CHANGE OF WELDING TECHNOLOGY IN RECENT INDUSTRIES

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Abstract:
Welding is the process of joining of two parts with help of filler metal. In all cases it doesn't mean we need filler metal to weld or to join the two parts.In TIG welding we don't use filler metal if the thickness of material is above 2 mm. In recent industries automated robotics arm are used to weld because they are highly accurate& time saving at welding. In industries Welding process depend upon material thickness. According to thickness of material welding technology are used in industries.
Keyword: TIG,MIG, Abstract, Introduction,Filler metal,USW

Introduction:

Welding is a process of joining two metal pieces as a result of significant diffusion of the atoms of the welded pieces into the joint (weld) region. Welding is carried out by heating the joined pieces to melting point and fusing them together (with or without filler material) or by applying pressure to the pieces in cold or heated state.
Welding technology has changed over the last 5 decades. Welding and material joining in 2000 is more automated, productive, and safer than 50 years ago. In 1957, there were no lasers, no microprocessors, no Internet, no industrial robots and none of the advanced materials that are available today.If we see back 50 years ago there is no MIG(metal inert gas welding), TIG(tungsten inert gas welding), Spot welding in industries.50 years ago There is no automation in welding technology & welding technology are more complex to operate.All welding are manual hand operated &less safe.TIG,MIG & Spot welding has become one of the primary assembly operations in manufacturing plants where metal panels are assembled together. The main reason for this is the simplicity of the process, the large variety of inexpensive and standard equipment, and the use of robots to perform accurate and reliable welding processes.During the past 50 years, welding technology has improved dramatically due to the use of robots and improvements in welding equipment. Welding parameters, such as hold and squeeze time, have also improved due to a better understanding of metal composition and strength. Metal objects ranging from complex automotive bodies to simple buckets have been designed and manufactured with welding technology at the forefront of the production process.

Mostly used Automated Welding processes in industries :

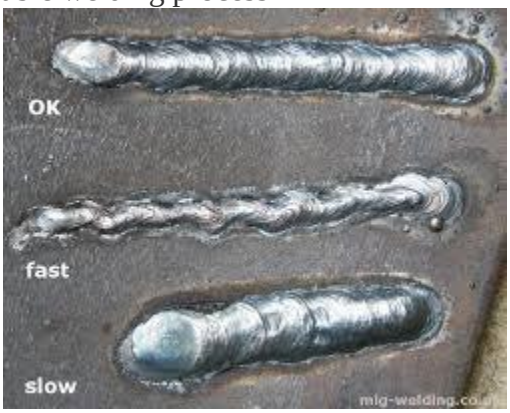
In industries mostly they use MIG,TIG& Spot welding for production/manufacturing. They are easy to operate and highly fast to operate & accurate at the same time.

MIG welding:

Metal inert gas welding is used if the thickness of material is about 5 mm to 20 mm. In MIG Welding industries use copper coted mild steel filler metal to join two part. In MIG industries use CO_2 gas as shielding gas to prevent from flux/slag formation. It can be automated easily and it is more safe.

Problem in MIG welding:-

CO_2 gas could not prevent from slag formation its less efficient. surface welding look is not better than TIG. It is consumable welding process



MIG welding surface look

TIG welding:

Tungsten inert gas welding is used if the thickness of material is less than 5 mm. if thickness is about 4 mm or 5 mm we don't use filler metal to weld.if thickness is less than 2 mm then only we need filler metal to weld parts. Even 0.025 mm thick material can be weld with TIG welding. surface welding look is very good than MIG welding. It is non consumable welding process.

Electrode	Coating	Position	Current	Penetration	Tensile Strength
E-6010	High Cellulose Sodium	All Positions	DCEP	Deep	60,000 PSI
E-6011	High Cellulose Potassium	All Positions	DCEP AC	Deep	60,000 PSI
E-6012	High Titania Sodium	All Positions	DCEN AC	Medium	60,000 PSI
E-6013	High Titania Potassium	All Positions	DCEP DCEN AC	Shallow	60,000 PSI
E-7018	Iron Powder Low hydrogen	All Positions	DCEP AC	Shallow to Medium	70,000 PSI
E-7028	Iron Powder Low hydrogen	Flat Horizontal Fillets	DCEP AC	Shallow to Medium	70,000 PSI

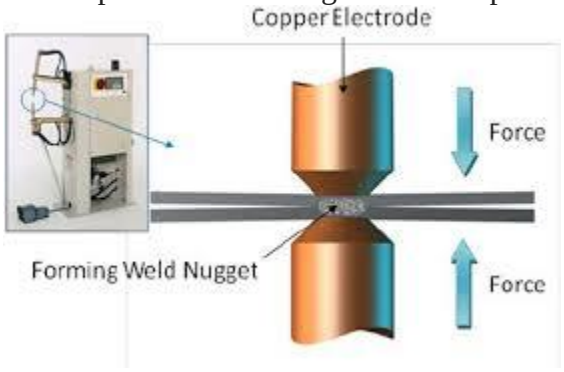
Electrode and penetration in tig

Mild Steel TIG filler rods for welding in DC TIG mode. A15 is the most commonly used, they are copper coated triple deoxidized mild steel rod that gives sound porosity-free welds on mild and low-alloy steels. Stainless steel rods are for use in DC TIG mode.

Problem in TIG welding:-
Argon gas is expensive if it is used as shielding gas in TIG and it will increase product manufacturing cost.

TIG welding surface look

Spot welding:
Spot welding is used if thickness of material is less than 2 mm. automobile industries are using Spot welding for vehicle manufacturing. because of its simplicity and easy operated process spot welding is used to weld. Resistance spot welding (RSW) is a process in which contacting metal surface points are joined by the heat obtained from resistance to electric current. It is a subset of electric resistance welding. Work-pieces are held together under pressure exerted by electrodes.



Spot welding

Ultrasonic Welding (USW):
Ultrasonic Welding is a Solid State Welding process, in which two work pieces are bonded as a result of a pressure exerted to the welded parts combined with application of high frequency acoustic vibration (ultrasonic).Ultrasonic vibration causes friction between the parts, which results in a closer contact between the two surfaces with simultaneous local heating of the

contact area. Interatomic bonds, formed under these conditions, provide strong joint.Ultrasonic cycle takes about 1 sec. The frequency of acoustic vibrations is in the range 20 to 70 KHz.Thickness of the welded parts is limited by the power of the ultrasonic generator.

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