Approach on MIG Additive Manufacturing
Sven-F. Goecke, Danny Lubosch, Sebastian Baum, Götz-F. Gottschalk and Georg Fischer (Germany)
Doc. XII-2362-19

6. Recommendation of submission to IIW Journal "Welding in the World"

7. Miscellaneous

8. Date and place of next meeting

9. Closure

