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CAR TOWING MACHINE

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ABSTRACT: If a vehicle is not able to start but it needs to be moved, a car dolly can be used as a method of moving it around. They act as wheel skates and once you have jacked each wheel onto a dolly,it is far easier to move the car to the position where it needs to be. Wheel dollies are known forlifting and moving heavy vehicular wheels. The wheels lifted by a dolly may be separate, or inpairs, and may be fixed to a vehicle. When all the wheels of a vehicle are lifted, if the dollies have their own caster wheels, the entire vehicle may be moved easily. Dollies are very easy to use. Simply position the tire in between the rails, and use the handle to bring the rails closer together. Wheel dollies allow one person to easily reposition the vehicle. This wheel dolly system will have one frame with four trolley wheel, handle mechanism is used which will helpto lift up the vehicle wheels from the ground and after placing this dolly below the wheels one can move or park the car easily. This invention relates to a wheel-lift device for lifting and carrying a wheel mounted to an axleof a vehicle. More specifically the present invention is directed toward a wheel-dolly having a lifting means for raising a damaged or immobilized wheel of an automobile, or machine, then carrying that wheel over obstacles when pulled by a winch or tow chain, or carrying wheel mounted on vehicle on a road or street when vehicle is attached to and pulled by a tow truck.

I. INTRODUCTION

Towing is coupling two or more objects together so that they may be pulled by a designated power source or sources. The towing source may be a motorized land vehicle, vessel, animal, or human, the load anything that can be pulled. These may be joined by a chain, rope, bar, hitch, three-point, fifth wheel, coupling, drawbar, integrated platform, or other means of keeping the objects together while in motion.

Towing may be as simple as a tractor pulling a tree stump. The most familiar form is thetransport of disabled or otherwise indisposed vehicles by a tow truck or "wrecker." Other familiar forms are the tractor-trailer combination, and cargo or leisure vehicles coupled via ballor pintle and gudgeon trailer-hitches to smaller trucks and cars. In the opposite extreme are extremely heavy duty tank recovery vehicles, and enormous ballast tractors involved in heavy hauling towing loads stretching into the millions of pounds.

Necessarily, government and industry standards have been developed for carriers, lighting, and coupling to ensure safety and interoperability of towing equipment. Historically, barges were hauled along rivers or canals using tow ropes drawn by menor draught animals walking along towpaths on the banks. Later came chain boats. Today, tug boats are used to makeover larger vessels and barges. Over thousands of years the maritime industry has refined towing to a science. Aircraft tow one-another as well. Troop and cargo carrying gliders are towed behind powered aircraft, which remains a popular means of getting modern leisure gliders aloft.
There are many safety considerations to properly towing a caravan or trailer / travel trailer starting with vehicle towing capacity and ranging through equalizer hitches to properly and legally connecting the safety chains. According to the United States National Highway Traffic Safety Association, more than65,000 crashes involving passenger vehicles towing trailers occurred in 2004 in the US, jumpingnearly 20 percent from the previous year.

II. LITERATURE SURVEY

DRAG REDUCTION FOR A PASSENGER CAR TOWING A CARAVAN
S.J. HANDS and M.M. ZDRAVKOVICH
The aerodynamics of a car towing a caravan can be improved if the flow that separates from theroof of the car re-attaches again along the leading edge of the roof of the caravan. In the presentstudies a simple flat-plate deflector was attached to

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the roof of a model car and inclined at various angles. Two types of car were tested: a standard coup~ and an estate version. The lattershowed a markedly different flow pattern between the car and the caravan. A smoke- visualisation technique was utilised to determine the optimal angle for the deflector using a small smoke wind-tunnel. Drag and lift forces were measured for the two car--caravan combinations in a larger wind tunnel. It was found that the best position for the deflector was along the trailing edge of the roof (for either the coup~ or the estate car). Some additional reduction in drag was achieved by fixing a horizontal plate along the towing bar. Experimental study of the tilt angle body of towing vehicle with different loadJakub Polasika, Konrad J. Waluśa, Janusz Mielniczuk The body while the vehicle is moving is tilts the longitudinal and transverse directions. Transverse generated mainly by uneven road surface and longitudinal driving processes (acceleration and braking). Increasing the weight of the vehicle transported cargo enhances tilt.During cargo delivery vehicles are required to be adequately protected and the distribution of the load area in order to minimize dangerous tilt. Incorrectly secured load during heavy brakingcan move and change drive trajectory of the vehicle and extend the braking distances. The results of road tests change the inclination of car body of the vehicle a towing car transporting vehicles of different mass.

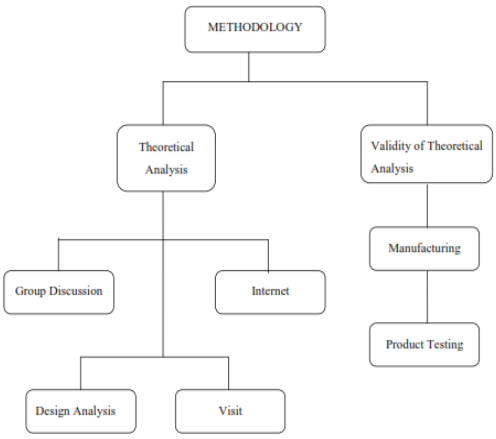
Open-Loop Control Laws for a Vehicle Towing Three Trailors
Y. YAVIN
A vehicle pulling a train of three trailers has to go from a point Po to a point Pf, both of them inthe (X, Y)-plane, during a given time interval [0, tr]. During its motion the pulling vehicle has to move in such a manner that none of the vehicles will collide with a circular shaped obstaclethat is located between the points. By using the concept of path controllability, and a method oftrial and error, control laws are derived for the pulling vehicle control mechanism, such that theabove-mentioned maneuver can be performed. Analysis of dynamic stability of car trailer combinations with Nonlinear damper properties

Ning Zhang, Guo-dong Yin, Tian Mi, Xiao-gao Li, Nan Chen
The dampers installed in the suspension of the towing car have some nonlinear property in roadtests, like a practical piecewise linear property. Its influence on the dynamic stability of car trailer combinations are investigated in this paper. This non linearity is modelled by a magic formula damper model and then integrated into an extended single track model with tandem axel trailer. Both the system local stability and global stability are analysed with different theoretical methods. The results of system phase portrait show a limit cycle and the corresponding longitudinal velocity is identified as the system dynamic critical speed. Fatigue life simulation of a rear tow hook assembly of a passenger car

C.L. Petracconi, S.E. Ferreira, E.S. Palma
A comparison between laboratory test data on fatigue crack nucleation in a rear tow hook pin assembly of passenger vehicle and a computational methodology using commercial package software is presented. Fatigue damage is determined using local material response, measured during experimental tests. Experiments were performed simulating the actual conditions in thecustomer environment. Stress and strain were experimentally measured by using strain gages, bonded on the hook assembly. These experimental lives are compared with those obtained through numerical analysis using a commercial fatigue software. Fatigue analysis methods (S–N curves, rain flow counting and Miner rule) were used to determine the fatigue damage imposed on the component. Interpretation and evaluation of the measured strain and stresses, simulation tests and fatigue life assessments, on the basis of S–N curve, are described in this paper.

III. METHODOLOGY

FLOW CHART:



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METHODOLOGY OF WORKING PROCESS:

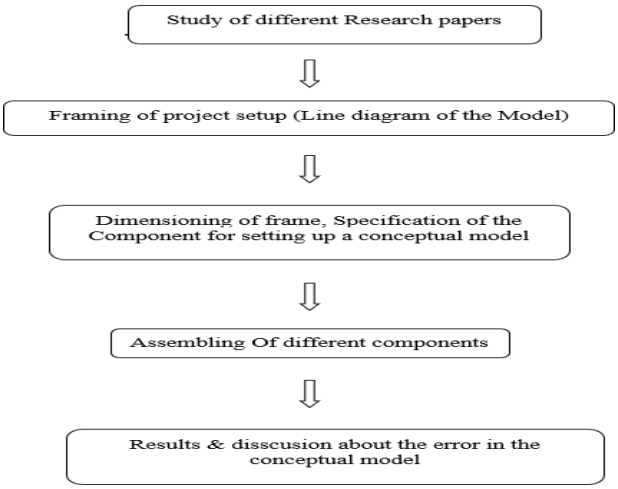

Fig 2. Flow Chart for Working Process

Step 1: - We started the work of this project with literature survey. We gathered many researchpapers which are relevant to this topic. After going through these papers, we learnt about Designof Car Towing Model.
Step2: - After that the components which are required for our project are decided.
Step 3: - After deciding the components, the 3 D Model and drafting will be done with the helpof CATIA software.
Step 4: - The components will be manufactured and then assembled together.
Step 5: - The experimental observations will be taken, calculations will be done and then the result will be concluded.

CALCULATION:
DESIGN OF SHAFT.
Material selection : -

Ref :- "PSG (1.10 & 1.12) + (1.17)"

DESIGNATION	ULTIMATE TENSILE STRENGTH N/mm^2	YEILD STRENGTH N/mm^2

Since the loads on most shafts in connected machinery are not constant, it is necessary tomake proper allowance for the harmful effects of load fluctuations.
According to ASME code permissible values of shear stress may be calculated formvarious relations.
= 0.18 x 800

= 144 N/mm^2

OR

fs_{max} = 0.3 fyt

=0.3 x 680 =204 N/mm

Considering minimum of the above values ;

- **fs_{max} = 144 N/mm^2**

Shaft is provided with key way; this will reduce its strength. Hence reducing above valueof allowable stress by 25%

- **fs_{max} = 108 N/mm^2**

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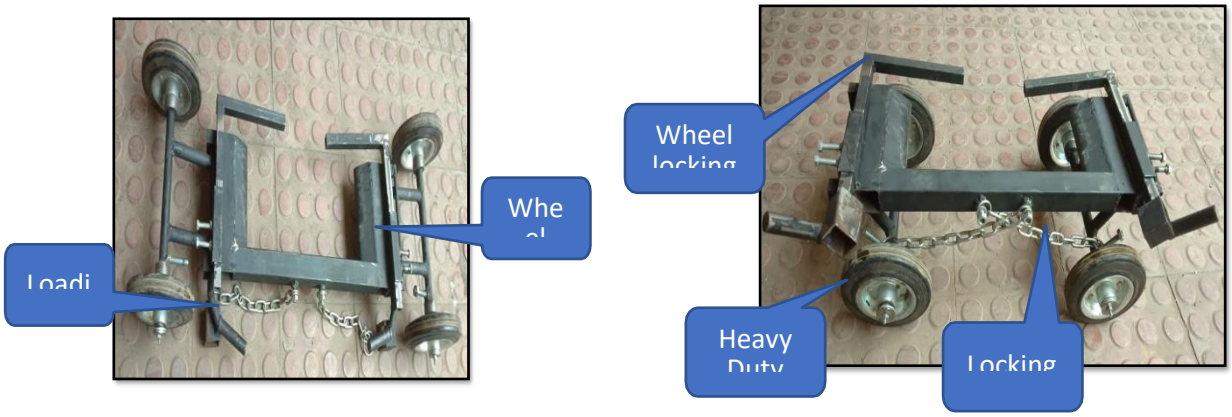
IV. WORKING

Taking Trial of actual Project



Advantages:

- Breakdown vehicle easy to move
- Less time required to installed
- Installation process is safer as compare to other towing mechanism
- Less manufacturing cost

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- Low maintenance cost

DISADVANTAGES:

- Only use for rear wheels
- Use for less distance
- Use only minimum speed
- For storage more space required in the vehicle
- High effort required to lift the vehicle

APPLICATIONS:-

- Move the puncture vehicle
- Move the Electrical brake down vehicle

V. FUTURESCOPE

All members will work on to improve the effort while lifting & releasing the automobile or machine by providing the Hydraulic or Electric provision for lifting the vehicle easily.Currently working only for rear wheels, in future will working for front wheels

VI. CONCLUSION

The project carried out by us made an impressing task in the field of automobile and automobile workshops. It is very usefully for the workers to work in the automobile workshopare in the service station. This project has also reduced the cost involved in the concern. Projecthas been designed to perform the entire requirement task which has also provided.

VII. REFERENCES

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[7]. Ning Zhang, Guo-dong Yin, Tian Mi, Xiao-gao Li, Nan Chen
[8]. Fatigue life simulation of a rear tow hook assembly of a passenger car
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