RESUME

Name: Degala Venkata Kiran

Date of Birth: 16-07-1983

Status: Married

Nationality: Indian

Contact Address:

Permanent

D.V.Kiran
C/o B. Janardhana Rao
Door no.: 7-4-37(2), Lawyer Pet
Ongole, Andhra Pradesh.

Present

D.V.Kiran
Room no. 213
Mech. and Industrial Engg. Dept.
IIT Roorkee, Roorkee
Uttarakhand – 247667.

Tel. No.: +91 9652403553, +91 9885607571
E-mail: dvk13mech@gmail.com, dvkiranfme@iitr.ac.in

Academic Qualification

Sr. No.	Exam passed	University/Institution/ Board	Year of passing	Subject (% of marks / C.G.P.A)	Total % of marks/ C.G.P.A	Division	Rank/position in the univ.
1	Xth standard	Adithya public school, Board of secondary education, Ongole, AP	1998	Not applicable	77.50	First	-----
2	XIIth standard	Umamaheswara junior college, Intermediate board, Ongole, AP	2000	Mathematics – 94.7 Physics – 98.7 Chemistry – 91.3	90.70	First	Fifth Position in the college
3	Bachelor of engineering	GITAM college of engineering, Andhra university, Visakhapatnam, AP	2005	Mechanical Engineering 1st year – 81.9 2nd year – 74.5 3rd year – 73.1 4th year – 67.0	74.10	First	-----
4	Master of technology	Indian Institute of Technology, Roorkee	2007	Mechanical Engineering (welding engineering specialization) End of 1st year – 8.82 End of 2nd year – 8.91	8.91 (C.G.P.A out of 10)	First	First position in the class
5	PhD	Indian Institute of Technology, Bombay	2012	Mechanical Engineering (Manufacturing specialization)	Best PhD thesis award from Indian Institute of Welding in the area of welding for the year 2012		
6	Post-doc.	KAIST, South Korea	2012-2015	Mechanical Engineering (ALPHA Lab)	Supervisor: Prof. Suck-Joo Na		

Area of Research

- Welding Science and Technology
- Numerical analysis of heat transfer and fluid flow in fusion welding processes
- Numerical analysis of residual stresses and deformation in fusion welding processes
- Experimental stress analysis
- Statistical modeling and optimization

Research Experience

Position: Post-doctoral researcher **Institution**: KAIST **Duration**: 2012 – 2015	**Thesis Title:** Heat transfer and fluid flow analysis of multi-wire submerged arc welding process using CFD.

Abstract: Tandem submerged arc welding (SAW-T) process with more than single wire increase the productivity due to the simultaneous deposition from more than one welding wire. However, the presence of more than one arc leads to a very complex phenomenon of heat transfer from the arc to the work piece and the fluid flow inside the weld pool. Understanding the same helps in the better application of the present welding process. Numerical modeling is the economical route to understand the heat transfer and fluid flow phenomenon inside the weld pool. However the reliability of the numerical model depends on how accurate the arc phenomenon is modeled. In multi-wire process, the magnetic field generated by each individual arc has a significant influence on the behavior of the other arc as well as on the transfer direction of the molten drop from the electrode to the work piece. Initially an attempt is made in the present work to understand the arc behavior in SAW-T process experimentally. The experimental study involves performing bead-on-groove welds in 20 mm thick HSLA steel following a three level design. The leading and trailing wire currents are the process parameters considered in the present work. Welding current and voltage waveforms, and the arc images are recorded simultaneously while performing the experiments. Next a physical model for the leading and trailing arc interaction is developed and validated with the corresponding experimental results. Further few regression models are developed to predict the leading and trailing arc dimension variation with respect to leading and trailing arc currents, and the arc interaction. Finally the above studied arc behavior is utilized in the reliable modeling of heat transfer and fluid analysis of the two wire tandem submerged arc welding process. The model solves the equations of conservation of mass, momentum, and energy along with the volume of fluid (VOF) method. VOF method is adopted to track the shape of the free surface. The numerical model is validated extensively by comparing the calculated weld pool dimensions with the corresponding experimental results and found to be in good agreement.

Next, the heat transfer and fluid flow model is extended to three wire tandem SAW process. The arc interaction physical model and the regression models for the leading and trailing arcs dimensions proposed in the two wire tandem SAW process are also extended to three wire tandem SAW process. The model is validated by comparing the calculated weld pool dimensions with the corresponding experimental weld bead shapes available in open literature and found to be in fair agreement.

Position: PhD Research Student **Institution**: IIT Bombay **Duration**: 2008 - 2012	**Thesis Title:** An experimental and numerical investigation on two wire tandem submerged arc welding process.

Abstract: Two wire tandem submerged arc welding (SAW-T) process facilitates high rate of deposition due to the simultaneous deposition from two welding wires. Since the leading wire is usually connected to a DC welding arc and the trailing wire to a wave-controlled pulsed AC arc, the tandem process requires a thorough understanding of the influence of the process variables on the temperature distribution, bead dimensions, and weld joint mechanical properties for successful use of the same. Recourse is attempted by developing a three-dimensional heat transfer model for SAW-T process which follows a novel scheme to account for material deposition and heat input from two electrode wires and associated welding arcs simultaneously. The experimental study involves the preparation of single-pass welded coupons in a 12.0 mm thick marine grade HSLA steel following central composite rotatable design. The final weld width and the reinforcement height showed greater sensitivity to trailing wire current pulses while the penetration was influenced primarily by leading wire current. Increase in leading wire current or trailing wire positive current or trailing wire negative current, or decrease in trailing wire negative current time or welding speed reduce the cooling rate, volume fraction of ferrite phase, welding joint tensile strength and Charpy impact toughness. The analytical estimation of the leading and trailing volumetric heat sources is able to rightly trace the influence of welding conditions. No a-priori simplified assumption is thus necessary to assume the shape and size of the volumetric heat source corresponding to a typical welding arc. The computed weld bead dimensions and thermal cycles from the numerical model are validated against the corresponding measured results and found in good agreement.

Position: Master's Student **Institution**: IIT Roorkee **Duration**: 2005 – 2007	**Thesis Title:** Influence of the tungsten inert gas welding process parameters on the performance of dissimilar aluminum alloy weld joints.

Abstract: Pulsed gas tungsten arc welding (P-GTAW) process optimizes the heat input to the weld pool by altering the current between peak and base currents. The heating and fusion takes place during the periods of peak current, with cooling and solidification during the periods of base current. In the present investigation, P-GTAW for two dissimilar combinations of Al alloys – a heat treatable and a non heat treatable e.g. (a) Al-6%Cu & Al-5%Si, and (b) Al-5%Mg & Al-3.6%Mg – were performed. Attempts are made to improve the mechanical properties of the Al-6%Cu & Al-5%Si weld joints by two different methods (a) post weld heat treatment (T6 condition) and (b) Warm rolling (hot rolling + cold rolling). The influence of the pulse parameters and the strengthening processes on the micro-hardness and tensile strength of the welding joints were studied. The decrease in pulse frequency or duty cycle increased the micro-hardness and tensile strength of both Al-6%Cu to Al-5%Si, and Al-5%Mg to Al-3.6%Mg weld joints. The warm rolling process improves the micro-hardness and tensile strength of the Al-6%Cu to Al-5%Si weld joint more effectively than post weld heat treatment (T6) process.

Teaching Experience

- **Teaching Assistant for Manufacturing Process Laboratory**

  Manufacturing process lab is a third year undergraduate laboratory in mechanical engineering department of IIT Bombay. The laboratory involves experiments spanning across the casting, forming, machining and welding laboratories. As a teaching assistant to this laboratory, I have been handling regular laboratory experiments on the gas metal arc welding (GMAW), gas tungsten arc welding (GTAW), resistance spot welding (RSW), and shielded metal arc welding (SMAW) processes since July'2008. These experiments primarily involve preparing welding coupons at various parametric combinations and studying the influence of welding conditions on various process responses based on fundamental analytical relations.

- **Teaching Assistant for Manufacturing Practice Laboratory**

  Manufacturing practice laboratory is a second year undergraduate laboratory in mechanical engineering department of IIT Bombay. The students undergoing this laboratory are expected to manufacture two or three separate components using several manufacturing processes. This laboratory further involves regular tutorials teaching the students the technology of various manufacturing processes. As a teaching assistant to this laboratory, I have been regularly taking the tutorials on various welding, brazing and soldering processes and assisting the students in completing their respective jobs.

Referees

Referee 1 (PhD supervisor)
Prof. Amitava De, Mechanical engineering department, IIT. Bombay, Powai, Mumbai,
Ph: +91 22 2576 7509, +91 9820536733; Fax: +91 22 2572 6875; email: amit@iitb.ac.in
Referee 2 (Post-Doctorate supervisor)
Prof. Suck-Joo Na, Mechanical engineering department,
Korea Advanced Institute of Science and Technology, Daejeon, South Korea,
Ph: +82 423503216, +82 1088177314; Fax: +82 423503210; email: sjoona@kaist.ac.kr
Referee 3 (M.Tech supervisor)
Prof. D.K.Dwivedi, Mechanical and industrial engineering department, IIT.Roorkee, Roorkee,
Ph: +91 1332 285826, +91 9837014340;Fax: +91 1332 273560; email: dkd04fme@iitr.ernet.in

Software Experience

- Operating systems: Windows
- FEM packages: ABAQUS 6.8-EF1, SYSWELD 2009
- CFD Packages: FLOW 3D
- Programming languages: FORTRAN 90
- Statistical packages: MINITAB 15
- Other packages: MATLAB 7.8, ORIGIN 8.0

List of Publications

International Journals

1. D. V. Kiran, B. Basu, A. K. Shah, S. Mishra and A. De, "Probing influence of welding current on weld quality in two wire tandem submerged arc welding of HSLA steel", ***Science and Technology of Welding and Joining***, 15 (2), 2010, pp. 111-116 **[IF: 1.707]**.
2. D. V. Kiran, B. Basu, A. K. Shah, S. Mishra and A. De, "Three-dimensional heat transfer analysis of two wire tandem submerged arc welding", ***ISIJ International***, 51 (5), 2011, pp. 793-798 **[IF: 1.069]**.

3. S. Bag, D. V. Kiran, A. A.Syed and A. De, “Efficient estimation of volumetric heat source in fusion welding process simulation”, ***Welding in the World***, 56 (11/12), 2012, pp. 88-97 **[IF: 0.746]**.
4. D. V. Kiran, B. Basu and A. De, “Influence of process variables on weld bead quality in two wire tandem submerged arc welding of HSLA steel”, ***Journal of Materials Processing Technology***, 212 (10), 2012, pp. 2041-2050 **[IF: 2.236]**.
5. D. V. Kiran and A. De, “Reliable estimation of volumetric heat source in numerical simulation of fusion arc welding process”, ***Indian Welding Journal***, 45 (4), 2012, pp. 1-11.
6. D. V. Kiran, S. A. Alam and A. De, “Development of process maps in two wire tandem submerged arc welding process of HSLA steel”, ***Journal of Materials Engineering and Performance***, 22 (4), 2013, pp. 988-994 **[IF: 0.998]**.
7. D. V. Kiran, D W. Cho, W. H. Song and S. J. Na, “Arc behaviour in two wire tandem submerged arc welding”, ***Journal of Materials Processing Technology***, 214 (8), 2014, pp. 1546-1556 **[IF: 2.236]**.
8. D. W. Cho, D. V. Kiran, W. H. Song and S. J. Na, “Molten pool behaviour in the tandem submerged arc welding process”, ***Journal of Materials Processing Technology,*** 214 (11), 2014, pp. 2233-2247 **[IF: 2.236]**.
9. D. V. Kiran and S. J. Na, "Experimental studies on submerged arc welding process", ***Journal of Welding and Joining,*** 32 (3), 2014, pp. 1-10 **[IF: 0.254]**.
10. D. V. Kiran and S. J. Na, "Numerical studies on submerged arc welding process", ***Journal of Welding and Joining,*** 32 (4), 2014, pp. 1-9 **[IF: 0.254]**.
11. D. V. Kiran, D. W. Cho, H. K. Lee, C. Y. Kang and S. J. Na, “A study on the quality of two-wire tandem submerged arc welds under iso-heat input conditions” ***International Journal of Advanced Manufacturing Technology***, 78 (1-4), 2015, pp. 53-62 **[IF: 1.458]**.
12. D. V. Kiran, D. W. Cho, W. H. Song and S. J. Na, “Arc interaction and molten pool behaviour in the three wire submerged arc welding process”, ***International Journal of Heat and Mass Transfer***, 87, 2015, pp. 327-340 **[IF: 2.383]**.
13. D. W. Cho, D. V. Kiran and S. J. Na, “Analysis of the flux consumption and metal transfer for tandem submerged arc welding process under Iso-heat input conditions”, ***Welding Journal***, 94, 2015, pp. 396s-401s **[IF: 0.925]**.
14. J. Cheon, D. V. Kiran and S. J. Na, “Thermal metallurgical analysis of GMA welded AH36 steel using CFD-FEM framework”, ***Materials and Design,*** 91, 2016, pp. 230-241 **[IF: 3.501]**.
15. J. Cheon, D. V. Kiran and S. J. Na, “CFD based visualization of finger shaped evolution in gas metal arc welding process”, ***International Journal of Heat and Mass Transfer***, 97, 2016, pp. 1-14 **[IF: 2.383]**.
16. D. V. Kiran, J. Cheon, N. Arif, H. Chung and S. J. Na, “Three dimensional finite element modeling of pulsed AC gas metal arc welding processes”, ***International Journal of Advanced Manufacturing Technology***, DOI 10.1007/s00170-015-8297-2 **[IF: 1.458]**.
17. W. Ligang, J. Cheon, D. V. Kiran and S. J. Na, “CFD simulations of GMA welding of horizontal fillet joint based on coordinate rotation of arc models”, ***Journal of Materials Processing Technology***, 231, 2016, pp. 221-238 **[IF: 2.236]**.
18. D. V. Kiran, J. Cheon, N. Arif, H. Chung and S. J. Na, “Heat transfer and fluid flow analysis of pulsed DC and AC GMAW processes”, ***Journal of Physics D: Applied Physics*** (*In progress*) [**IF: 2.721**].

International and National Conferences

1. D. V. Kiran, B. Basu, A. K. Shah, S. Mishra and A. De, “Three-dimensional heat transfer modeling of tandem submerged arc welding process”, ***National Welding Conference*** *(NWS 2009)*, 2009, Mumbai, India.
2. D. V. Kiran, B. Basu, A. K. Shah, S. Mishra and A. De, “Numerical modeling of two wire tandem submerged arc welding process and its experimental validation”, ***National Welding Conference*** *(NWS 2010)*, 2010, Vishakhapatnam, India.
3. D. V. Kiran, V. D. Manvatkar and A.De, “Development of process maps for two tandem submerged arc welding process of HSLA steel using numerical process model and artificial neural network based prediction model”, ***1st Interquadrennial ICF Conference in Middle East and Africa***, 2011, Luxor, Egypt.
4. S. Bag, D. V. Kiran and A. De, “Efficient estimation of volumetric heat source in fusion welding process simulation”, ***64th Annual Assembly of the International Institute of Welding***, 2011, Chennai, India.
5. D. W. Cho, D. V. Kiran, W. H. Song and S. J. Na, “CFD simulation of submerged tandem arc welding process”, ***66th Annual Assembly of the International Institute of Welding***, 2013, Essen, Germany.
6. D. V. Kiran, D. W. Cho, W. H. Song and S. J. Na, " Three dimensional heat transfer and fluid flow modeling of two wire tandem submerged arc welding processes”, ***Autumn Annual Conference of KWJS***, 2013, South Korea.
7. D. V. Kiran, D. W. Cho, W. H. Song and S. J. Na, "Molten pool behavior in three wire tandem submerged arc welding of X-groove joint", ***67th Annual Assembly of the International Institute of Welding***, 2014, Seoul, South Korea.
8. J. Cheon, D. V. Kiran, S. W. Han, L. Wu and S. J. Na, "Estimation of welding distortion based on CFD process simulation", ***67th Annual Assembly of the International Institute of Welding***, 2014, Seoul, South Korea.
9. D. W. Cho, D. V. Kiran and S. J. Na, "Molten pool behaviour in the tandem submerged arc welding process", ***67th Annual Assembly of the International Institute of Welding***, 2014, Seoul, South Korea.
10. S. J. Na, D. V. Kiran, D. W. Cho, J. H. Cheon, “Visualization of multi-wire SAW process by CFD simulations”, ***Visual-JW 2014***, 2014, Osaka, Japan.