Chapter -3

SCOPE OF THE RESEARCH WORK

3.1 OBJECTIVE OF THE RESEARCH

a. To develop polyurethane foam cored natural fiber reinforced plastic sandwich structures.
b. Testing the Mechanical and inflammability behaviour of sandwich structures.

3.2 SCOPE OF THE PRESENT INVESTIGATION

Polyurethane (PU) sandwich constructions enable cost-effective manufacturing of stiff and lightweight structures, as well as decorated parts in a single processing step. Albus and Stefan have used PU rigid foam for thermal insulation in building materials such as walls, roofs floors. Textron Automotive Company has demonstrated two bumper beam designs made from glass fiber that were tailored to meet the 8-km/hour impact requirements of Federal Motor Vehicle Safety standard 581.

The use of long natural fiber as replacements for glass as reinforcement in composites is currently generating much interest in the research community. Plant fiber offers a number of advantages over glass in such applications. Because plant fibers sequester CO$_2$.

From the atmosphere, their use represents a net positive contribution to the global carbon budget, the ultimate disposal of composites is an important issue; plant fiber based composites may be combusted or composted at the end of their product life cycle, an option not possible with glass fiber reinforced equivalents. Cost benefits may also be realized by the use of plant fibers as a replacement for glass. Within a Indian context, the overproduction of certain agricultural commodities has resulted in great interest in the production of alternative crops on set-aside land. Tropical
fibers such as coir or oil palm or sisal are produced in million of tons per annum; new applications are urgently required for these materials. The use of plant fibers in composites are the subject of a number of reviews. Although such fibers are generally considered to be viable for use in composites, the problem of compatibility of the fiber with the matrix is an area that must be considered. Plant fibers are hydrophobic, in nature because of an abundance of hydroxyl groups, so they are not compatible with hydrophobic matrices such as polyester. This incompatibility leads to low fiber-matrix interfacial bond strength, poor wetting of the fibers by the matrix resin, and a reduction in mechanical performance when the composite is exposed to moisture. For this reason a number of studies looked at the effectiveness of coupling agents such as silanes with sisal/epoxy, jute/epoxy, jute/polyester and banana/polyester.

3.3 RESEARCH METHODOLOGY

2) Studying the existing literature and strengthening mechanisms of PU sandwich structures to identify the lacunae.
   
   A. PU Sandwich, fabrication technology, end applications.
   B. Mechanical behavior such as compressive, bending etc.

3) Fabricating and testing PU sandwich structures.