International Journal of Advance Research in Science and Engineering
Vol. No.6, Issue No. 01 , January 2017
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

MODELING AND IMPACT ANALYSIS ON FRONT BUMPER OF A CAR

Y. Naveen Kumar Reddy[1], K. Santosh Reddy[2], D. Kapil Kumar[3], N. Kiran[4], Jyotsna Santhi[5]

[1, 2, 3, 4] B.Tech, [5]Working as Assistant Professor

Visvesvaraya College of Engineering& Technology, M.P. Patelguda,

Bonguloor Xroads, Ibrahimpatnam Hyderabad, (India)

ABSTRACT

The point of venture is to plan and perform affect examination on front guard of an auto to discover stresses prompted in it. Mechanical properties are critical to know the disappointment system amid effect. Limited component programming ansys is used to concentrate the conduct of front guard. Another additional innovative for improving crashworthiness is the use of material to make the part to ingest vitality amid the mischance. Explore concentrates on polymer composite material. It is thinking about their ability, geometry, and distinctive parameters that effect the similarity of the guard. The static test and investigation is done on guard by changing the heap and area of load application. The outcomes got will be looked at for side load and focus load to know the anxiety dissemination. Guards are imperative as they keep the effect vitality changed from car to travelers. This spared affect vitality is discharged to environment which lessens harms of travelers and autos.

The outline model of auto guard is done in catiav5r20 and investigation is done in ansys by utilizing express flow workbench

Key Words: Bumper, Catiav5r20, Ansys15.0.7, Affect Loads, Express Progression.

I. INTRODUCTION

Auto accidents are going on reliably. Most drivers are induced that they can avoid such inconvenience a few conditions. Regardless, we ought to consider the estimations – ten thousand dead and several thousands to million harmed every year . These numbers require the need to improve the prosperity of autos amid the mishaps. Auto guard is one of the key systems in traveler vehicles. Guard planned to envision or decline physical damage to the front or rears of traveler motor vehicles in crash condition. They secure the hood, trunk, fire cook, fuel, vapor and cooling framework furthermore prosperity related apparatus, for instance, halting lights, headlamps and taillights, et cetera. A not too bad framework of auto guard must give security for travelers and should have low weight. Various countries have particular execution rules for guard. Under the International security directions at first made as European measures and now got by most countries outside North America, a vehicle security framework still limit consistently after a straight - on pendulum or moving - limit impact of 4 Kmph (2.5 mph) to the front and the back, and to the front and back corners of 2.5 Kmph (1.6 mph) at 445mm over the ground with the vehicle stacked or purged. In North America (FMSS: Federal Motor

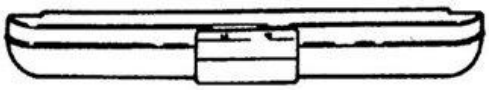
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Vehicle Safety Standards), Canada (CMVSS: Canadian Motor Vehicle Safety Models) and E.C.E. Joined Nations Agreement, Regulation No. 42, 1994. This standard molecule is recognized by ARAI India, so it is utilize d for this review

II. TYPES OF BUMPERS

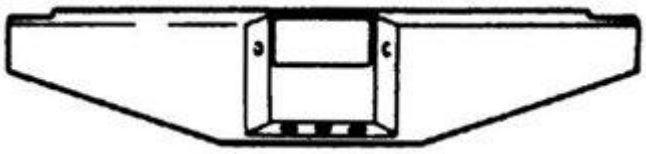
The guards are classified into five distinct sorts in light of the shape and geometry. they are

Standard Bumper



Deep Drop Bumper (Also Known As a Cowboy Bumper)

Deep drop bumpers are typically found on older truck and it is made of with chrome plate. this type of bumpers are have heavy duty.



Roll Pan Bumper

Roll pan bumpers are mainly use in custom compact trucks. Theavailable trailer hitches will sit in the middle, behind the bumper.

Step Bumper

Step bumper is typically found on heavy vehicles trucks, and SUVs. The small cutout in the center looks like a step. This bumper also has holes for hitch balls and can be used to tow lightweight trailers.

Tube Bumper

Tube bumpers are mainly used in jeeps.

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

II. INTRODUCTION TO CAD

French association Dassault Systems made multi-arrange CAD/CAM/CAE business programming CATIA (Computer Aided Three-dimensional Interactive Application). This is formed in the C++ programming dialect, CATIA is the essential aftereffect of the Dassault Systems thing lifecycle organization programming suite. In 1977 a French air make creator Avions Marcel Dassault, started CATIA as an in-house headway around then customer of the CADAM CAD programming to develop Dassault's Mirage contender plane, then was grasped in the shipbuilding, auto, flight and distinctive business wanders.

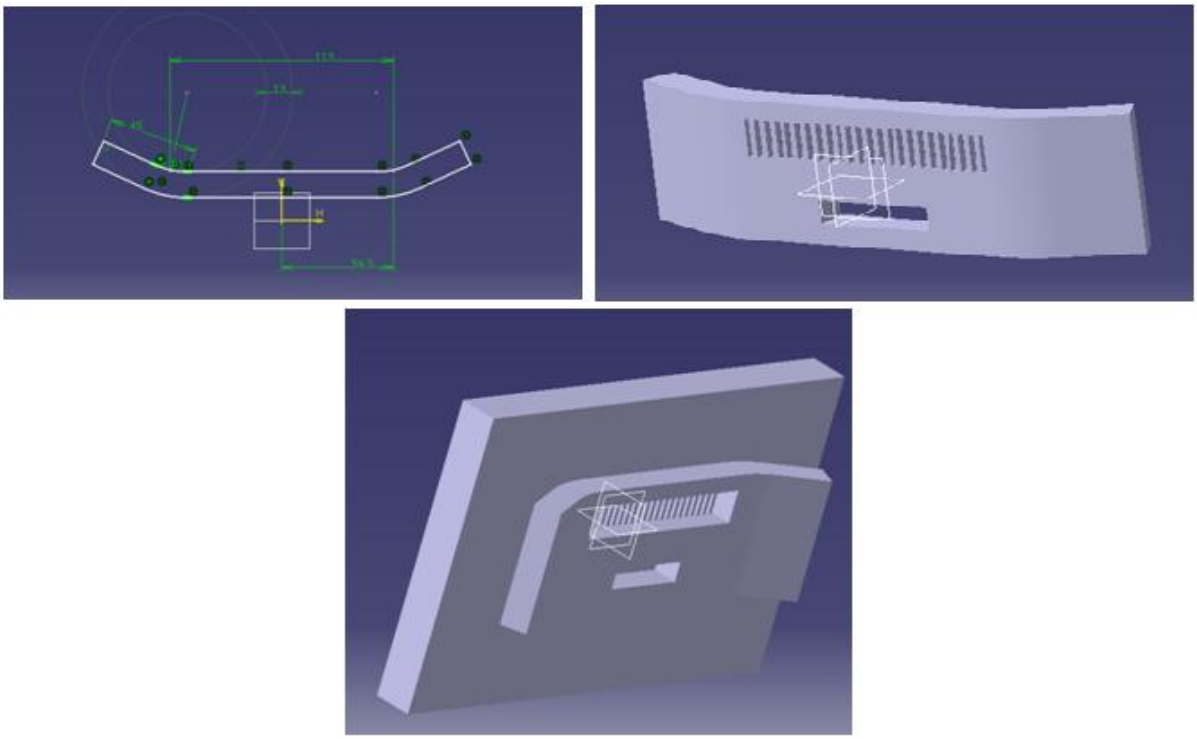
Modules like 3D portrayals, part configuration work seat, structure or tooling parts for formation of 3D sections like gatherings and shaped are accessible in CATIA. The devices in the CATIA empower useful resiliences, Kinematics definition and item definition. CATIA can be associated with a wide assortment of business ventures, from flying and safeguard, auto, and advanced rigging, to front line, shipbuilding, customer stock, plant diagram, buyer packaged items, life sciences, building outline and improvement, strategy compel and petroleum, and organizations.

III. MATERIALS USED IN BUMPER

At one time, most auto guards were made of steel. By then, most were made of chrome or a chrome plated material. Today, auto guards can be created utilizing anything from chrome secured material to a variety of different versatile materials or plastics. This makes specifying auto guard genuinely more jumbled, as guard created utilizing unmistakable materials require out and out various organizing medications. Organizing a chrome plated guard requires a touch of resistance and a light sanding touch, yet it is completely something that even the most nice auto proprietor can accomplish in a day or less. The fundamental foe of chrome plated guard is oxidation (rust). The more you allow rust spots to remain on your guard, the more troublesome the organizing strategy will be. Guards on most new autos are shading encouraged plastic "wrappers,"formed easily around the front and back terminations of the vehicles. They may fulfill the eye, however whether these guard shield the vehicle they include from damage in low-speed impacts is another matter. As showed by the National Institute for Highway Safety, how well the auto is guaranteed depends, as it were, on what's underneath the plastic. Guard structures generally consolidate a stronghold bar notwithstanding essentialness holding material, for instance, polypropylene foam. Better guards every now and again have water driven defends instead of, or in any case, the foam. Today's plastic auto guard and band structures are elegantly fulfilling, while offering ideal conditions to both fashioners and drivers. The prevailing a portion of current plastic auto guard system scarves are made of thermoplastic olefins (TPOs), polycarbonates, polyesters, polypropylene, polyurethanes, polyamides, or blends of these with, for instance, glass strands, for quality and assistant unyielding nature. The usage of plastic in auto guard and bands gives planners a tremendous measure of chance with respect to styling a model vehicle, or improving a present model. Plastic guard contain strongholds that allow them to be as impact protected as metals while being less expensive to supplant than their metal partners. Plastic auto guard overall reach out at an indistinguishable rate from metal protects under standard driving temperatures and don't generally speaking require exceptional devices to keep them set up.

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Guard bar is one of the guideline parts of the guard structure that shields a vehicle from front and back accidents. In this way, it is fundamental to framework and create watch shaft which can add to have extraordinary impact direct. The most basic thought in arranging guard structure is the limit of the guard system to hold enough imperativeness to meet the principal equip makers (OEM's) inside guard standard. A late work dispersed in refered to that the ability to remain set up at quick impact, weight, manufacturing process limit, cost, formability and recyclability of materials are the essential issue ought to have been considered in arranging guard bar in the midst of the blueprint organize. Interchange factors, for instance, quality, shape, influence condition, thickness, cross fragment and ribbing configuration furthermore ought to be considered in arranging auto guard bar. In any case, guard bar arranges need to satisfy and meet prosperity gages need by neighborhood and all inclusive directions. Designmodel in catia



IV. INTRODUCTION TO FEA

FEA is the effective usage of the Finite Element Method (FEM), which is used by architects, and scientists to scientifically model and numerically understand extremely complex structural, liquid, and multi phase issues. The FEA programming is used in wide range of businesses yet is most generally utilized as a part of the aeronautical, biomechanical and locomotive industries.

An arrangement of points in finite element (FE) called “hubs” which make the state of the outline. The finite element mesh is formed by joining the hubs by finite elements themselves and contains the material and basic properties of the model, characterizing response of it in specific conditions. The finite element mesh may vary for different materials depend on the foreseen change in stress levels of a specific part.

Areas that experience high changes in stress for the majority part require a higher mesh density than those that experience little or no stress variation. Purpose of interest might incorporate crack purpose for before tried material, corners, filets, complex purpose of intersect, and high-stress regions.

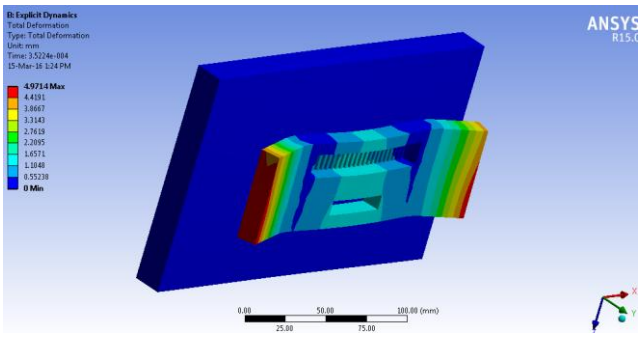
International Journal of Advance Research in Science and Engineering
Vol. No.6, Issue No. 01 , January 2017
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

V. MATERIAL

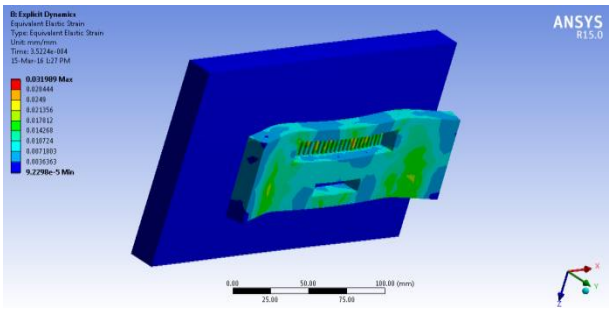
Material	Young's modulus	Poisson's ratio	Density
Aluminium alloy	71GPA	0.33	2.77e-006 kg mm^-3
CARBON FIBAR	450GPA	0.3	1800 kg mm^-3

ALUMINIUM ALLOY

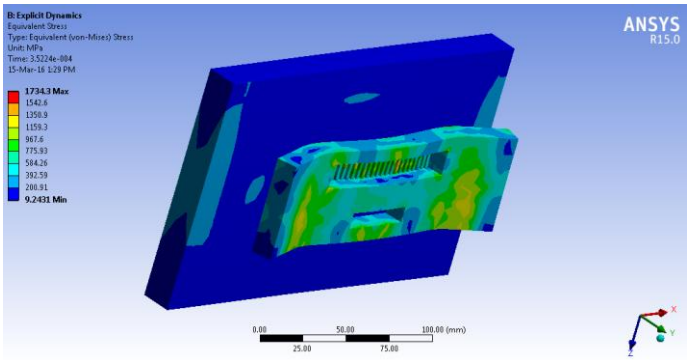
Total deformation



EQUIVELENT STRAIN



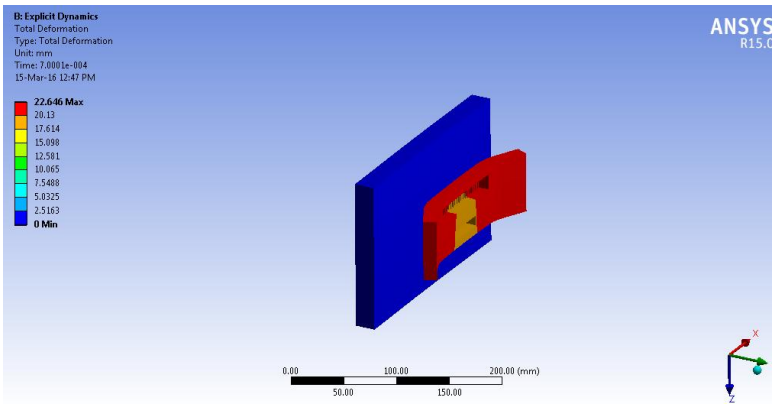
EQUIVELENT STRESS



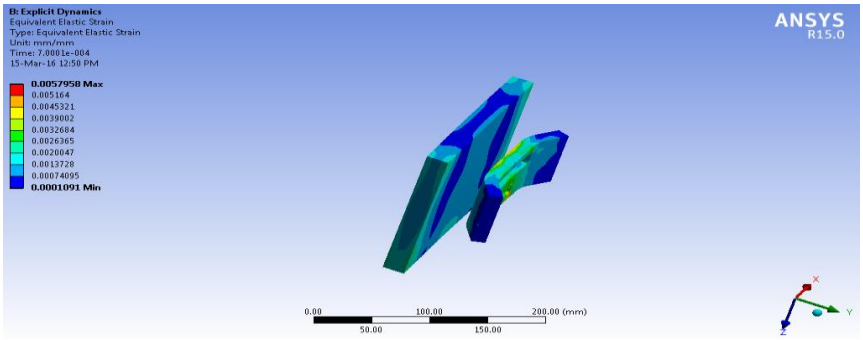
International Journal of Advance Research in Science and Engineering
Vol. No.6, Issue No. 01 , January 2017
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

VI. CARBON FIBAR

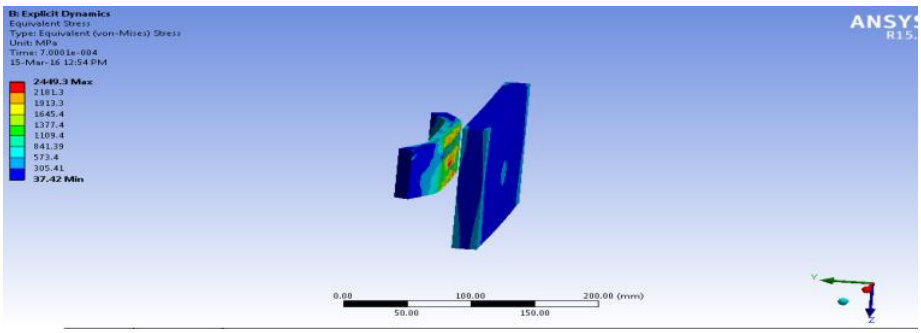
total deformation



Equivalent strain



Equivalent stress



VII. RESULT

Material	Total deformation	Equivalent stress	Equivalent strain
Aluminium alloy	4.9714	0.031989	1734.3
CARBON FIBAR	22.646	0.0057958	2449.3

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

VIII. CONCLUSION

Study on different materials which are suitable for the improvement of bumper. The best material has been suggested for bumper by analysis on different materials.

As we observed the total deformation of the aluminum alloy is lesser then the carbon fiber so the aluminum alloy is better for the car bumper then carbon fiber

REFERENCES

[1] Cheon S S, Choi JH, Lee DG.Development of the composite bumper beam for passenger cars.JComposStruct1995; 32:4919.

[2] Reid SR, Zhou G. Impact behavior of fiber-reinforced composite materials and structures. England: Wood head publishing; 2000.

[3] [Maeda R, Ueno S, Uda K, Matsuoka T. Strength test of aluminum alloy bumper for automobile. Furukawa Review 1994(13).

[4] Cheon SS, Dai GL, Jeong KS. Composite side-door impact beam for passenger cars. J Compos Struct 1997; 38:229–39.

[5] Cheon SS, Lim TS, Lee TS. Impact energy absorption of glass fiber hybrid composites.J Compos Struct 1999; 46:267–78.

[6] Feng ZS, feng SQ. Research of CA1092 a

[7] [7] utomotive body

AUTHOR DETAILS

[1] *Y.Naveen kumar reddy,B.Tech from Visvesvaraya college of engineering& technology, m.p. patelguda,bonguloor xroads, ibrahimpatnam Hyderabad*

[2] *K.Santoshreddy,B.Tech from Visvesvaraya college of engineering& technology, m.p. patelguda, bonguloor xroads, ibrahimpatnam Hyderabad*

[3] *D.KapilkumarB.Tech from Visvesvaraya college of engineering& technology, m.p. patelguda, bonguloor xroads, brahimpatnam Hyderabad*

[4] *N.KiranB.Tech from Visvesvaraya college of engineering& technology, m.p. patelguda,bonguloor xroads, ibrahimpatnam Hyderabad*

[5] jyotsnasanthi, *working as assistant professorfrom Visvesvaraya college of engineering& technology, m.p. patelguda, bonguloor xroads, ibrahimpatnam Hyderabad*