4. RESEARCH OBJECTIVE

As per the literature review, it is known that during the manufacturing stage, more residual stresses occurs which may create problem in both quality and performances such as transverse cracking occurs in the bottom flange of the concrete casing and At the time of loading structural failure occurs due to the failure of the stress and stiffness value.

- So the main objective of this research work is to protect the failure of the structural element.

- For the protection of the failure of the structural element, this work has the development of a software which is based on the FEM & calculate the value of Stress and Stiffness.
5. RESEARCH METHODOLOGY

It is very difficult to obtain analytical solution for many engineering problems. An analytical solution is a mathematical expression that gives the values of the field variable at any location in the body. For problems involving complex shapes, material properties & complicated boundary conditions, it is difficult & in many cases intractable to obtain analytical solution that satisfies the governing differential equation. Hence for most of the practical problems the engineer resorts to numerical methods that provides approximate but acceptable solution. The three methods that are used are as follows-

1. Functional Approximation
2. Finite difference method
3. Finite element method

In Functional Approximation Raly-Ritz, Galerkin & collocation method are used which are based on the trial & error method so the calculated result is not more accurate while in finite difference method the original body or the system is discritized by a mesh of nodal points so the calculated result is accurate from the theoretical point of view but not from practical point of view. While in FEM, a body or a structure may be divided into the smaller elements of finite dimensions called ‘Finite Element’. The original body or the structure is then considered as an assemblage of these elements connected at a finite number of joints called ‘Nodes’ or ‘Nodal Points’ & the calculated result from this method is more accurate as comaired to other method.

WHY FINITE ELEMENT ANALYSIS

FEM gives more accurate result as comaired to other method .By using FEM ,the analysis of any part or element can be done, Because analysis of any part or element can be done before manufacturing so it will save to the manufacturing cost. By using this method the failure of any component can also be protected.it will also save to  time and Material.

FINITE ELEMENT ANALYSIS: The basic concept of the Finite Element Analysis is that a body or a structure may be divided into the smaller elements of finite dimensions called ‘Finite Element’. The original body or the structure is then considered as an assemblage of these elements connected at a finite number of joints called ‘Nodes’ or ‘Nodal Points’. By the early 70's, FEA was limited to expensive mainframe computers generally owned by the aeronautics, automotive, defense, and nuclear industries. Since the rapid decline in the cost of computers and
the phenomenal increase in computing power. FEA consists of a computer model of a material or design that is stressed and analyzed for specific results. It is used in new product design, and existing product refinement is then considered. A company is able to verify a proposed design will be able to perform to the client's specifications prior to manufacturing or construction. Modifying an existing product or structure is utilized to qualify the product or structure for a new service condition. In case of structural failure, FEA may be used to help determine the design modifications to meet the new condition.