

## **STUDY ON MANUFACTURING AND BUTT PIPELINES**

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**Keywords:** Pipelines, MIG-MAG welding, metal materials, orbital welding, robotic welding.

**Abstract:** This paper presents the manufacture and assembly of welded pipelines. Current manufacturing processes are pipelines welding process with flux wire or more MIG-MAG welding process with full wire or cored wire. The material used to manufacture pipelines is usually alloyed steel and welded their manufacture is either helical or generators (longitudinal).

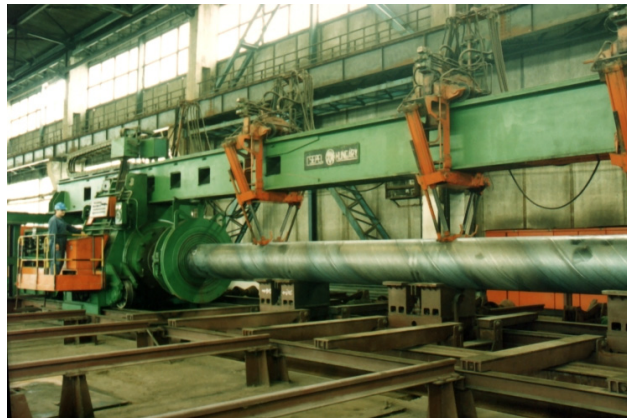
### **1. Paper object:**

The paper presents the main manufacturing operations and joint operations as well as welding current evolutive. Also are areas where pipelines are used and materials that are produced. Currently depending on the material of the pipes are made may be land, air and underwater.

### **2. Welding materials and processes used to manufacture and joining pipelines**

Manufacturing processes and joining:

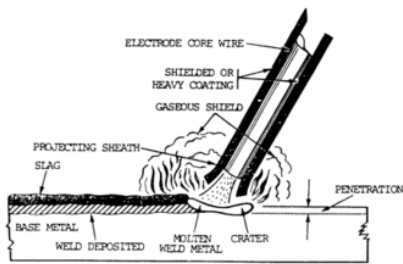
Most pipelines are carried out by welding or screw operations or the generator (longitudinal).



*Fig.1. Spiral welded steel pipe flux*

Currently in production pipelines using high productivity processes: MIG-MAG and flux of these processes with more wire. Adding lately and tubular wires.

Installation of pipelines on the site is made by butt welding electrode processes. In recent years butt welding technology has allowed pipelines and butt welding mechanized MIG-MAG and cored wire filled.



**Fig.2. Coated electrode manual welding.**



**Fig.3. Tractor with magnetic fastening, cutting and welding.**

If modern steels, supermartensitic developed especially for applications for transportation fuel products, welding was performed until recently with welding materials, especially solid wire, duplex steel and superduplex. Currently, the market appeared homogeneous materials for welding, tubular wire as metal powders, for the average shielding gas welding and welding flux.

Materials used in manufacture:

In selecting materials used to produce longitudinally welded pipe welding flux using multiple wires are taken into account the following:

- Values of physical parameters of the working environment or the environment acting on the material (pressure, temperature, humidity, etc.)
- The intensity and nature of application (static or dynamic variable).
- Fluids or working environment (nature and character of their aggression).

Presentation of non-alloy and alloy steels used to manufacture pipes.

- Electric welded non-alloy steel pipes for pressure purposes with specified low temperature. Ex. P215NLb (symbolizing alphanumeric).
- Alloy and non alloy steel pipes for pressure electric welded with specified high temperature. Ex P195GH (symbolizing alphanumeric).
- Steel pipes for pipelines for combustible fluids. Ex. L555MB (symbolizing alphanumeric).
- Alloy steel welded pipes used for the transformation from fine-grained pressure. Ex.P4605NL2 (symbolizing alphanumeric).
- Austenitic stainless steel tubes longitudinally welded general purpose. Ex. 10TiMoNiCr175 (make steel).

### **3. Current technologies for welding pipelines:**

As I said in the first paper pipelines are made by longitudinal and spiral welded by processes MIG-MAG and flux.

The development objective of implementing volume MIG-MAG welding flux expense is based on the unique advantages of the protective gas welding environments:

- High productivity of the process determined by the high rate of deposit ( $D = 2-4g / s$ ) high penetration ( $j = A/mm^2$  150-250), that can speed welding welding high ( $v_s = 30-100$  cm / min);

- Developing equipment by reducing the gauge and even miniaturization sources profound implications on the quality of welding;
- Choice of wire electrode leading to widening the scope of use to a growing number of metallic materials;
- Development of cored wire production and increasing its diversification in terms of destination (non-alloy steel, low alloy or high alloy), the core character (rutile, basic and metal powders) of spring protection (gas mixtures, carbon dioxide or self).

As pipelines process of combining the most commonly used procedure manual welding with coated electrode process celulozic. Thanks to versatility, simplicity of equipment and operation, manual welding with coated electrode is one of the most widely used welding processes worldwide. Dominates other welding processes in industrial maintenance and repair activities, and is used extensively in industrial assembly and production pipelines.

#### **4. Evolutionary trends in materials, processes and techniques of welding of pipelines.**

Current trends assembly by welding of pipelines are elevated to new orbital welding equipment. These plants can be used in butt welding of pipelines of small and large using minimum energy and time.

The concept Orbital Welding is basically a loosely defined term that is usually used for processed only, where the arc is travels at least 360 degrees around the work piece without interruption.

An automated and autogenous gas tungsten arc welding process.

From welding terminology Orbital-Welding belongs to the category semi-mechanized (TIG) welding.

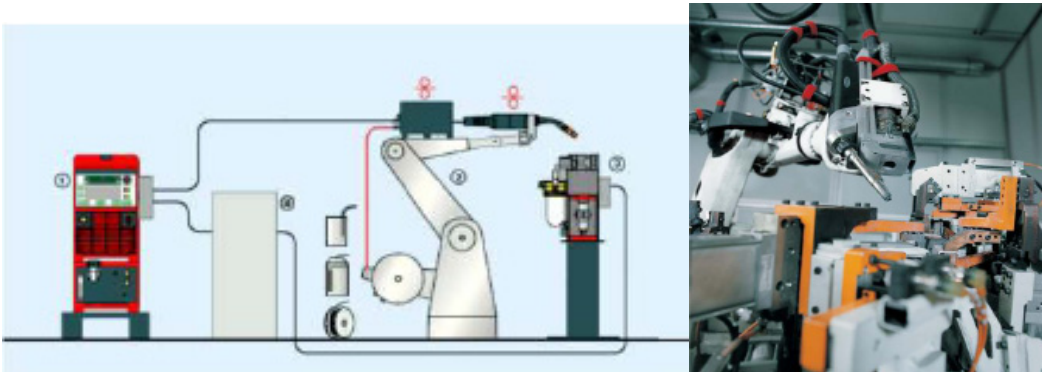
Because of the need for good control of the weld puddle, the Orbital-Welding process is only practiced with the TIG process and relevant rules like selection of gases, cleanness, weldability of specific materials and consequential mechanical strength specifications such as tensile and bend loading, are very important.

Orbital-welding is presently used whenever the quality of the weld joint has the highest priority. These demands are not only limited to mechanical strength and X-ray qualification, but also to the important aspects of the aesthetics of the weld seam. For any users a uniform, flat and smooth root-pass is the main reason for using this process.



**Fig.6. Orbital Welding**

Today we want the implementation of new manufacturing robots welded pipelines generators. (Longitudinal). We want to implement these systems to reduce manufacturing time and energy costs.



**Fig.8. Robotic equipment for welding pipe longitudinal**



**Fig.9. Manufacturing process for spiral welding**

## **5. Conclusion:**

To those mentioned above have resulted the following conclusions:

- Use in the manufacture and assembly of pipelines welding technology obsolete, hard and with a high energy and time can create a large deficit in the production and assembly lines.
- Robotic implementation of new systems somewhat higher cost but with a significantly shorter working time and low power consumption can make a big contribution in terms of manufacture and assembly of pipelines.
- Also by applying these new technologies can eliminate a large percentage of pollutants emitted from welding.

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