

Summer Internship Report

On

NDE Of Composites

INTRODUCTION-

The composite material form a material system composed of a mixture or a combination of two or more macro constituents that differ in form and chemical composition and insoluble in each other. It can be very strong and stiff, yet very light in weight so the ratio of strength to weight and stiffness to weight are several times greater than steel and aluminum. It has a good tailor-made, mechanical, corrosion resistance properties. Composites are applicable in the automotive industry, aerospace, sports, agricultural equipment. Composite mechanical damage is typically in the form of delamination (laminates to laminates or laminates to core) broken fiber due to impact, fatigue damage that affects the zone of composite material. There are many NDE practices for composites such as ultrasonic, acoustic emission, x-ray and some other advanced techniques such as x-ray tomography, laser ultrasonic, holography, vibro-thermography etc.

Composite Fabrication-

There are many fabrication processes are used for manufacturing of composite which is as follows-

- Wet forming process
- Pre-mixed based process

Here for the fabrication process, we used vacuum bag molding wet forming process, by using this process we made composite material of dry fiber and carbon prepreg.

For dry fiber composites manufacturing for of all, we take a glass mold plate and make it clean by using liquid (acetone). The mold plate should be clean for making the good final surface finish and after that, we use releasing agent on the mold so that the final product can be easily removed and to ensure a good finish we also use a gel coating. After that, we take the required amount of dry fiber in proper dimensions, breather-ply, peel-ply, nylon-polythene

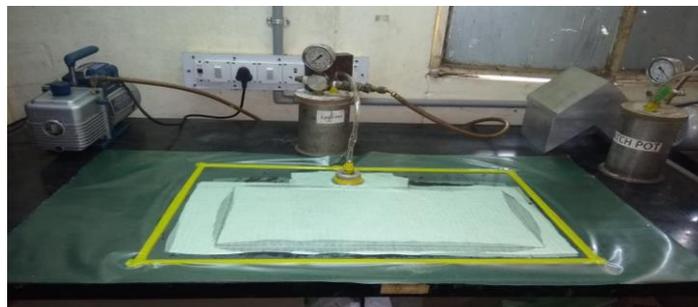


Fig.1

Vacuum pump and other equipment for making it After cleaning the mold we make resin which is the mixture of epoxy and hardener. We place the resin on the mold properly and then placed a single layer of dry fiber and again place the resin on the dry fiber and use roller to roll on it and we use roller to remove air present in between the fiber and we repeat the process until we get the required thickness of composite and then we use the peel ply and breather ply. Breather ply is used to absorb the extra resin. After this we use nylon polythene for producing a vacuum, after this, we placed this for curing.

The same process is used for making the composites of carbon prepreg. here we do not use the resin because the resin is already present in this. Here we can also used the de-bulking process. The de-bulking process basically we produced vacuum in the intermediate step of fabrication. It is used because when we need a thick composite plate then during the process there may be some air left between the layers so to reduce we use this process.

Ultrasonic Testing-

In ultrasonic testing, the main components are probe/transducer, display screen. Here we use a normal probe of 5MHz for testing. The transducer generates high-frequency ultrasonic energy. The sound energy is introduced and propagates through the material in the form of waves. When there is a discontinuity (such as a crack) in the wave path, part of the energy will be reflected back from the surface. The reflected wave signal is transformed into an electrical signal transducer and is displayed on a screen.



Fig.2

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