



# INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact Factor: 6.078

(Volume 7, Issue 2 - V7I2-1199)

Available online at: <https://www.ijariit.com>

## Design of automotive pamper suspension system

Pundru Srinivasa Rao

[srinupundru@gmail.com](mailto:srinupundru@gmail.com)

Mahatma Gandhi Institute of Technology, Hyderabad, Telangana

### ABSTRACT

*This work presents the design of suspension system of automobile which is based on study of the effects of air when the vehicle is in motion and this was focused on optimum size, angle, and shape of the spoiler. The spoiler or wings are the additional attachments used for an automobile which controls the flow of air and lift and it reduce suspension of the system. By reducing lift and drag forces with better traction control of the wings and the mileage of the vehicle will be improved. The wings in an automobile are used to decrease the lift force and have to control over traction. This concept of the design has an adjustable wing which can be altered as per their requirement. As they are adjustable, they can be rotated along a single axis which helps in to change the drag on the vehicle thus resulting to increase the mileage of the vehicle. They are placed on the rear side window of the vehicle.*

**Keywords:** Drag force, Lift force, Pamper, Spoiler

### 1. INTRODUCTION

The pamper suspension system is introduced in automobiles to increase the speed of the vehicle. In this concept functional wings are used to support vehicle in integrating its speed in terms of performance and efficiency. As in automobiles the rear wings are added to increase down force and these rear wings are in generic ellipsoid shape. The streamlines and flow separations at the rear are depicted in the upper part. The inverted wing which is in ellipsoid shape is added at the back side of the flow which result as a lower base pressure and down force created by this wing. Furthermore the high speed flow is created near the wing and the flow on the body is reduces the area of flow separation due to this a rear wing can increase the down force of a vehicle and increases the lift of the wing. The prediction of components and properties of the vehicle are required for accurate prediction and understanding the behavior of the flow to reduce the effect of drag limitation, boundary layer transition and flow separations. The reduction of vehicle drag is a key step for the improvement of crosswind stability of the vehicles. To

reduction of vehicle drag, increase the crosswind stability of the vehicles are required for improvement in inflow predictions and shape optimization of the vehicles. The faster moving air exerts less pressure, and therefore the air must exert an upward force and the drag is a vector quantity having both magnitude and direction. The inverted shape of a wing creates a down force rather than lift and this increases traction around curves and keeps the vehicle at high speed and because the air under the car is moving faster than that the air above it, slower moving air creates greater pressure and forcing the vehicle down against the track.

### 2. DESIGN PROCESSES OF AUTOMOTIVE PAMPER SUSPENSION SYSTEM

The scales or wings place on the rear window of the vehicle. The drag and traction forces can be controlled by adding attachments to the vehicle. The large amount of down force produced by race cars allows higher speeds .and small changes in the automobile vehicle front or rear wing can lead to a significant change in performance of a wing. It is reducing drag and wind noise, minimizing noise emissions, and preventing undesired lift forces and other causes of instability at high speeds.



Fig. 1: Spoiler

The major forces which are affecting the motion of automobile vehicle are drag, lift. Some energy is lost to move the vehicle through the air and this energy is used to overcome a drag force. The vehicle drag is due to frontal pressure and rear vacuum. This

project focuses on a new concept of an attachment similar to wings of a automotive vehicle Fig 1 and Fig 2 shows the spoiler and pamper suspension system of an automotive vehicle.



**Fig. 2: Pamper suspension system**

To reduce the drag using character lines and these lines help the air to pass smoothly over the body and thus reducing the air resistance on roof rack, mud flaps, rear spoiler. By replacing the back window with the concept scales to reduce the drag coefficient. scales with circular shape and aerofoil cross-section. these scales are adjustable with height and can be rotated along one axis. By Adjusting height of scales the drag can be altered by rotating along one direction. By this mechanism, the vehicle can take place to a noticeable level. Therefore, the scales are analysed with different shapes such as endplates or gurney wing flaps to determine their influence in disturbed air. Moreover, the study which is carried out in different aerofoil cross-sections, and additional flaps. These are named as scales having the cross-section of an aerofoil. They are placed on the rare window of the vehicle. As they are adjustable, they can be rotated along a single axis which helps in reducing and increasing the drag on the vehicle thus, resulting in the aero-braking system. That helps during high speeds. The drag co-efficient and maintain the down force. By adjustable height of the spoilers. The drag can be increased and decreased by rotating along one direction. The spoiler or winds are the additional attachments used for an automobile for the avoidance of the lift force, better traction control, improve handling, reduce drag force. They create a laminar flow of air and improve the mileage of the vehicle by decreasing the lift force and have to control over traction.

### 3. CONCLUSION

In this work the automotive pamper suspension system which is subjected to spoiler is discussed based on to reducing the lift

force and simultaneously utilizing the drag force in automobiles. In this the mechanism, the cable and the link are directly coupled hence it is a linear function of brake travel system to the rotation of the blade. The analysis are carried out to optimize the function of brake travel to the required output rotation. The function can be altered by changing the dimension and orientation of the other members that include the fixed end, the link, the pivot point and the rolling contact and these can take place to a suitable level. Therefore, the scales are considered with different aspects such as endplates, wings to determine their influence in disturbed air in its motion of the vehicles. Moreover, the study carried out in this work are the aerofoil cross-sections, scales, and the analysis of the wings.

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