International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 04 Issue: 02 | Feb -2020 ISSN: 2582-3930

A Review paper on MS & SS plates for finding bending radius by using Arc Welding

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Abstract—
Arc welding is a process of joining metals by using electrodes, by using high heat to melt the parts together and allow them to cool causing fusion. It is a type of welding to join metals, other than joining process like brazing and soldering. It has been widely used for machining applications like machine parts, rod, bolts, studs etc. It shows that good weld ability and also used for carburized parts. This Review paper is to investigate the tests like dye-penetration, magnetic, hardness on welded joints and to find the bending radius at different load conditions. **Keywords-** Arc welding, electrode, Dye-penetration, magnetic, hardness, Bending radius, MS(mild steel),SS(stainless steel)

I. INTRODUCTION

Welding is a process of joining two similar and Non-similar metal or non-metal with the application of heat and pressure, but in some cases without the application of pressure the process has been done. The electrode is used to join the metal in Arc welding process with the help of spool gun. Welding is used for making permanent joints. It is used for the manufacturing of automobile parts, railway wagons, aircraft frames, machine parts, tanks, structural works, boilers, ship building furniture etc. Arc welding is a process which produces the coalescence of metals by heating them with an arc between a continuously fed filler metal electrode and the work.

These are the parameters that are used for the Arc welding process. By this we can do the arc welding with the represented size of the electrode and the type of the electrode that used.

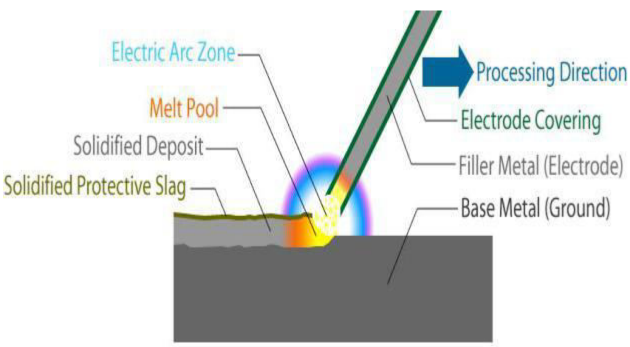

Figure- Arc welding process

For finding the bend radius, The bend allowance (BA) is the length of the arc of the neutral line between the tangent points of a bend in any material. Adding the length of each flange taken between the center of the radius to the BA gives the Flat Pattern length. This bend allowance formula is used to determine the flat pattern length when a bend is dimensioned from 1) the center of the radius, 2) a tangent point of the radius or 3) the outside tangent point of the radius on an acute angle bend.

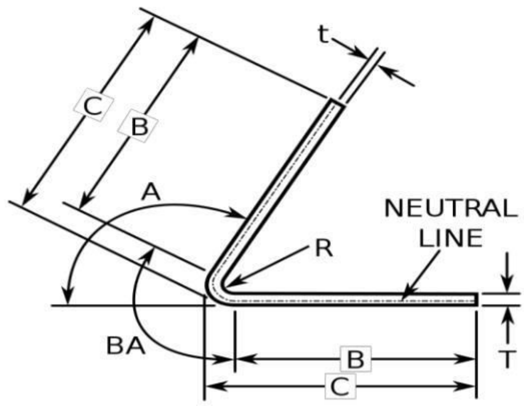

Figure- Bend radius for metal plates

II. LITERATURE REVVIEW

Tejpal singh et al.[1]have took mellow steel plates of sizes 300*125*10 mm3 with grade IS2062 (E410) as base metals since this metal is generally utilized for designing applications in the ventures. They have welded the steel plates utilizing SMAW process with the welding groove points of 50°, 60°, 70°. As indicated by their investigation, they found that the normal elasticity of the example having50°grooveangleismorethanthe example having 60° and 70° score points. They saw that the rigidity of the weld joint is not as much as that of base metal. And furthermore, the joint effectiveness in 50° score point is higher than that of 60° and 70° notch edges. They clarified that the purpose behind most elevated productivity might be because of less inside anxieties prompted in the weld metal as the volume of depression is less contrasted and the notch point having included edge of 60°and 70°. Consequently, they reasoned that bigger the included points of weld groove have bigger volume and bigger volume of filler metal is required to fill it. This 5 causes more extension and withdrawal bringing about progressively initiated interior burdens. They additionally reasoned that the greatest level of prolongation is seen in 50° depression point and least level of extension is seen in 70° score edge. What's more, they likewise found that the most extreme effect quality is seen in 50° notch edge while the base is seen in 70°groove point .

Rouhollah Mohsen Pezeshkian[2] had examined the mechanical and microstructural properties of the P460N steel after the steel parts are joined by Shielded metal circular segment welding process (SMAW). P460N combination steels originate from the fine grain standardized steel family. This kind of composites is generally utilized in oil ventures, substance enterprises, power plants and furthermore for the creation of warmth exchangers, gas jars, LPG bottles and in different fields. In his investigation, he had arranged three examples with the depression points of 60°,45°,75°and went along with them utilizing SMAW process. And afterward he had played out certain tests like Tensile quality test, grain size test, and metallographic test on the welded joint metal, heat influenced zone (HAZ), and Base metal (BM). At that point he looked at all the test outcomes. And afterward he reasoned that the yield worry in welded example cross-segment done by SMAW process with the depression edges of 45° and 75° is not as much as that of the base metal (P460N steel). In SMAW technique with groove edge of 60° yield worry in welded divide is more than that of base metal which is satisfactory from building and standard perspective. Also, in the wake of playing out the metallographic test on the three example he reasoned that the grain size of the weld metal and the HAZ in the example with groove edge of 60° is a lot nearer to the base metal contrasted with every single other size. From this planned, the 60° notch point is assessed as the best possible section edge .

Saiedeh Safaiepour[3] studied the mechanical properties and metallurgical properties on the weld joint made by SMAW process. In his study he took five specimens with thegroove angles of 45°,60°,65°,70°,75°andjoinedthemusing the SMAW process. He then performed the tensile strength test, impact strength test, bending test, and the grain size test on all the five specimens. He studied that the impact energy results in HAZ were different so that HAZ areas in the specimen with 45°,60° and 65° groove angles have less impact energy compared to base metal. But in the specimen with 70° and 75° groove angle, impact energy was more in base metal. This increase can be due to the formation of intermetallic compounds that are formed by high entered heat energy created by welding conditions in these regions. By performing tensile strength test, he studied that the tensile strength in all the cases for all the welded metals is more than that of the base metal. But the yield stress in the groove angles of 45°, 65°, 70°, 75° is less than that of the parent metal. Whereas, for the groove angle of 60° the yield stress in welded metal is more than that of the base metal. Since, the base of engineering plan is yield stress he preferred 60° angle rather than75° angle.

Ipek and Elaldi[4] joined high strength armor steel with different welding angles and investigated the effect of angle and geometry of the welding groove on tensile, compression and bending strength on the welded samples. In their study they obtained the highest tensile strength at the welding angle of 54° and the V-welding groove geometry. They also determined the compressive strength was obtained at welding angle of 48° and the X-welding groove geometry. The fracture occurring in the welded samples as a result of the tensile test was usually associated with the base metal-weld metal transition zone. HAZ and the base-metal weld-metal transition zone are the most critical regions in the welded joints.

Ling et al[5] joined JIS SS400 structural steel sheets in three different welding groove configurations and examined mechanical and microstructural properties of welded joints. In their study the highest tensile strength was obtained in the joint made by double half rooted V groove having 35° welding groove angle and 2 mm root width. They determined the highest impact strength in half V-groove configuration with 35° angle having a 9mm root width [5].

Bekir Cevich[6] explained that the quality of the welded joints depends on many factors such as welding current, voltage, welding speed, shielding gas type, and the welding position. One of the main factors in the welding position is the Groove design.This is because different stresses (tensile, compressive, bending.) can occur on the welded joints. For this reason, while designing welded constructions, it is important to join them with the most appropriate groove configuration by considering the stresses the welded joints can be exposed to. In his study he explained the effect of groove configuration on the mechanical and metallurgical properties of S275 structural steel joined by SMAW process. S275 structural steels are widely used as structural steel tubes, construction pipes, foundation pipes, piling tube sheet, and profiles especially in structural engineering. Then he performed the tensile, hardness and bending tests to determine the mechanical properties of the SMAW joint for different grooves. As a result of his microstructure studies, it is seen that different structures such as ferrite, Widmansttaten ferrite, and acicular ferrite were formed in the weld metal and coarse-grained region. He observed that the hardness of the weld metal was higher than HAZ and the base metal in all the joints. He found that the bending strength of the welded samples were lower than that of the base metal. The lowest bending strength was obtained in the joint made with V-type welding configuration. In bending test results, it was observed that fractures occurred in all the weld samples. In all of them the fracture occurred mainly near to the base metal-weld metal transition zone.

Li et al[7] welded a 7075-T6 Al alloy using V-welding groove at different angles (0°,25°,50°,75°, and 90°) by gas tungsten arc welding method and examined the effects of the welding groove angle on the mechanical properties of the welded joints. In their study they found that the weld groove angle had a significant influence on the mechanical properties and the highest tensile strength was obtained 0° welding groove angle and the smallest tensile 4 strength was obtained at 90° groove angle. They used ER5356 filler metal and made full penetration welds on the workpieces with various included joint angles. After testing the results showed that by using crack resistant filler and by selecting the proper design and post weld heat treatment, strong and dependable welds can be produced on thin Al7075-T6 sheet. They also found that the ductility is also affected by the heat treatment conditions and the joint design. No apparent changes in ductility were observed in 0° groove configuration.

Kayaetal[8] have reported that grain boundary ferrite, widmansttat ferrite, acicular ferrite, polygonal ferrite bainite, and perlite may be present in the weld pool.

Percentages of those phases changes, depending on the cooling rate after the fusion of low carbon and low alloy steels. they also stated that coarse grains are formed due to the effect of heat input in the zones nearest to the weld metal in the arc welding methods. And also stated that the hardest zone was the weld metal in joining the steels with carbon content less than 0.22% via arc welding and the hardness values decreases from weld metal to base metal. They also stated that the first property sought in the welded joints should have the strength of the joint to be the same as or close to that of base metal. In the study it was determined that the welding groove configuration was effective in the tensile strength of the welded samples .

A. Chennakesava Reddy et al[9] have done an analysis on SMAW welding process and suggested some weld parameters required for the optimization of mechanical parameters using taguchi method on DSS material. They suggested that the influence of filler wire material is minimum and the influence of welding position (i.e., welding groove angle) is maximum on the ultimate tensile strength of the weld joint and the input parameters are 85 amps welding current, 2.50 minutes welding time, flat position with included groove angleof60° and thefillermetalis308ER.They also concluded that the influence of filler metal is minimum and influence of welding current is maximum on the hardness of the weld joint. The welding current used here is 75 amps, the filler metal being 310ER. And also, the influence of welding current is minimum and the influence of welding position and groove angle is maximum on impact energy of the weld joint. Here the input welding current is 95 amps, while the filler metal used is 310ER .

Brajesh kumar singh et al[10] have elaborated the effects of variations in the joint designs in the properties of the welded joint. In their study they have considered mild steel plates, IS2062:E250. their main objective was to compare the effects of variation in geometry of butt-joint welding on the mechanical properties of mild steel plates. The welding was carried out on different butt joint designs, such as, square butt joint, single-V joint, double-V joint and single-J joint keeping all other process parameters like current, voltage, welding speed as constant. The results of the mechanical tests and microstructural investigation test revealed that the double-V joint was superior to all the other joints having better mechanical properties than other joints. Single-V joint was also upto the mark but more width of HAZ is recorded in this case as compared to others. This increased the chances of weld defects thus limiting its application areas. Single-J joint was also a good option, but the presence of martensite in its microstructure increases its hardness value considerably, inducing the property of brittleness in it and hence limiting its applications too. Thus, comparing all the properties of all the joints the optimum condition was obtained in double-V joint, single-V joint with the included angle of 60° .

Kumar Vikas et al[11] found that during welding, random variations in current and voltage occur, which cannot be recorded with ordinary ammeter and voltmeter. Acquisition of voltage and current signals while welding is in progress at a very high speed using digital storage oscilloscope (DSO) and subsequent analysis of the stored data can be very useful to understand the arc welding.

Kumar Paul[12] has demonstrated that modern welding controllers with the help of sliding mode control are able to converge more diverse domains, quantitative and qualitative,in - electrical, metallurgical compatibility, welding quality,energy and process efficiency, health hazards, operating duty factor, simplicity of set up, process availability, cost etc to a unique optimization function. Conflict-free optimization has been achieved through selective and off-line use of sliding surface using soft-sliding mode control. In these research paper it is brought in to consideration about the adverse effect of the welding on the human health and that it can be brought under control by adopting the sliding modecontrol technique.

Ravindra Kumar, et al[13] Shielded metal arc welding (SMAW) was used to weld together ASTM SA210 GrA1(Low Carbon Steel) steel. The oxidation studies were conducted on different regions of shielded metal arc weldment such as base metal, weld metal and heat affected zone (HAZ) specimens after exposure to air at 900 ◦C under cyclic conditions. The thermo-gravimetric technique was used to establish kinetics of oxidation. X-ray diffraction (XRD) and scanning electron microscopy/energy-dispersive analysis (SEM/EDAX) techniques were used to analyze the oxidation products. The base metal oxidized in air indicated the formation of high intensity of $Fe2O3$ (Iron oxide) as reveled by XRD analysis and form a thicker oxide scale on the base metal than that of weld metal at 900 ◦C. The oxidation resistance was found to be maximum in case of HAZ due to the formation of densely inner oxide scale and it was least in case of base metal. The oxidation rate (total weight gain values after 50 cycles of xidation) of different basemetal>weldmetal.

Goyal V.K, et al[14] developed an analytical model assumes the primary heat transfer to weld pool is the initial arc heating considered as continuous heat source (arc heat source) of double ellipsoidal nature followed by deposition of superheated filler metal considered as point heat source of interrupted nature superimposed on the first one. The dissimilar nature of the two heat sources is treated by different analytical techniques to estimate their temperature distribution in weld pool and HAZ a tits vicinity. The geometry of the weld pool has been estimated by evaluation of the weld isotherms causing melting of the base metal under the influence of two heat sources acting on the weld

Ghosh P.K et al[15] carried out an experiment on plate weld deposition of 10 mm thick the arc characteristics and behaviour of metal transfer affecting the quality of pulsed current GMA weld is depends upon the pulse parameters and arc voltage primarily due to their influence on arc profile, stability in shielding of arc environment as well as nature of droplets transferred during welding. The arc characteristics defined by its root diameter, projected diameter and length, stiffness of arc affecting the weld quality.

Tong L.G, et al[16] proposed a physical model represents the fluid and thermal dynamics of the SMAW process are quantitatively described, and the drop short circuit transition process is analyzed. To investigate the effects of material parameters on the fluid and thermal dynamics of the weld pool during SMAW, FR (Fusion Ratio) and FL (Fusion Length) are proposed to describe the pool accurately. The evolution and geometry of a weld pool with V-type grooves during butt SMAW were investigated. The results provide a theoretical basis for improving the welding process and welding quality while avoiding welding defects.

Palani P.K, et al[17] uses different methodologies for Pulsed welding is a controlle method of spray transfer, in which the arc current is maintained at a value high enough to permit spray transfer and for long enough to initiate detachment of a molten droplet. Once the droplet is transferred the current is reduced to a relatively low value to maintain the arc. Parameters of peak current, background current, peak current duration, background current duration, pulsing frequency and load duty cycle; it have a distinct effect on the characteristics such as the stability of the arc, weld quality, bead appearance and weld bead geometry. Improper selection of these pulse parameters may cause weld defects including irregular bead surface, lack of fusion, undercuts, burn-backs and stubbing in

Vivek Goel, et al[18] developed an expert system can be used, usually by a welding engineer, to plan for SMAW jobs. This paper presents an expert system to help plan and train shielded metal arc welding (SMAW) operations. It accumulates most of the available information on the SMAW process including edge preparation, electrode selection, economic evaluation, analysis of weld defects and trouble-shooting.

S.M. Tabatabaeipour, et al[19]studied the ultrasonic testing of two welding processes such as shielded metal arc welding (SMAW) and gas tungsten arc welding (GTAW) and the ultrasonic testing technique used is time-of-flight diffraction (ToFD).The specimens were examined by the ultrasonic ToFD technique under identical conditions. B-scan images obtained from ToFD measurements of the two welds indicate that inspection of the specimen prepared by the SMAW process is easier than the one made by the GTAW process due to higher scattering of waves in the latter.

Masaya Shigeta, et al [20] developed a quantitative evaluation system for arc characteristics such as arc stability and welding spatter generation related to shielded metal arc welding (SMAW) without human sensory evaluation. Factors that correspond to sensory evaluations by welders were investigated based on image processing. For the quantitative evaluation of arc stability, results show that the root mean square and the standard deviation of the arc centre fluctuation, correspond to welders' sensory evaluation at AC and DC discharges. For welding spatter generation, a method of counting white pixels in a binarized image evaluates the number and size of welding spatters which closely coincide with welders' sensory evaluations. V.E.

Buchanan, et al [21] found that the abrasive wear behaviour of hypereutectic and hypoeutectic based Fe-Cr-C hard facings were reported and interpreted in terms of the microstructures. The coatings were deposited onto a grey cast iron substrate by shielded metal arc welding using two commercial hard facing electrodes. It was found that the hardness of the hypereutectic coating was significantly higher than the hypoeutectic coating. In both cases, optimum hardness was achieved within the first deposited layer. The abrasion tests showed that there was no significance difference in the wear resistance of the hard facings at the higher loads and there was contrasting wear behaviour in the dry and slurry conditions.

F. Molleda, et al [22] performed an experiment on mild steel then Spatter results when droplets of liquid metal that have been ejected from the weld pool by the impact of small droplets from the covered electrode solidify and weld to the surface of the base material. The studies show that spatter and reveals that these small droplets do not oxidise during their short trajectory and they arrive with sufficient heat to weld to the adjacent base material. In this experiment welds were performed on mild steel using covered electrodes (rutile type) to obtain spatter on the adjacent base material. Scanning electron microscopy and X-ray mapping were used to study the above mentioned phenomena. The spatter particle welds to the base material and transfers heat very quickly to it so producing a very thin recrystallised region in the heat affected zone.

Min Zeng, et al [23] In this research paper they adopted a refined method of current wave-form control, and reported a model for GMAW comprising four modules that were inverter power supply, arc load, wire feeder system and waveform control system. SIMULINK tools of MATLAB were implemented to establish this model, and the simulation results were compared with the experiments to comprehensively evaluate the influence of the large constant current and the small constant current of arc stage on the welding outcomes. In the short circuit transfer process, the base short circuit current duration and the peak short-circuit current had great impacts on spatter generation whereas the effect of the current surge rate was relatively small within a certain range. Parameters of waveform control method were obtained and optimized based on this model were confirmed effective and efficient for a high stability of welding process.

Gurpreet Singh Sindu, al [24] studied to investigate the roll of intermixed weld metal of shielded metal arc welding consumable on weld properties. Intermixing of weld fluxes, change the chemical compositions of electrodes etc are applied for purpose of high weld quality, high productivity, strength and economy in pipeline Fabricators look for welding process which is cost effect and is able to give higher deposition rate better penetration and robust structures.

Izzatul Aini Ibrahim, et al [25] studied, the effects of different parameters on welding penetration, microstructural and hardness measurement in mild steel that having the 6mm thickness of base metal by using the robotic gas metal arc welding are investigated. The variables that used in this study are arc voltage, welding current and welding speed. The penetration, microstructure and hardness were measured for each specimen after the welding process and the effect of it was studied. The value of depth of penetration increased by increasing the value of welding current 90, 150 and 210 A. Welding current, Welding speed and Arc voltage is factor that will determine the penetration.

Xiaolei Jia, et al [26] invented a new method to predict heat source parameters in the GMAW simulation process by using regression equations, which obtained from a set of welding simulations, was presented. The heat source parameters could then be accurately calculated with those equations and measured values of weldment characteristics together with peak temperature. In regression analysis, the

PLSRA(Partial Least Square Analysis) was adopted in prediction of welding heat source parameters owing to its advantage of requiring less simulation data. In this MRA(Multiple regression analysis) mathematical forms simulating the relationships between welding pool characteristics (fusion width W, penetration depth D, peak temperature Tp) and simulated heat source parameters (Q, a, b, f, cr) were obtained.

Alireza Bahrami, et al [27] studied that selecting the welding parameters appropriately, such as the power supplied to the arc and the translation speed of the arc can reduce the energy consumed per unit length of weld. It is shown that increasing the arc power in conjunction with increasing the travel speed of the arc leads to reduced energy consumption per unit length of weld; this reduction in energy consumption is for equivalent welds, i.e., welds with identical geometric features. The study of temperature distribution in the work-piece reveals that the weld pool maximum temperature is higher when the combinations of higher travel speed and power inputs are applied even though the total heat input and material properties remain

Mehmet Eroglu [28] studied the shielded metal arc welding electrodes were produced for making boride coatings and low-carbon steel plates were surfaced with single-pass bead on-plate welds. The microstructure of the coating changes with the change of boron content. Increasing the boron content in the coating changes the microstructure from a hypoeutectic to a hypereutectic consisting of primary Fe2B borides and a small quantity of Fe2B-martensite eutectic. is observed for the eutectic and The micro hardness of the coating increases with increasing boron content. As the coatings produced by the developed electrodes have high hardness values, these electrodes may be potentially useful for hard facing to improve the surface properties of agriculture tools, components for mining industry and other equipment’s for Soil preparation.

Shwkar Srivastava [29] studied the effect of the various process parameters on welding of IS:2062 mild steel plate using gas metal arc welding process with a copper coated mild steel wire of 0.8 mm diameter. A set of experiments has been performed to collect the data using Box Behnken Design technique of Response Surface Methodology. Based on the recorded data, the mathematical models have been developed. Further an attempt has been made to minimize the bead width and bead height and maximize the depth of penetration using response surface methodology. Bead geometry variables, heat affected zone, bead width, bead height, penetration and area of penetration are greatly influenced by welding process parameter i.e. welding speed, welding current, shielding gas flow rate, voltage, arc travel speed, contact tip – work distance, type of shielding gas etc. and also it plays an important role in determining the mechanical properties of the weld such as tensile strength, hardness etc.

Arun Kumar Paul[30] has demonstrated that modern welding controllers with the help of sliding mode control are able to converge more diverse domains, quantitative and qualitative, in - electrical, metallurgical compatibility, welding quality, energy and process efficiency, health hazards, operating duty factor, simplicity of set up, process availability, cost etc to a unique optimization function. Conflict-free optimization has been achieved through selective and off-line use of sliding surface using soft-sliding mode control. In these research paper it is brought in to consideration about the adverse effect of the welding on the human health and that it can be brought under control by adopting the sliding mode control technique.

Wen-Hou Chu, et al[31] derived a mathematical model of the welding control system and identified the value of the system parameters A fuzzy gain scheduling PID controller modulates the rate of an electrode feed mechanism that regulates arc current. The electrode feed rate mechanism with this controller driven by an AC servomotor can both compensate for the molting part of the electrode and the undesirable fluctuation of the arclength during welding operation. It can also be easily applied to any welding system whose electrode is consumed during the welding process. By maintaining the magnitude of the arc current at the desired value and ensuring the stability of the arc length, excellent welding performance can be obtained.

Dhaval Patel, et al [32] studied the effect of magnetic field on the weld quality and geometry when the field is applied longitudinal to the electrode travel i.e. the field lines are perpendicular to the electrode travel. The weld quality of the pieces will be checked by conducting different weld test as hardness, tensile strength and impact test.

Prakash et al [33] (2016) the present work deals with optimization of welding process variables by using arc welding. In this process input variables are arc voltage (V), current (A) and welding speed(S) with tensile properties, hardness &penetration as responses of low carbon steel (ASTM A29). Design of experiments based on taguchi orthogonal array [L9]; and analysis of variance (ANOVA) is used to determine the impact of parameters with the optimal condition.

Singhmar et al [34] (2015) reviewed that the various combination of parameters were obtained by conducting the experiment as per the orthogonal array. Arc current has the highest influence on the tensile strength contribution of 41%followed by Arc voltage with contribution of 20% and gas flow rate with contribution of 16%.

Kalita et al [35] (2015) In the present work the effect of three important parameters of MIG welding, welding voltage, current and shielding gas flow rate on the tensile strength of C20 steel has been studied. An experiment has been designed using Taguchi’s L9 orthogonal Array with three repetitions. All welding work has been carried out using ER70S-4 electrodes. Results shows that welding voltage has significant effect, both on mean and variation of the tensile strength of the weld having 87.019%welding current has significant effect on mean only (10.807%contribution). Shielding gas flow rate has insignificant effect on the tensile strength of weld. From analysis of experimental data the optimal setting is found to be: Welding current 200 amp. Welding voltage 30V and Shielding gas flow rate (CO2) 8lit/min. we can use other variable parameters also like electrode etc. with other materials combinations.

Kumar et al [36] (2013) this paper shows that the result of the analysis of variance (ANOVA) for the Hardness (BM, WZ, HAZ).The analysis of variance was carried out at 95% confidence level. The ANOVA is carried out to investigate the influence of the design parameters on hardness by indicating that which parameter is significantly affected the quality characteristics. In this experimentation work, the authors have generated results for S/N ratios of Hardness (BM, WZ, and HAZ)

Anoop c a et al [37] (2013) The reviewed study has discussed an application of the Taguchi method for investigating the effects of process parameters on the weld microhardness; grain size and HAZ width in the GTA Welded aluminium alloy of 7039. From the analysis of the results using the S/N ratio approach, analysis of variance and taguchi's optimization method, the following can be concluded: Peak current of 150 A ,base current of 75A and pulse frequency of 150Hz are the optimized welding parameters for getting highest micro hardness, smallest eqiuxed weld grains and minimum HAZ width. Out of three selected parameters, peak current has the highest contribution i.e. 61.58% .

Chhabra et al [38](2013) in this study, the process parameters are optimized by using the taguchi's techniques based on taguchi's L9 orthogonal array. Experiments have been conducted based on three process parameters, namely the three shielding gases, welding current and arc travel speed and three levels of each parameters were carefully selected. Micro hardness has been predicted for the optimum welding parameters and parameters percentage of contribution in producing a better joint is calculated, by applying the effect of the S/N ratio and analysis of variance .Based on the study, shielding gas was found to be the most significant variable over the other process parameters while the welding current and arc travel speed took the second and third rank respectively. The optimum parameters for the high micro hardness obtained through the taguchi is the combination of process parameters of Ar+CO2 shielding gas, 190 Amp.welding current and 22 cm/min arc travel speed. Maximum hardness, in terms of optimum value of 432 HV is achieved. Shielding gas (Ar+CO2) was most significant with 68.36% contribution, followed by the welding current or 16.30% and arc travel speed of 12.88%.

CONCLUSION

From the review paper study, it is found that when the welding current ,voltage, increases ,The tensile strength decreases ,but when welding speed increases ,the tensile strength also increases. In the case of elongation is also same to tensile strength. Optimization was done to find optimum welding conditions to maximize tensile strength and percentage of elongation of welded joints. We can find the bending radius with the help of angle of inclination when the weld joint is bend when different load are applied.

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