FABRICATION OF FIBRE ROVING IN LATHE

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Abstract: *A filament winding machine is made and is used in production of fabrication of pipes and round shape specimens. A lathe type machine is used in design of the machine. The range of the winding angle or orientation angle is around 90 depending upon the mandrel diameter used . Mandrel speed Is kept constant and is then connected in the chuck of the lathe machine. A filament winding machine is designed and developed for the fabrication of pipes and round shape specimens. In this setup, glass fibre roving is kept and is then rotated with the help of a lathe machine. Winding machine is not used in this setup.*

Key Words: *Mandrel, winding resin, lathe, glass fibre, pulley roller.*

1. INTRODUCTION:

This process is a type of a manufacturing process, where the resins along with the hardener is wound on the mandrel which is kept in the chuck of the lathe machine. It is a technique used in the production of open and closed end structures. This process involves winding filaments under tension over a rotating mandrel. The mandrel rotates around the spindle while a delivery eye on a carriage transverses horizontally in line with the axis of the rotating mandrel, laying down fibers in the desired pattern or an angle.

The first most common filaments are glass or carbon and are then dipped in the resin bath and then they are wound in the mandrel connected in the headstock of the lathe. Depending on the resin system and its characteristics, often the rotating mandrel is placed for sometimes until it is dried. Once the resin has cured, the mandrel is removed or extracted, leaving the final product. For example, such as water bottles, the mandrel is a fixed part that prevents flow of water pouring down and it prevents from entering of the fluid in the bottle.

Then after the thread is rotated with the mandrel, the mandrel is dried for 48 hours and then removed by the action of the wax performance.wax has the properties and has the tendency to remove the material, with the help of the wax performance the material is removed from any windings. The process involves the following processes:

- The process involves a continuous fibre stand or a roving tape which is fixed in a stand.
- Then the fibres are dipped in the epoxy resin and then are rotated in the mandrel.
- Finally the fibres are rotated and then the mandrel is kept for drying around 48hours.

2. LITERATURE REVIEW:

- Farhan manasaiya et.al. presented a paper on filament winding.
- J.f.silva et.al.presented a paper on two processing techniques.
- Mohan R et.al. Presented on strength of fiber composites.
- Rengarajan et.al. Presented on reinforced plastics.

3. MATERIALS:

S.NO	Name of material	Quantity
1	Winding resin	1lt
2	Roving glass fibres	1 rove
3	Hardener	300ml
4	Mandrel	Circular rod
5	Lathe machine	-
6	Pulleys and rollers	5

TABLE 1.1

3. METHOD:

A lathe machine is given in the place and the glass fibres are wound above the lathe bed then the fibre is rotated with the help of the roller and is then dipped in resin bath thread is therefore connected to the lathe machine with the help of a roller.

The mandrel is connected to the chuck of the lathe machine the mandrel may be in circular shape. While switching on the lathe machine, the chuck along with the mandrel is rotated.
So what happens is the fibre connected, therefore dipped in the resin bath and is then through the roller, the fibre is rotated through the mandrel.

The machine is rotated clockwise as well as anti clock wise direction after sometime after the mandrel is dried fibres are taken out from the mandrel and it looks like in circular shape.
Before the fibre is taken out from the mandrel, wax comes into performance. The wax is fully spread above the mandrel surrounded with the fibres and then the fibres are taken out with the help of the wax.

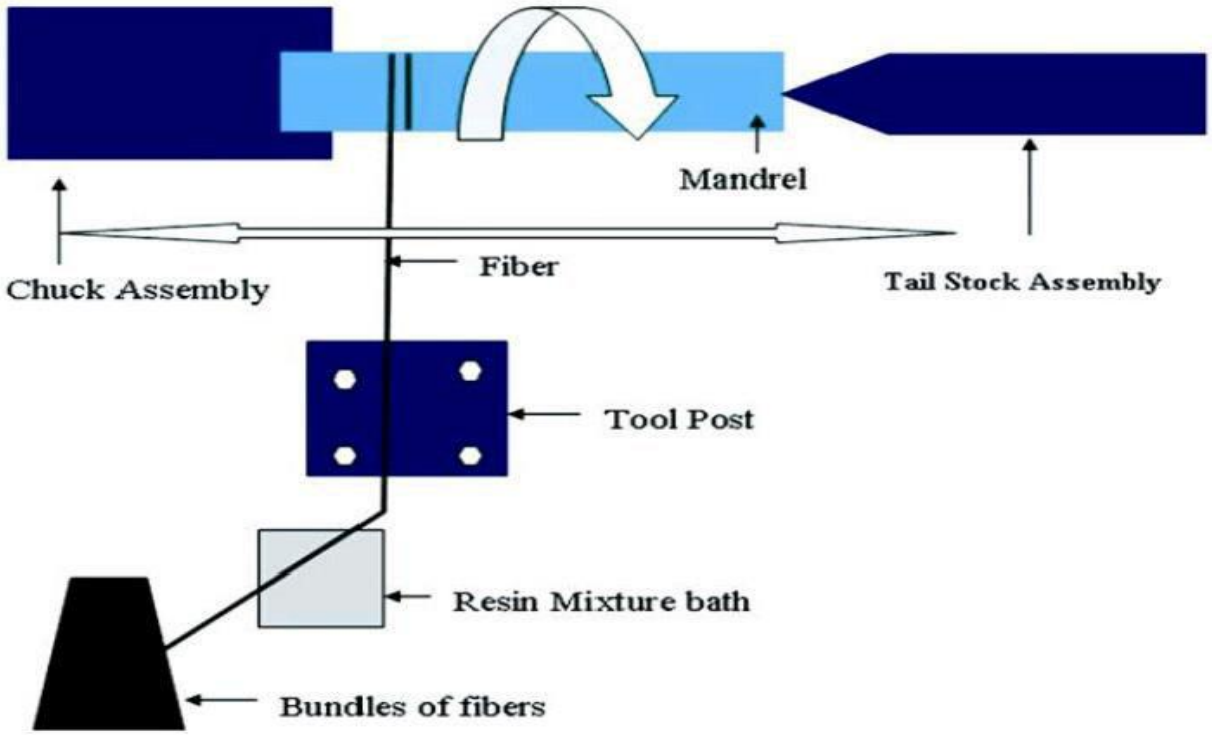

FIGURE 1.1

4. DISCUSSION:

1. Instead of using winding machine lathe machine is used here.
2. In this roving fibres are spinner through the mandrel.
3. The fibres are spinner through higher speed rate according to the lathe speed.
4. Dimensions were produced using this machine for different mechanical tests.

5. ANALYSIS:

- Highly reproductible nature of the process
- Continuos fibre over the entire part
- High fibre volume Is obtainable
- Ability to orient fibres in the load direction
- Fibre and resin used in lowest cost form
- Size of component not restricted by oven or autoclave size
- Process automation results in cost savings

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7. RESULT:

1. It is used to produce pressure vessels, water and chemical tanks at low cost.
2. Used to produce composite pipes at various diameters, which can be used for waste water pipes.
3. It is non corrodible.
4. There will not be any leakage in the bottom of any objects.
5. As there is only glass fibres used in this type of process, there is no chance in breakage.

8. CONCLUSION:

At present, this technology can be used in everywhere and every place. Natural fibres can be used for high tech applications, such as composite parts for automobiles. Compared to composites reinforced with glass fibres, composites with natural fibres have advantages such as lower density, better thermal insulation, and reduced skin irritation. So, unlike glass fibres, natural fibres can be broken down by bacteria once they are no longer in use. Resins are highly viscous substance of a plant or a synthetic origin that is typically convertible into polymers. So instead of using a natural fibre, it is better to use a glass fibre so that it will not be broken. Glass fibres have high properties on withstanding the breakage. It is best to use glass fibres instead of using natural fibres, as well as it will be smooth to use.

REFERENCES:

1. Mohan R, Kishore, Shridar M K and Rao R M V G K (1983) 'compressive strength of jute/glass hybrid fibre composite', Journal of material science letters, vol. 2 ,- pp 99-102.
2. Rengarajan and Kishore (1985), 'Jute/glass sandwich composite, Journal of reinforced plastics and composites, Vol. 4, pp 186-19'4.
3. Rajendran, I and Vijayarangan, S., A Parametric Study of Free Vibration of Leaf Springs, Proc .of 14th Into. Conf. on CADI CAM, Robotics & Factories of the Future, Coimbatore, India .1-3rd Dec 1993, p 77-85
4. Lye S.W and Boey F.Y.C (1995), 'Development of a low-cost prototype filament-winding system for composite. Components, Journal of Materials Processing Technology, Vol. 52, Issues 2-4, pp.570-584’

Web references:

- http://iopscience.iop.org/article/10.1088/1757-899X/257/1/012039/pdf
- http://www.dtic.mil/dtic/tr/fulltext/u2/a268923.pdf