

Tubes manufacturing in sheet metal working

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Abstract - Tubes are necessary and play role in industrial huarea, wide range of products, mechanical engineering, electronic engineering, medical engineering, to sensor technology or microfluidics. Demand increasing in now days in developing and developed nations. It consists number of avdatanges in industrial manufacturing. Thin-walled pipes are the ratio of steel pipe of outer diameter to thickness of wall more than 20 is referred to as steel pipes of thin wall. In this research paper focused on innovative joining technologies of connecting tubes and fixing tubes to sheet such as welding, riveting and nut bolt.. During research work we found lots of research work has been conducted over the on tubes manufacturing in sheet metal forming technique which deal with advancment of novel and optimized processes, to counteract these restrictions.

Key Words: Thin wall tubes, Joining technologies, Forming techniques , Tube manufacturing, Advancment and development.

1. INTRODUCTION

There are so many of tubes manufacturing companies in all over world such as Nippon steel, Radiant, Steel Limited and Ismt Limited etc. China Manufactured in largest amount of seamless type of pipes and tubes comparatively other countries. Generally raw material is used for tubes manufacturing process is steel as we know steel is an alloy and it composed of aluminium ,tungsten, manganese and so on. Also we use Stainless steel, Nickel and Titanium for manufacturing High quality materials tubes. Steel pipes and hollow tubs we see everywhere in our day to day life steel pipes are long in size and hollow tubes Manufactured by various purposes since they are strong and used in underground flow of water for transporting purpose, gas throughout the citizens and towns. It's produced by distinct in two methods such as seamless or welded pipe.

Tubes are not all the same .They have variety of different applications. Ground oil pipelines example submarine pipeline that need to be capable of withstanding huge subsea pressure. Many drinking water supply line are also made of steel. State of the art structural tubes round , Round, square, rectangular cross sections are put to various uses.

1.Literature Survey

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Serial Number	Title of paper	Author and year
1	Micro Tube forming	Christoph hartl and 10 may 2019
2	Thinned wall tubes	Eva maria rubio and18 December 2017
3	Joining thinned wall tubes	Sophie 7 September 2021
4	Stainless steel tube	Muriel Palengat 30 January 2014
5	Thinned steel tubes	Denis Favie 30 January 2014

3.Manufacturing techniques [1].

Commonly, thin-walled pipes are defined ratio of the outer diameter to minimum thickness of wall is greater than 20 (do/tmin > 20) [2]. Difference in hoop stress at inner and outer tube surface become often ignored. Here Pipe inner diameter consider as the tube and Outer diameter is represented by (Do) and thickness of wall generally described as (Tw).

Hartl [1] Neatly summaries Thin walled tube pipes application are where we need flexible pipe their we used it widely.

This paper investigates due to technologies of fabrication and joining of thinned wall pipe in tube.

In all this process we control all the parameter for to enhancing the dimensional. Standards material in order to make a good quality of material we are restrict to the quality of that material in this all care should be taken it is going on strict quality check and quality of that product is good and with accuracy.

4.Finding :-

1] Welding process:- Depending on which type of material accuracy we want according to that there it number of welding process can be carried out In which TIG welding is use for process of small diameter tubes fabrication. Welding process is done two time on a same material first at the time of steel sheet. Enter in the welding machine and convent it to coil shape second time when welded to get a desirable tube. Welded material are Stainless steel(304) ,stainless steel (304L) ,Stainless steel (316) ,Stainless steel.

2) Drawing :- In a drawing process we are applied some form of force that is tensile in order to reduce it's shape and size and diameter for bigger to smaller. Also be due to force material is thinner and has dimension accuracy surface finish strength is achieve on cold working. The drawing process. Have two main types (I) sheet metal drawing bar ,(2)tube drawing.

3]Annealing:- Annealing is one of the heating process in which metal is heated above it's. recrystallization temperature in order to make grain size fine and good strength is good from this we see that molecular bonds are tighten making material strength full If we want to restore the ductility of the material then metal is process by Annealing.

4)Sinking process :- Sinking is one of the drawing process in which tubes is shrinks to the small Area in this process a die one of is used without mandrel inserted. If we take mandrel in which good inner surface quality is not guaranteed the outer surface can be detected by die. Angle due to see the tube is getting good. Value of original size and shape.

5)Inspection and testing :- In this test or process comes that is Inspection and testing in which we can Inspect the material of testing of material before approaching to the customer. Some type of testing includes – 1) Bending 2) OD / ID/ WT talerance3) Cracks 4) Scratches 5) Discoloration . (6) Hardness and there inspection.

5.Recent Method Use :

Seamless pipes and tubes:- In this type the rollers is used to carried out the method combine with the pilger rolling this rolling technique invented by Reinhard and max mannesman

ASTM A312 TP 310 Seamless Pipes
used in Textile Machinery.

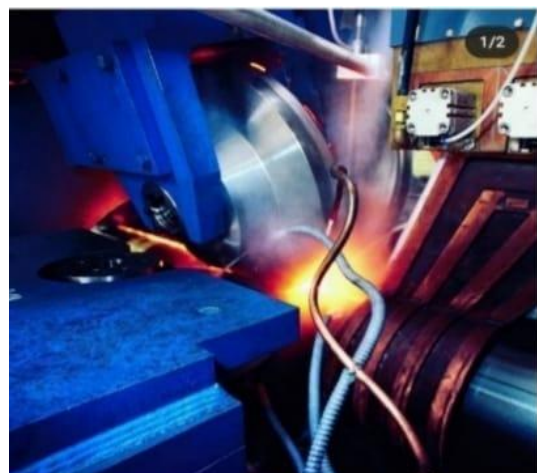


Seamless pipes and tube (hot extrusion hot hollow forged) As Name suggest in which we are heating the material after this.

Extrusion taking place to make a hollow material by forging process. There are seamless and welded tubes. With welded tubes a distinction is made between high frequency longitudinally welded tubes (ERW) Electric resistance welded tubes.

Hot electric resistance-welded pipes and tubes:- in this we use current to heat the material in place of flame and welding can be done and rotating capper disk is used as on electric and it increases the temperature by 2600f for welding.

Electric resistance welded pipe and tubes In this type of method current is passed between the two edges of the steel to make joint between two edged without welding.



An ERW tube is made from coil . It unwound and formed, heated at the ends using high frequency technology, then pressed and welded

Together. A spiral tube also manufactured from a coil the strip unwound and formed spirally to create a tube. The edges are welded from the inside and outside.

6) Recent Advancement

The sheet metal industry is one of the largest and fastest growing industry in the world. It has considered as traditional in its approach.

Still it has experienced the influx of emerging technologies earlier manual tools are used mainly used for sheet metal industry such as cutting, machining, welding as well as the assembly of the final project However, today many of these tools are replaced by advanced and effortless versions.

The growth of the sheet metal fabrication industry is fueled by two factors improved supply chain practices, and technology advancements. After reading all these, you might be intrigued to know about the major trends in the sheet metal industry.

7) New trends :-

•Automation- automation is new trend and it play the major role in the future,it has changed various industries and the sheet metal industry one them. The act of cutting and bending sheet metal has simplified due to robotics technologies.

Additionally these automated are playing important role for manufacturers to achieve precision, as well as minimize their material waste.

Additive Fabrication- 3D printing is an already an intermediate part of the manufacturing industry it means we can not say that 3d printing is technology.

By using 3D technology many industries are taking advantage and benefits of this technology by using this technology time as well as reduction in cost takes place by eliminating few assembly steps, getting great design freedom and minimize waste. Ultimately, these new technology are helping them their production quality. Sheet metal 3D printing content the metal stamping to develop a required design.

Tube Laser Technology- In recent technology this technology is one of the best and fastest growing sheet metal fabrication technology. Example of Tube laser machine this is the Advancement of laser tube machining.

This technology give a us various benefits over traditional sheet metal Cutting and manufacturing processes.



To produce sharp and intricate cuts many industries use this technology, due to this the fabrication quality and speed get improve. By using this technology the material waste and assembly cost get redesign.

Reshoring- This technology is also a another big trend to change the metal fabrication industry. Nowadays many businesses prefer the availing services of manufacturers rather than the world wide countries it has some benefits such as:

- Reducing unemployment.
- Reducing the cost of products.
- Maintaining trade and budget deficits.

8) Discussions or Problem statement

Uptil whatever we see the technique of regarding tube manufacturing among them micro tubes flaring test is simplest method to collected the information about formability. Important parameter for micro material is ductility. Pushing the conical rod into tube until failure occurs this is known as flaring test . But it has uncountless disadvantages such as elasto plastic buckling and necking followed by fracture. Therefore it influence the measured results. This researched gave us result use the evaluation for micro tube formability.

9) Summary

The reason behind this review to provide achievement and advancement and latest updates regarding and researched in micro tube forming processes and techniques for the fabrication and Shaping. Trying to reach some issues in further research work and efforts in standardization.

10) References

- <https://www.mdpi.com/2075-4701/9/5/542>
- <https://www.semanticscholar.org/paper/Review-on-Advances-in-Metal-Micro-Tube-Forming-Hartl/0265b0e8c25a359da915622f0f1a7adedb684856#related-papers>
- https://vdocument.in.cdn.ampproject.org/v/s/vdocument.in/amp/review-on-advances-in-metal-micro-tube-forming-the-application-of-micro-components.html?amp_js_v=a6&_gsa=1&usqp=mq331AQKKAQArABIIACAw%3D%3D#aoh=16525021829833&referrer=https%3A%2F%2Fwww.google.com&_tf=From%20%251%24s&share=https%3A%2F%2Fvdocument.in%2Freview-on-advances-in-metal-micro-tube-forming-the-application-of-micro-components.html
- <https://www.semanticscholar.org/paper/Fabrication-of-Superplastic-Microtubes-Using-Furushima-Manabe/7b319fba4fa97c5aabfed597b9055c09037a65e6>
- https://www.jstage.ist.go.jp/article/matertrans/49/6/49_P-MRA2008810/article
- https://www.jstage.ist.go.jp/article/matertrans/49/6/49_P-MRA2008810/article
- https://www.researchgate.net/publication/333048478_Review_on_Advances_in_Metal_Micro-Tube_Forming
- <https://www.coursehero.com/file/89467236/Review-Exam03-MANE-4333docx/>
- https://mfr.edp-open.org/articles/mfreview/full_html/2014/01/mfreview140008/mfreview140008.html
- <https://www.sciencedirect.com/topics/engineering/pipe-manufacturing-process>



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