CHAPTER 6

METHODOLOGY AND SCOPE OF PRESENT WORK

In continuation with the discussion in the previous chapter a methodology is designed to achieve the objectives.

This work may be divided into four important phases. 1) In phase 1, simulation of temperature distribution for various joint designs in near field and far field configuration is attempted. This is done for ABS and HDPE. 2) Phase 2 is to carry out initial experiments to arrive at the range of welding parameters (weld time, weld pressure, hold time, amplitude) for amorphous and semi-crystalline thermoplastics. 3) In phase 3, validation of simulated results by actual measurement of temperature at the joints is carried out. Studies using Differential Scanning Calorimetry (DSC) and Scanning Electron Microscope (SEM) are carried out on the specimen before and after welding to understand the changes that take place in the polymers. 4) In phase 4 simulation of temperature and stress distribution in the horn is attempted. A flow diagram of activities is presented in Figure 6.1.

As the machine used was capable of providing an amplitude of 60 μm at the horn tip, the amplitude used in this study is 60 μm.
Figure 6.1 Research methodology - Flow diagram