

References

1. SODEL. *Metallurgical Expertise*. Hardfacing [cited 2024 23-03-2024]; Available from: <https://metallurgicalexpertise.wordpress.com/2020/09/15/hardfacing-complete/>.
2. tech, w. *Buttering in Welding?* 2019 [cited 2023 02-10-2023]; Available from: <https://weldingtech.net/buttering/>.
3. Karakaş, O., et al., *Dissimilar Welding Applications and Evaluation of Fatigue Behaviour of Welded Joints: An Overview*. *Strength of Materials*, 2023. **55**(1): p. 111-127.
4. TWI. *Physical vapour deposition*. 16 July 2023]; Available from: <https://www.twi-global.com/technical-knowledge/faqs/faq-what-is-physical-vapour-deposition-pvd>.
5. Faraji, G., H.S. Kim, and H.T. Kashi, *Severe plastic deformation: methods, processing and properties*. 2018: Elsevier.
6. Abegunde, O.O., et al., *Overview of thin film deposition techniques*. *AIMS Materials Science*, 2019. **6**(2): p. 174.
7. Silcotek. *Chemical Vapor Deposition Benefits and Limitations*. 17 July 2023]; Available from: <https://www.silcotek.com/blog/chemical-vapor-deposition-benefits-and-limitations>.
8. Pedersen, H. and S.D. Elliott, *Studying chemical vapor deposition processes with theoretical chemistry*. *Theoretical Chemistry Accounts*, 2014. **133**: p. 1-10.
9. Zhang, Q., D. Sando, and V. Nagarajan, *Chemical route derived bismuth ferrite thin films and nanomaterials*. *Journal of Materials Chemistry C*, 2016. **4**(19): p. 4092-4124.
10. Giurlani, W., et al., *Electroplating for decorative applications: Recent trends in research and development*. *Coatings*, 2018. **8**(8): p. 260.
11. Fractory. *Electroplating Explained – How It Works, Types, Benefits & More*. 2023 [cited 2024 16-03-2024]; Available from: <https://fractory.com/electroplating-explained/>.
12. Saha, M.K. and S. Das, *Gas metal arc weld cladding and its anti-corrosive performance: a brief review*. *Athens Journal of Technology and Engineering*, 2018. **5**(2): p. 155-174.

13. Sienicki, J., et al., *Cold spraying and laser cladding as an alternative to electroplating processes*. Aircraft Engineering and Aerospace Technology, 2018. **91**(2): p. 205-215.
14. Raghukandan, K., *Analysis of the explosive cladding of cu–low carbon steel plates*. Journal of Materials Processing Technology, 2003. **139**(1-3): p. 573-577.
15. Yeom, H. and K. Sridharan, *Cold spray technology in nuclear energy applications: A review of recent advances*. Annals of Nuclear Energy, 2021. **150**: p. 107835.
16. Metal, s. *Friction Stir Welding (FSW) – Process & Applications*. 2024 [cited 2024 27-03-2024]; Available from: <https://www.sunrise-metal.com/friction-stir-welding-process-and-applications/>.
17. Kanishka, K. and B. Acherjee, *A systematic review of additive manufacturing-based remanufacturing techniques for component repair and restoration*. Journal of Manufacturing Processes, 2023. **89**: p. 220-283.
18. Lader, S.K., M. Baruah, and R. Ballav, *Improvement in the weldability and mechanical properties of CuZn40 and AA1100-O dissimilar joints by underwater friction stir welding*. Journal of Manufacturing Processes, 2023. **85**: p. 1154-1172.
19. Mishra, R.S. and Z. Ma, *Friction stir welding and processing*. Materials science and engineering: R: reports, 2005. **50**(1-2): p. 1-78.
20. TABER. *The Benefits of Friction-Stir Welding in The Marine Industry*. 2020 16 July 2023]; Available from: <https://taberextrusions.com/benefits-of-friction-stir-welding-in-the-marine-industry/>.
21. Grujicic, M., et al., *Prediction of the grain-microstructure evolution within a Friction Stir Welding (FSW) joint via the use of the Monte Carlo simulation method*. Journal of Materials Engineering and Performance, 2015. **24**: p. 3471-3486.
22. Mehta, K., *Investigation of friction stir welding between dissimilar materials copper to aluminum*. 2017, Pandit Deendayal Energy University, Gandhinagar.
23. Akinlabi, E.T., A. Els-Botes, and P.J. McGrath. *Effect of travel speed on joint properties of dissimilar metal friction stir welds*. in *Proceedings of 2nd International Conference on Advances in Engineering and Technology (AET), Uganda*. 2011.
24. Rajendran, C., et al., *Effect of tool tilt angle on strength and microstructural characteristics of friction stir welded lap joints of AA2014-T6 aluminum alloy*. Transactions of Nonferrous Metals Society of China, 2019. **29**(9): p. 1824-1835.
25. Ma, Z., *Friction stir processing technology: a review*. Metallurgical and materials Transactions A, 2008. **39**(3): p. 642-658.

26. Merah, N., et al., *Friction Stir processing influence on microstructure, mechanical, and corrosion behavior of steels: A review*. *Materials*, 2021. **14**(17): p. 5023.
27. Sharma, C., et al., *Friction stir spot welding-process and weld properties: a review*. *Journal of The Institution of Engineers (India): Series D*, 2021: p. 1-17.
28. Shen, Z., et al., *Interfacial microstructure and properties of copper clad steel produced using friction stir welding versus gas metal arc welding*. *Materials Characterization*, 2015. **104**: p. 1-9.
29. Pan, T.-Y., *Friction stir spot welding (FSSW)-a literature review*. 2007.
30. Padhy, G., C. Wu, and S. Gao, *Friction stir based welding and processing technologies-processes, parameters, microstructures and applications: A review*. *Journal of Materials Science & Technology*, 2018. **34**(1): p. 1-38.
31. TWI. *Bobbin tool friction stir welding*. 16 July 2023]; Available from: <https://www.twi-global.com/media-and-events/insights/bobbin-tool-friction-stir-welding>.
32. Fuse, K. and V. Badheka, *Bobbin tool friction stir welding: A review*. *Science and Technology of Welding and Joining*, 2019. **24**(4): p. 277-304.
33. Liu, Z., et al., *Study on the relationship between welding force and defects in bobbin tool friction stir welding*. *Journal of Manufacturing Processes*, 2022. **84**: p. 1122-1132.
34. Li, Y., D. Sun, and W. Gong, *Effect of tool rotational speed on the microstructure and mechanical properties of bobbin tool friction stir welded 6082-T6 aluminum alloy*. *Metals*, 2019. **9**(8): p. 894.
35. Ibrahim, A.B., et al., *Effect of process parameters on microstructural and mechanical properties of friction stir diffusion cladded ASTM A516-70 steel using 5052 Al alloy*. *Journal of Manufacturing Processes*, 2018. **34**: p. 451-462.
36. Rhee, K., et al., *Fabrication of aluminum/copper clad composite using hot hydrostatic extrusion process and its material characteristics*. *Materials Science and Engineering: A*, 2004. **384**(1-2): p. 70-76.
37. Baboian, R., G. Haynes, and R. Turcotte, *Galvanic Corrosion on Automobiles, in Galvanic Corrosion*. 1988, ASTM International.
38. Nikfahm, A., et al., *Effect of grain size changes on corrosion behavior of copper produced by accumulative roll bonding process*. *Materials Research*, 2013. **16**: p. 1379-1386.

39. Copeland, D., et al., *Aluminum-copper clad member, method of manufacturing the same, and heat sink*. 2001, Google Patents.
40. Mahmoud, E.R., S.Z. Khan, and M. Ejaz, *Laser surface cladding of mild steel with 316L stainless steel for anti-corrosion applications*. *Materials Today: Proceedings*, 2021. **39**: p. 1029-1033.
41. Jiang, W., et al., *Finite element analysis of the effect of welding heat input and layer number on residual stress in repair welds for a stainless steel clad plate*. *Materials & Design*, 2011. **32**(5): p. 2851-2857.
42. Sasaki, T., et al., *Microstructural evolution of copper clad steel bimetallic wire*. *Materials Science and Engineering: A*, 2011. **528**(6): p. 2974-2981.
43. Choi, H.-J., M. Lee, and J.Y. Lee, *Application of a cold spray technique to the fabrication of a copper canister for the geological disposal of CANDU spent fuels*. *Nuclear Engineering and Design*, 2010. **240**(10): p. 2714-2720.
44. Roy, R.K., et al., *Joining of 304SS and pure copper by rapidly solidified Cu-based braze alloy*. *Fusion engineering and design*, 2011. **86**(4-5): p. 452-455.
45. Liu, B., et al., *Effect of heat treatment on the mechanical properties of copper clad steel plates*. *Vacuum*, 2018. **154**: p. 250-258.
46. Wei, P. and F. Chung, *Unsteady Marangoni flow in a molten pool when welding dissimilar metals*. *Metallurgical and Materials Transactions B*, 2000. **31**(6): p. 1387-1403.
47. Yang, T., et al., *Interface behavior of copper and steel by plasma-MIG hybrid arc welding*. *Acta Metallurgica Sinica (English Letters)*, 2013. **26**(3): p. 328-332.
48. Magnabosco, I., et al., *An investigation of fusion zone microstructures in electron beam welding of copper–stainless steel*. *Materials Science and Engineering: A*, 2006. **424**(1-2): p. 163-173.
49. Singhal, T.S. and J.K. Jain, *GMAW cladding on metals to impart anti-corrosiveness: Machine, processes and materials*. *Materials Today: Proceedings*, 2020. **26**: p. 2432-2441.
50. Rao, N.V., G.M. Reddy, and S. Nagarjuna, *Weld overlay cladding of high strength low alloy steel with austenitic stainless steel–structure and properties*. *Materials & Design*, 2011. **32**(4): p. 2496-2506.
51. Berridge, D. *Corrosion-Resistant Alloy Cladding of Subsea Componets*. in *Offshore Technology Conference*. 2011. OTC.

52. Robinson, A., *Recent developments in the application of weld overlay cladding deposits within areas of difficult access*. The Welding Institute, 1986: p. 61-74.
53. Dupas, P. and D. Moinereau, *Evaluation of cladding residual stresses in clad blocks by measurements and numerical simulations*. Le Journal de Physique IV, 1996. **6(C1)**: p. C1-187-C1-196.
54. Singh, V., V. Singh, and N.A. Mohan. *Study of corrosion behaviour of SS-316 cladding deposited by shielded metal arc welding*. in *IOP Conference Series: Materials Science and Engineering*. 2018. IOP Publishing.
55. Mohammed, R., et al., *Microstructure, mechanical and corrosion behaviour of weld overlay cladding of DMR 249A steel with AISI 308L*. *Materials Today: Proceedings*, 2019. **15**: p. 2-10.
56. Buchanan, V., D. McCartney, and P. Shipway, *A comparison of the abrasive wear behaviour of iron-chromium based hardfaced coatings deposited by SMAW and electric arc spraying*. *Wear*, 2008. **264(7-8)**: p. 542-549.
57. Saha, M.K., et al., *Effect of heat input on geometry of austenitic stainless steel weld bead on low carbon steel*. *Journal of The Institution of Engineers (India): Series C*, 2019. **100**: p. 607-615.
58. Palani, P., N. Murugan, and B. Karthikeyan, *Process parameter selection for optimising weld bead geometry in stainless steel cladding using Taguchi's approach*. *Materials Science and Technology*, 2006. **22(10)**: p. 1193-1200.
59. Verma¹, A.K. and S. Das, *A Brief Overview On Cladding Techniques With A Reference to Weld Cladding Using Gas Metal Arc Welding*. *Reason—A Technical Magazine*, 2011. **10**.
60. SUZHOU WALDUN WELDING CO., L. *GMAW Weld Overlay*. What is GMAW Cladding? [cited 2024 16-03-2024]; Available from: <https://www.hardfacingfty.com/gmaw-weld-overlay/>.
61. Murugan, N. and R. Parmar, *Stainless steel cladding deposited by automatic gas metal arc welding*. *Welding Journal-Including Welding Research Supplement*, 1997. **76(10)**: p. 391s.
62. Matias, J.V., et al., *Behavior of a superaustenitic stainless steel weld cladding deposited by the gas metal arc welding process*. *Materials Today Communications*, 2023. **34**: p. 104978.

63. Khan, A., et al., *An Investigation on Cladding of Stainless Steel on Mild Steel using Pulse Current GMAW*. International Journal of Engineering Trends and Applications (IJETA), 2018. **5**(2).
64. Yoganandh, J., et al., *Optimization of GMAW process parameters in austenitic stainless steel cladding using genetic algorithm based computational models*. Experimental Techniques, 2013. **37**: p. 48-58.
65. Sreeraj, P., T. Kannan, and S. Maji, *Simulation and parameter optimization of GMAW process using neural networks and particle swarm optimization algorithm*. International Journal of Mechanical Engineering & Robotics Research, 2013. **2**(1): p. 130-146.
66. LIMITED, W.I. *What You Need to Know About Weld Cladding Overlay*. 2024; Available from: <https://www.westermans.com/blog/description-of-the-weld-clad-overlay-process/>.
67. Chen, J.H., et al., *Deposition of multicomponent alloys on low-carbon steel using gas tungsten arc welding (GTAW) cladding process*. Materials transactions, 2009. **50**(3): p. 689-694.
68. Poo-arporn, Y., et al., *Gas tungsten arc welding of copper to stainless steel for ultra-high vacuum applications*. Journal of Materials Processing Technology, 2020. **277**: p. 116490.
69. Cheng, Z., et al., *MIG-TIG double-sided arc welding of copper-stainless steel using different filler metals*. Journal of Manufacturing Processes, 2020. **55**: p. 208-219.
70. Biswas, K. and C.K. Sahoo, *A review on TIG cladding of engineering material for improving their surface property*. Surface Topography: Metrology and Properties, 2023.
71. Lu, S.-P., et al., *Microstructure and wear property of Fe–Mn–Cr–Mo–V alloy cladding by submerged arc welding*. Journal of Materials Processing Technology, 2004. **147**(2): p. 191-196.
72. Mortazavian, E., Z. Wang, and H. Teng, *Repair of light rail track through restoration of the worn part of the railhead using submerged arc welding process*. The International Journal of Advanced Manufacturing Technology, 2020. **107**: p. 3315-3332.

73. Du Toit, M. and J. Van Niekerk, *Improving the life of continuous casting rolls through submerged arc cladding with nitrogen-alloyed martensitic stainless steel*. *Welding in the World*, 2010. **54**(11): p. R342-R349.
74. Gülenç, B. and N. Kahraman, *Wear behaviour of bulldozer rollers welded using a submerged arc welding process*. *Materials & design*, 2003. **24**(7): p. 537-542.
75. Tušek, J. and M. Suban, *High-productivity multiple-wire submerged-arc welding and cladding with metal-powder addition*. *Journal of materials processing technology*, 2003. **133**(1-2): p. 207-213.
76. DRAGAN, S., Y.A. YAROS, and A. YAROS, *The Paton Welding Journal 2009 № 08*.
77. steel, w.a. *High Energy Density Welding Processes*. [cited 2023 28-07-2023]; Available from: <https://ahssinsights.org/joining/high-energy-density-welding/high-energy-density-welding-processes-laser-welding/>.
78. Patterson, T., et al., *A review of high energy density beam processes for welding and additive manufacturing applications*. *Welding in the World*, 2021. **65**(7): p. 1235-1306.
79. Mai, T. and A. Spowage, *Characterisation of dissimilar joints in laser welding of steel–kovar, copper–steel and copper–aluminium*. *Materials Science and Engineering: A*, 2004. **374**(1-2): p. 224-233.
80. Yinghua, L., et al., *Improving the microstructure and mechanical properties of laser clad Ni-based alloy coatings by changing their composition: A review*. *Reviews on Advanced Materials Science*, 2020. **59**(1): p. 340-351.
81. Arnold, J. and R. Volz, *Laser powder technology for cladding and welding*. *Journal of thermal spray technology*, 1999. **8**(2): p. 243.
82. Powell, J., *Laser cladding*. 1983.
83. Wang, A., S. Sircar, and J. Mazumder, *Laser cladding of Mg-Al alloys*. *Journal of materials science*, 1993. **28**: p. 5113-5122.
84. Yue, T.M., et al., *Laser cladding of stainless steel on magnesium ZK60/SiC composite*. *Materials Letters*, 2001. **47**(3): p. 165-170.
85. Yan, H., et al., *Microstructure and interfacial evaluation of Co-based alloy coating on copper by pulsed Nd: YAG multilayer laser cladding*. *Journal of Alloys and Compounds*, 2010. **505**(2): p. 645-653.

86. Liu, F., et al., *Laser cladding of Ni-based alloy on copper substrate*. Journal of University of Science and Technology Beijing, Mineral, Metallurgy, Material, 2006. **13**(4): p. 329-332.
87. Sampedro, J., et al., *Laser cladding of TiC for better titanium components*. Physics Procedia, 2011. **12**: p. 313-322.
88. Parekh, R., R.K. Buddu, and R. Patel, *Multiphysics simulation of laser cladding process to study the effect of process parameters on clad geometry*. Procedia Technology, 2016. **23**: p. 529-536.
89. Lin, J. and W. Steen, *Design characteristics and development of a nozzle for coaxial laser cladding*. Journal of Laser Applications, 1998. **10**(2): p. 55-63.
90. Wang, F., et al., *Online study of cracks during laser cladding process based on acoustic emission technique and finite element analysis*. Applied surface science, 2008. **255**(5): p. 3267-3275.
91. Singh, S., et al., *Development of thick copper claddings on SS316L steel for In-vessel components of fusion reactors and copper-cast iron canisters*. Fusion Engineering and Design, 2018. **128**: p. 126-137.
92. Yao, C., et al., *Interface microstructure and mechanical properties of laser welding copper-steel dissimilar joint*. Optics and Lasers in Engineering, 2009. **47**(7-8): p. 807-814.
93. Phanikumar, G., et al., *Characterization of a continuous CO₂ laser-welded Fe-Cu dissimilar couple*. Metallurgical and Materials Transactions A, 2005. **36**: p. 2137-2147.
94. Ciou, Y.-C., et al., *Mechanical and microstructural properties of dissimilar copper and stainless-steel butt welds prepared using zigzag and circular fiber laser oscillation methods*. Materials Science and Engineering: A, 2022. **859**: p. 144178.
95. Liu, Y., et al., *Research and progress of laser cladding on engineering alloys: A review*. Journal of Manufacturing Processes, 2021. **66**: p. 341-363.
96. Siddiqui, A.A. and A.K. Dubey, *Recent trends in laser cladding and surface alloying*. Optics & Laser Technology, 2021. **134**: p. 106619.
97. Raj, D., S.R. Maity, and B. Das, *State-of-the-art review on laser cladding process as an in-situ repair technique*. Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering, 2022. **236**(3): p. 1194-1215.

98. Sun, Z. and R. Karppi, *The application of electron beam welding for the joining of dissimilar metals: an overview*. Journal of Materials Processing Technology, 1996. **59**(3): p. 257-267.
99. Yu, T., et al., *Microstructure and wear behavior of AlCrTiNbMo high-entropy alloy coating prepared by electron beam cladding on Ti600 substrate*. Vacuum, 2022. **199**: p. 110928.
100. Yu, T., et al., *Mo20Nb20Co20Cr20 (Ti8Al8Si4) refractory high-entropy alloy coatings fabricated by electron beam cladding: Microstructure and wear resistance*. Intermetallics, 2022. **149**: p. 107669.
101. Klimenov, V., et al., *Microstructure, phase composition and hardness of Ti–Au cladding deposited on Ti–6Al–4V substrate by electron beam powder bed fusion method*. Vacuum, 2022. **203**: p. 111289.
102. Węglowski, M.S., S. Błacha, and A. Phillips, *Electron beam welding–Techniques and trends–Review*. Vacuum, 2016. **130**: p. 72-92.
103. Osipovich, K., et al., *Wire-Feed Electron Beam Additive Manufacturing: A Review*. Metals, 2023. **13**(2): p. 279.
104. Guo, J., *Solid state welding processes in manufacturing*, in *Handbook of manufacturing engineering and technology*. 2015, Springer. p. 569-592.
105. Gulenc, B., *Investigation of interface properties and weldability of aluminum and copper plates by explosive welding method*. Materials & Design, 2008. **29**(1): p. 275-278.
106. Paul, H., et al., *Microstructure and phase transformations near the bonding zone of Al/Cu clad manufactured by explosive welding*. Archives of Metallurgy and Materials, 2012. **57**(4): p. 1151-1162.
107. HSFL Carvalho, G., et al., *Aluminum-to-steel cladding by explosive welding*. Metals, 2020. **10**(8): p. 1062.
108. Paul, H., et al., *The effect of interface morphology on the electro-mechanical properties of Ti/Cu clad composites produced by explosive welding*. Metallurgical and Materials Transactions A, 2020. **51**: p. 750-766.
109. Bai, Q.-L., et al., *An investigation into the inhomogeneity of the microstructure and mechanical properties of explosive welded H62-brass/Q235B-steel clad plates*. The International Journal of Advanced Manufacturing Technology, 2017. **90**: p. 1351-1363.

110. Gerland, M., et al., *Explosive cladding of a thin Ni-film to an aluminium alloy*. Materials Science and Engineering: A, 2000. **280**(2): p. 311-319.
111. Kaur, J., et al., *Cladding of stainless steel (SS304) on aluminium alloy (AA1100) by explosive welding*. Materials Today: Proceedings, 2018. **5**(9): p. 19136-19139.
112. Engineering, F. *What is explosion welding?* What is explosion welding? 2019 [cited 2014 16-03-24]; Available from: <https://fastenerengineering.com/what-is-explosion-welding/>.
113. Bahrain, A. and B. Grassland, *Sixth Paper: Explosive Welding and Cladding: An Introductory Survey and Preliminary Results*. Proceedings of the Institution of Mechanical Engineers, 1964. **179**(1): p. 264-305.
114. Mróz, S., et al., *Using the explosive cladding method for production of Mg-Al bimetallic bars*. Archives of Civil and Mechanical Engineering, 2015. **15**(2): p. 317-323.
115. Xia, H.-b., S.-g. Wang, and H.-f. Ben, *Microstructure and mechanical properties of Ti/Al explosive cladding*. Materials & Design (1980-2015), 2014. **56**: p. 1014-1019.
116. Saravanan, S. and K. Raghukandan, *Influence of interlayer in explosive cladding of dissimilar metals*. Materials and manufacturing processes, 2013. **28**(5): p. 589-594.
117. Saravanan, S. and K. Raghukandan, *Thermal kinetics in explosive cladding of dissimilar metals*. Science and Technology of Welding and Joining, 2012. **17**(2): p. 99-103.
118. Raj, P., et al., *Tensile and shear strength evaluation in joining dissimilar plates of mild steel with aluminum alloy through explosive cladding approach*. Materials Today: Proceedings, 2023. **80**: p. 2753-2759.
119. Durgutlu, A., B. Gülenç, and F. Findik, *Examination of copper/stainless steel joints formed by explosive welding*. Materials & design, 2005. **26**(6): p. 497-507.
120. Wang, Y., et al., *Fabrication of a thick copper-stainless steel clad plate for nuclear fusion equipment by explosive welding*. Fusion Engineering and Design, 2018. **137**: p. 91-96.
121. Loureiro, A., et al., *Explosive welding*, in *Advanced Joining Processes*. 2021, Elsevier. p. 207-237.
122. Findik, F., *Recent developments in explosive welding*. Materials & Design, 2011. **32**(3): p. 1081-1093.

123. Khan, H.A., et al., *Roll bonding processes: State-of-the-art and future perspectives*. Metals, 2021. **11**(9): p. 1344.
124. Pfaffenberger, R.T. and L.R. Van Horik, *Roll welded structure and process*. 1969, Google Patents.
125. Yang, W., *An investigation of bonding mechanism in metal cladding by warm rolling*. 2011: Texas A&M University.
126. Zixuan, L., et al., *Recent advances and trends in roll bonding process and bonding model: A review*. Chinese Journal of Aeronautics, 2023. **36**(4): p. 36-74.
127. Bay, N., et al., *Bond strength in cold roll bonding*. CIRP Annals, 1985. **34**(1): p. 221-224.
128. Li, L., K. Nagai, and F. Yin, *Progress in cold roll bonding of metals*. Science and technology of advanced materials, 2008.
129. Akramifard, H., H. Mirzadeh, and M. Parsa, *Cladding of aluminum on AISI 304L stainless steel by cold roll bonding: Mechanism, microstructure, and mechanical properties*. Materials Science and Engineering: A, 2014. **613**: p. 232-239.
130. Naseri, M., M. Reihanian, and E. Borhani, *Bonding behavior during cold roll-cladding of tri-layered Al/brass/Al composite*. Journal of Manufacturing Processes, 2016. **24**: p. 125-137.
131. Gholami, M.D., R. Hashemi, and B. Davoodi, *Investigation of microstructure evolution on the fracture toughness behaviour of Brass/Low Carbon Steel/Brass clad sheets fabricated by Cold Roll Bonding process*. Journal of Materials Research and Technology, 2023.
132. Li, X., et al., *Interfacial microstructure and mechanical properties of Cu/Al clad sheet fabricated by asymmetrical roll bonding and annealing*. Materials Science and Engineering: A, 2011. **529**: p. 485-491.
133. Jamaati, R. and M. Toroghinejad, *Cold roll bonding bond strengths*. Materials Science and Technology, 2011. **27**(7): p. 1101-1108.
134. Frolov, Y., et al., *Deformation of expanded steel mesh inlay inside aluminum matrix during the roll bonding*. Journal of Manufacturing Processes, 2020. **58**: p. 857-867.
135. Wang, P., et al., *Effects of annealing on the interfacial structures and mechanical properties of hot roll bonded Al/Mg clad sheets*. Materials Science and Engineering: A, 2020. **792**: p. 139673.

136. Dhib, Z., et al., *Cladding of low-carbon steel to austenitic stainless steel by hot-roll bonding: microstructure and mechanical properties before and after welding*. Materials Science and Engineering: A, 2016. **656**: p. 130-141.
137. Luo, Z., et al., *Interfacial microstructure and properties of a vacuum hot roll-bonded titanium-stainless steel clad plate with a niobium interlayer*. Acta Metallurgica Sinica (English Letters), 2013. **26**: p. 754-760.
138. Ghalehbandi, S.M., M. Malaki, and M. Gupta, *Accumulative roll bonding—a review*. Applied Sciences, 2019. **9**(17): p. 3627.
139. Karthikeyan, J., *Development of oxidation resistant coatings on GRCo-84 substrates by cold spray process*. 2007.
140. Fukumoto, M., et al., *Deposition of copper fine particle by cold spray process*. Materials transactions, 2009. **50**(6): p. 1482-1488.
141. Singh, S. and H. Singh, *Effect of electroplated interlayers on bonding mechanism of cold-sprayed copper on SS316L steel substrate*. Vacuum, 2020. **172**: p. 109092.
142. Stoltenhoff, T., et al., *Microstructures and key properties of cold-sprayed and thermally sprayed copper coatings*. Surface and Coatings Technology, 2006. **200**(16-17): p. 4947-4960.
143. Hassani-Gangaraj, S.M., A. Moridi, and M. Guagliano, *Critical review of corrosion protection by cold spray coatings*. Surface Engineering, 2015. **31**(11): p. 803-815.
144. Singh, S., et al., *Influence of cold spray parameters on bonding mechanisms: A review*. Metals, 2021. **11**(12): p. 2016.
145. Wan, L. and Y. Huang, *Friction stir welding of dissimilar aluminum alloys and steels: a review*. The International Journal of Advanced Manufacturing Technology, 2018. **99**(5): p. 1781-1811.
146. Emamian, S.S., et al., *Improving the friction stir welding tool life for joining the metal matrix composites*. The International Journal of Advanced Manufacturing Technology, 2020. **106**(7): p. 3217-3227.
147. Kulekci, M.K., U. Esmel, and B. Buldum, *Critical analysis of friction stir-based manufacturing processes*. The International Journal of Advanced Manufacturing Technology, 2016. **85**(5): p. 1687-1712.
148. Barooni, O., et al., *New method to improve the microstructure and mechanical properties of joint obtained using FSW*. The International Journal of Advanced Manufacturing Technology, 2017. **93**(9): p. 4371-4378.

149. Wei, Y., et al., *Microstructure and conductivity of the Al-Cu joint processed by friction stir welding*. Advances in Materials Science and Engineering, 2020. **2020**: p. 1-10.
150. Xue, P., et al., *Enhanced mechanical properties of friction stir welded dissimilar Al-Cu joint by intermetallic compounds*. Materials science and engineering: A, 2010. **527**(21-22): p. 5723-5727.
151. Aonuma, M. and K. Nakata, *Dissimilar metal joining of ZK60 magnesium alloy and titanium by friction stir welding*. Materials Science and Engineering: B, 2012. **177**(7): p. 543-548.
152. Li, B., et al., *Dissimilar friction stir welding of Ti-6Al-4V alloy and aluminum alloy employing a modified butt joint configuration: Influences of process variables on the weld interfaces and tensile properties*. Materials & Design, 2014. **53**: p. 838-848.
153. Li, J., et al., *The microstructure and mechanical properties of titanium/copper welded joint by FSW*. Materials Science and Technology, 2022. **38**(17): p. 1532-1542.
154. Beygi, R., et al., *Design of friction stir welding for butt joining of aluminum to steel of dissimilar thickness: Heat treatment and fracture behavior*. The International Journal of Advanced Manufacturing Technology, 2021. **112**: p. 1951-1964.
155. Sato, Y.S., et al., *Constitutional liquation during dissimilar friction stir welding of Al and Mg alloys*. Scripta Materialia, 2004. **50**(9): p. 1233-1236.
156. Shokri, V., A. Sadeghi, and M. Sadeghi, *Effect of friction stir welding parameters on microstructure and mechanical properties of DSS-Cu joints*. Materials Science and Engineering: A, 2017. **693**: p. 111-120.
157. Wang, T., et al., *Towards obtaining sound butt joint between metallurgically immiscible pure Cu and stainless steel through friction stir welding*. Metallurgical and Materials Transactions A, 2018. **49**(7): p. 2578-2582.
158. Joshi, G.R. and V.J. Badheka, *Microstructures and properties of copper to stainless steel joints by hybrid FSW*. Metallography, Microstructure, and Analysis, 2017. **6**: p. 470-480.
159. Jafari, M., et al., *Microstructures and mechanical properties of friction stir welded dissimilar steel-copper joints*. Journal of Mechanical Science and Technology, 2017. **31**(3): p. 1135-1142.
160. Imani, Y., M. Givi, and M. Guillot. *Improving friction stir welding between copper and 304L stainless steel*. in *Advanced Materials Research*. 2012. Trans Tech Publ.

161. Najafkhani, A., K. Zangeneh-Madar, and H. Abbaszadeh, *Evaluation of microstructure and mechanical properties of friction stir welded copper/316L stainless steel dissimilar metals*. International Journal of Iron & Steel Society of Iran, 2010. **7**(2): p. 21-25.
162. Akbari, M., et al., *Enhancing metallurgical and mechanical properties of friction stir lap welding of Al–Cu using intermediate layer*. Science and Technology of Welding and Joining, 2013. **18**(6): p. 518-524.
163. Firouzdor, V. and S. Kou, *Al-to-Cu friction stir lap welding*. Metallurgical and Materials Transactions A, 2012. **43**(1): p. 303-315.
164. Naidu, R.B., *Friction stir welding: Thermal effects of a parametric study on butt and lap welds*. 2006.
165. Safeen, M.W. and P. Russo Spina, *Main issues in quality of friction stir welding joints of aluminum alloy and steel sheets*. Metals, 2019. **9**(5): p. 610.
166. Argade, G., et al., *Friction stir lap welding of stainless steel and plain carbon steel to enhance corrosion properties*. Journal of Materials Processing Technology, 2018. **259**: p. 259-269.
167. Gao, Y., et al., *Microstructures and mechanical properties of friction stir welded brass/steel dissimilar lap joints at various welding speeds*. Materials & Design, 2016. **90**: p. 1018-1025.
168. Avery, D., et al., *Fatigue behavior of solid-state additive manufactured inconel 625*. Jom, 2018. **70**: p. 2475-2484.
169. Tavassolimanesh, A. and A.A. Nia, *A new approach for manufacturing copper-clad aluminum bimetallic tubes by friction stir welding (FSW)*. Journal of Manufacturing Processes, 2017. **30**: p. 374-384.
170. Li, B., et al., *Effects of processing variables and heat treatments on Al/Ti-6Al-4V interface microstructure of bimetal clad-plate fabricated via a novel route employing friction stir lap welding*. Journal of Alloys and Compounds, 2016. **658**: p. 904-913.
171. Osman, N., et al., *Effect of Process Parameters on Interfacial Bonding Properties of Aluminium–Copper Clad Sheet Processed by Multi-Pass Friction Stir-Welding Technique*. Metals, 2019. **9**(11): p. 1159.
172. Lakshminarayanan, A. and K. Harikrishna. *Role of overlap ratio on the microstructure of friction stir multiseam clad copper-stainless steel lap joints*. in *Materials Science Forum*. 2020. Trans Tech Publ.

173. Guo, Y., et al., *Microstructure and properties of copper-steel bimetallic sheets prepared by friction stir additive manufacturing*. Journal of Manufacturing Processes, 2022. **82**: p. 689-699.
174. Kumar, K. and S.V. Kailas, *The role of friction stir welding tool on material flow and weld formation*. Materials Science and Engineering: A, 2008. **485**(1-2): p. 367-374.
175. Zhang, Y., et al., *Review of tools for friction stir welding and processing*. Canadian Metallurgical Quarterly, 2012. **51**(3): p. 250-261.
176. Liew, K.W., et al., *Effect of Tool Pin Geometry on the Microhardness and Surface Roughness of Friction Stir Processed Recycled AA 6063*. Metals, 2021. **11**(11): p. 1695.
177. Verma, S., M. Gupta, and J.P. Misra, *Effect of pin-profiles on thermal cycle, mechanical and metallurgical properties of friction stir-welded aviation-grade aluminum alloy*. Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture, 2019. **233**(11): p. 2183-2195.
178. Ghangas, G. and S. Singhal, *Effect of tool pin profile and dimensions on mechanical properties and microstructure of friction stir welded armor alloy*. Materials Research Express, 2018. **5**(6): p. 066555.
179. Moradi, M.M., H. Jamshidi Aval, and R. Jamaati, *Effect of tool pin geometry and weld pass number on microstructural, natural aging and mechanical behaviour of SiC-incorporated dissimilar friction-stir-welded aluminium alloys*. Sādhanā, 2019. **44**(1): p. 9.
180. Khan, N.Z., et al., *Analysis of defects in clean fabrication process of friction stir welding*. Transactions of nonferrous metals society of china, 2017. **27**(7): p. 1507-1516.
181. Leonard, A. and S. Lockyer. *Flaws in friction stir welds*. in *4th international symposium on friction stir welding*. 2003. Park City, Utah, USA.
182. Fuller, C.B., *Friction stir tooling: tool materials and designs*. Friction stir welding and processing, 2007. **7**.
183. Albannai, A.I., *Review the common defects in friction stir welding*. Int. J. Sci. Technol. Res, 2020. **9**(11): p. 318-329.
184. Dehghani, M., A. Amadeh, and S.A. Mousavi, *Investigations on the effects of friction stir welding parameters on intermetallic and defect formation in joining aluminum alloy to mild steel*. Materials & Design, 2013. **49**: p. 433-441.

185. Beygi, R., et al., *Buttering for FSW: Enhancing the fracture toughness of Al-Fe intermetallics through nanocrystallinity and suppressing their growth*. Journal of Manufacturing Processes, 2023. **90**: p. 233-241.
186. Li, Z., et al., *Fabrication of porous Ag by dealloying of Ag–Zn alloys in H₂SO₄ solution*. Journal of materials science, 2010. **45**: p. 6494-6497.
187. Zhang, F., et al., *Self-healing mechanisms in smart protective coatings: A review*. Corrosion Science, 2018. **144**: p. 74-88.
188. Davis, J.R., *Corrosion: Understanding the basics*. 2000: Asm International.
189. Yaro, A., K. Hameed, and A. Khadom, *Study for prevention of steel corrosion by sacrificial anode cathodic protection*. Theoretical foundations of chemical engineering, 2013. **47**(3): p. 266-273.
190. Rani, B. and B.B.J. Basu, *Green inhibitors for corrosion protection of metals and alloys: an overview*. International Journal of corrosion, 2012. **2012**.
191. Cowley, W.E., F. Robinson, and J. Kerrich, *Anodic protection for the control of corrosion fatigue*. British Corrosion Journal, 1968. **3**(5): p. 223-237.
192. Braithwaite, J.W. and M.A. Molecke, *Nuclear waste canister corrosion studies pertinent to geologic isolation*. Nuclear and Chemical Waste Management, 1980. **1**(1): p. 37-50.
193. Yaghoubi, S. and A. Shirazi, *Mechanical properties and corrosion behavior of friction stir welded copper plates under shielding gas*. International Journal of Fatigue, 2021. **152**: p. 106419.
194. Fattah-Alhosseini, A. and A.H. Taheri, *Effect of friction stir welding on corrosion behavior of pure copper in 3.5 wt.% NaCl solution*. Journal of Manufacturing Processes, 2015. **20**: p. 98-103.
195. Conte, N. *Ranked: The World's Biggest Steel Producers, by Country*. may 2023; Available from: <https://www.visualcapitalist.com/biggest-steel-producers-country/>.
196. Materials, A. *AISI 1018 Carbon Steel*. 2013 [cited 2023 02-10-2023]; Available from: <https://www.azom.com/article.aspx?ArticleID=9138>.
197. Konkol, P.J. and M.F. Mruczek, *Comparison of friction stir weldments and submerged arc weldments in HSLA-65 steel*. WELDING JOURNAL-NEW YORK-, 2007. **86**(7): p. 187.

198. Tiwari, A., et al., *FSW of low carbon steel using tungsten carbide (WC-10wt.% Co) based tool material*. Journal of Mechanical Science and Technology, 2019. **33**(10): p. 4931-4938.
199. Rai, R., et al., *friction stir welding tools*. Science and Technology of welding and Joining, 2011. **16**(4): p. 325-342.
200. university, p. *Scanning Electron Microscope*. 10-08-23]; Available from: <https://www.purdue.edu/epps/rem/laboratory/equipment%20safety/Research%20Equipment/sem.html#:~:text=The%20scanning%20electron%20microscope%20has,magnified%20at%20much%20higher%20levels>.
201. Matweb. *Vickers Hardness Testing*. 10-08-23]; Available from: <https://www.matweb.com/reference/vickers-hardness.aspx>.
202. ASTM, E., *Standard test methods for tension testing of metallic materials*. Annual book of ASTM standards. ASTM, 2001.
203. Standard, A., *Standard test method for guided bend test for ductility of welds E190-14*. ASTM international, 2014.
204. ASTM. *ASTM E190-21*. Standard Test Method for Guided Bend Test for Ductility of Welds 2021 [cited 2023 15-09-2023]; Available from: <https://compass.astm.org/document/?contentCode=ASTM%7CE0190-21%7Cen-US&proxycl=https%3A%2F%2Fsecure.astm.org&fromLogin=true>.
205. panalytical, M. *X-ray Diffraction (XRD)*. 11-08-23]; Available from: <https://www.malvernpanalytical.com/en/products/technology/xray-analysis/x-ray-diffraction>.
206. testing, I. *CORROSION TESTING*. 11-08-23]; Available from: <https://labtesting.com/services/materials-testing/corrosion-testing/#:~:text=Corrosion%20Testing%20determines%20the%20resistance,temperature%2C%20humidity%20and%20salt%20water>.
207. Gowri, S., et al., *Atomic force microscopy technique for corrosion measurement*, in *Electrochemical and Analytical Techniques for Sustainable Corrosion Monitoring*. 2023, Elsevier. p. 121-140.
208. Babu, R. and E. Singh, *Atomic force microscopy: A source of investigation in biomedicine*. International Journal of Electronic and Electrical Engineering, 2014. **7**(1): p. 59-66.

209. CAMBRIDGE, U.O. *Atomic force microscopy*. 11-08-23]; Available from: https://www.doitpoms.ac.uk/tlplib/afm/modes_operation.php.
210. Eff, M., *The effects of tool texture on tool wear in friction stir welding of X-70 steel*. 2012, The Ohio State University.
211. Choi, D., et al., *Frictional wear evaluation of WC–Co alloy tool in friction stir spot welding of low carbon steel plates*. International Journal of Refractory Metals and Hard Materials, 2009. **27**(6): p. 931-936.
212. Tiwari, A., et al., *Tool performance evaluation of friction stir welded shipbuilding grade DH36 steel butt joints*. The International Journal of Advanced Manufacturing Technology, 2019. **103**: p. 1989-2005.
213. Vicharapu, B., et al., *Degradation of nickel-bonded tungsten carbide tools in friction stir welding of high carbon steel*. The International Journal of Advanced Manufacturing Technology, 2021. **115**: p. 1049-1061.
214. Sierens, A., et al., *Review on the possible tool materials for friction stir welding of steel plates*. Sustainable Construction and Design (SCAD-2013), 2014. **5**(1).
215. Matweb.com. *Copper; Cu; Annealed*. Datasheet 2024; Available from: https://www.matweb.com/search/datasheet_print.aspx?matguid=9aebe83845c04c1db5126fada6f76f7e.
216. El Warraky, A., H. El Shayeb, and E. Sherif, *Pitting corrosion of copper in chloride solutions*. Anti-Corrosion Methods and Materials, 2004. **51**(1): p. 52-61.
217. Kear, G., B. Barker, and F. Walsh, *Electrochemical corrosion of unalloyed copper in chloride media—a critical review*. Corrosion science, 2004. **46**(1): p. 109-135.
218. Mišković-Stanković, V., et al., *Electrochemical study of corrosion behavior of graphene coatings on copper and aluminum in a chloride solution*. Carbon, 2014. **75**: p. 335-344.
219. McCafferty, E., *Validation of corrosion rates measured by the Tafel extrapolation method*. Corrosion science, 2005. **47**(12): p. 3202-3215.

List of publications from this work

Journal Publications

1. **Mahto, M. K.**, Kumar, A., Raja, A. R., Vashista, M., & Yusufzai, M. Z. K. (2022). Cladding of coppersheet on mild steel using friction stir welding. *The International Journal of Advanced Manufacturing Technology*, 118(9), 3345-3360. <https://doi.org/10.1007/s00170-021-08154-4>
2. **Mahto, M. K.**, Kumar, A., Raja, A. R., Vashista, M., & Yusufzai, M. Z. K. (2022). Friction stir cladding of copper on aluminium substrate. *CIRP Journal of Manufacturing Science and Technology*, 36, 23-34. <https://doi.org/10.1016/j.cirpj.2021.10.004>
3. **Mahto, M. K.**, Kumar, A., Vashista, M., & Yusufzai, M. Z. K. (2023). Effect of tool offset distancevariation and mechanical property evaluation for effective cladding of copper to steel by friction stircladding. *Journal of Manufacturing Processes*, 96, 161-175 <https://doi.org/10.1016/j.jmapro.2023.04.044>
4. **Mahto, M. K.**, Kumar, A., Vashista, M., & Yusufzai, M. Z. K. (2023). Corrosion behaviour of copper claddeed steel produced using multi pass friction stir welding process. *CIRP Journal of Manufacturing Science and Technology*, 47 (2023) 244–259 <https://doi.org/10.1016/j.cirpj.2023.10.006>

Conference Publications

1. **Mahto, M. K.**, Kumar, A., Vashista, M., & Yusufzai, (2022). ‘Tool offset variation and itsevaluation for effective cladding of copper to steel in friction stir welding’ (Oral Presentation)COPEN 12 International Conference on Micro, Meso, and Nano Engineering, 8-10 Dec. 2022, IIT Kanpur
2. **M. K. Mahto**, A Kumar, M. Vashista and Yusufzai M. Z. K. “Assessment of weld imperfections occurring during friction stir cladding of copper on aluminium” Oral presentation in 3rd International Conference on Recent Advancements in Mechanical Engineering (ICRAME) 2022, February 2022, NIT Silchar.
3. **M. K. Mahto**, A Kumar, M. Vashista and Yusufzai M. Z. K. “Assessment of weld imperfections occurring during friction stir cladding of copper on aluminium” Oral presentation in national welding meet (IIW-NWM) Kochi 14th-15th October 2022, Kochi.