

DESIGN AND DEVELOPMENT OF SHOCK ABSORBER TEST RIG

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ABSTRACT

Automotive vehicle performance has been a major focus of industrial research and development for nearly a century. While vehicle performance can be quantified in many ways like ride quality and handling is two aspects of performance directly related to suspension system. In a broader sense, vehicle's ride quality is characterized by suspension with low spring rate, low damping rate, resulting in large suspension travel. On the other hand, for achieving good handling characteristics suspensions with high spring rates and high damping rates, resulting in small suspension deflections are incorporated. Suspension system basically consists of different components like spring, shock absorber and linkages that isolates excitations from road to wheels and then to vehicle. So they perform a major role in obtaining desired ride and handling characteristics. Out of this, behavior of shock absorber (damper) significantly affects the performance of suspension system. This is difficult to achieve unless and until parts of the whole system performs their assigned task satisfactorily. For achieving this evaluation of performance of individual components of the suspension system is necessary. It raises need of a mechanism which will simulate different actual conditions that a vehicle is subjected. The mechanism or setup should be able to create a vehicular situation in which one end of the suspension test rig is subjected to jerks and bounce producing unsteady vibrations. While on the other side it should face loading conditions representing the weight of passenger and vehicle itself. So this paper encompasses the design and development of shock absorber test rig in which the above mentioned conditions are simulated and performance is evaluated.

KEYWORDS: Suspension System, Shock Absorber, Damping, Stiffness and Dynamic Characteristics