

## Static and Dynamic Analysis of an all-Terrain Vehicle

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**Abstract**— Single unit of all-terrain vehicle (ATV) has been analyzed and developed by 4<sup>th</sup> year Mechanical Engineering students of Faculty of Mechanical Engineering, (VIVA Institute of Technology). The aim of this project is to do the static and dynamic analysis of the designed ATV on ANSYS software. The students have to organize themselves to design and build the ATVs within budget constraint. This project emphasizes on the practical and engineering applications of the subjects like Vehicle Dynamics and Automotive Technology which are taken by the students within the same semester. The students have all the freedom in deciding the specifications of the ATV.

**Keywords**— ANSYS, ATV, VEHICLE DYNAMICS S

### I. INTRODUCTION

The objective of the study is to design a safest vehicle for driver. The roll cage is designed strictly according to the safety standards given to us. Line model of the roll cage & 3D Assembly of whole vehicle is modeled in SOLIDWORKS 2018. Finite element analysis (FEA) is carried out on line model of roll cage in cases of front collision, rear collision, rolling; dynamic, front bump & Rear bump analysis in ANSYS. FEA of suspension arms was carried out in ANSYS. Based on the result obtained from above tests the design is modified accordingly. The Centre of Gravity was tried to keep in middle of the vehicle & closest to the ground for optimum stability. The length of the vehicle was kept small so as to reduce weight and maintain a desired center of gravity, while the width of the vehicle was keeping the most to maintain stability returns.

## II. PROBLEMSTATEMENT

All-Terrain vehicle or an ATV is basically a Land based automobile capable of reaching remote areas where normal vehicles like cars/bikes cannot reach. ATVs have a wide range of applications nowadays like in Military, Forest departments, Farming, etc. The project is to analyze an ATV by calculating all the required parameters, analyzing CAD model of each component and making the complete assembly of an All-terrain vehicle on Solid works CAD software.

## III. METHODOLOGY

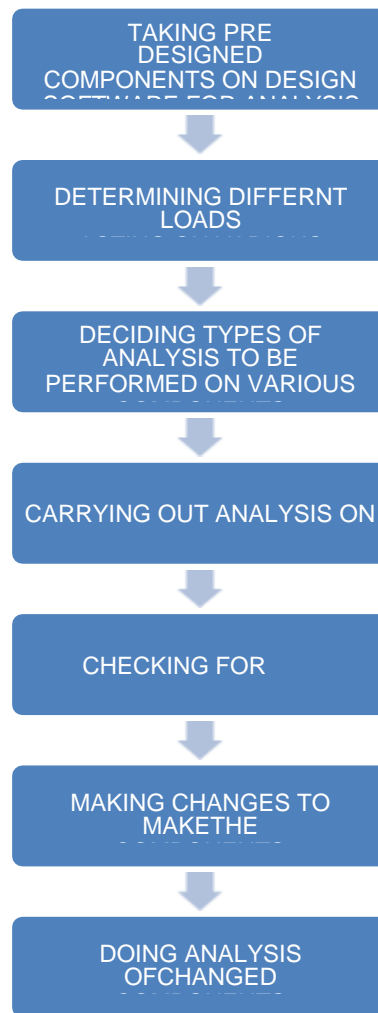


Fig. : The Process Represented

As a Flowchart

#### IV. CONCLUSION

The chosen design was the safest and the most reliable car for any long terrain. All the parameters like safety, cost, performance, reliability, durability, aesthetics, standard dimensions and material were also taken in consideration on the same time. Where ever possible finite element analysis was done on the regularly loaded parts and modifications were done accordingly to avoid any type of design failure. In case of rolling front and rear curved members Behind the driver's seat) take the side load equally not like in other designs where only the rear curved members were made to bear the side rolling loads.

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