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# A REVIEW ON CRUMPLE ZONE

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## *ABSRACT*

***This paper presents a review for an crumple zone. This review focuses on formal modeling of the corresponding smart vehicle units, to increase the road safety accidents as well as to allow formal analysis of models. We're going to find out how crumple zones redistribute the forces involved in a crash, what crumple zones are made out of and learn about a few other advanced safety systems that are being tested right now. We'll also find out how crumple zones have been incorporated into race cars, and why a number of racing fatalities could have been prevented if the sport had adopted these safety features sooner.***

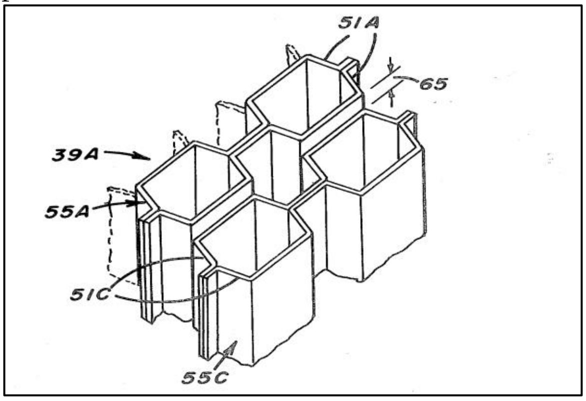
## INTRODUCTION

Every year millions of road users are killed or injured in road accidents. Road accidents were ranked as the ninth most common cause of death in 1990 and are estimated to be the third most common cause of death by 2020. Also, the fatality rate is projected to increase by over 80% in the developing countries and by 65% including the developed countries by 2020.

We're going to find out how crumple zones redistribute the forces involved in a crash, what crumple zones are made out of and learn about a few other advanced safety systems that are being tested right now. We'll also find out how crumple zones have been incorporated into race cars, and why a number of racing fatalities could have been prevented if the sport had adopted these safely.

## LITERATURE REVIEW

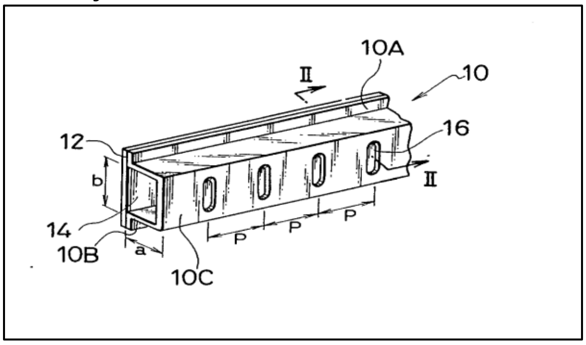
A pad adapted to sustain an impact load by stepwiseabsorption of kinetic energy.The pad incorporates acollapsible, Crushable core adapted to undergo stepwise deformation under the force of the impact load.Stepwise deformation of the core provides, during impact load application, a significant lowering of the peak dynamic load sustained by the pad and applied to the cued pad support. The normally encountered high buckle initiating peak loads are entirely avoided by the present.




Energy absorbing honeycomb structures

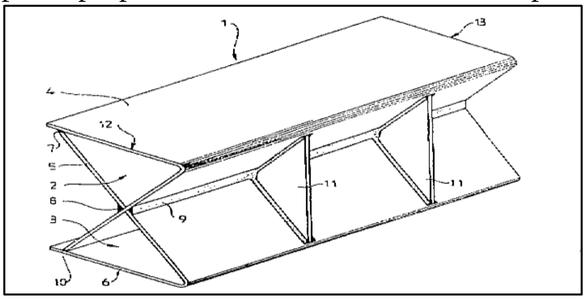
Conventional honeycomb exhibits a uniform energy absorbing characteristic when mechanical forces are applied to the columnar ends of the honeycomb cells. Generally, a honeycomb structure comprises plural corrugated ribbons of sheet material such as metal foil, paper, plastic or the like which are secured together at spaced node points. The resulting structure presentsplural hollow, multisided, parallel cells. The application of mechanical forces to the columnar ends of the cells causes the cell walls to fold into small accordion –like pleats resulting in compression of the structure and absorption of energy .Another characteristic of honeycomb is that its compression or columnar strength is considerably greater than its uniform crush strength. For this reason extremely high initial peak loads are required to initiate buckling of the cell walls. When conventional honeycomb is used as the core of a pipe whip restraint pad, the structural framework or the support to which the pad is secured also must be capable of sustaining the high peak loads.

A side member of a motor vehicle in which at least one of four side walls forming a closed tetragon has disposed thereon a plurality of beads extending transverse to the longitudinal direction of said at least one sidewall. The beads are shorter than the width of said at least one side wall and are spaced at a pitch of P to (a+b)><(l iO.1)/2, where b is the transverse length said at least one side wall and a is the transverse length of a side wall adjacent said at least one side wall.

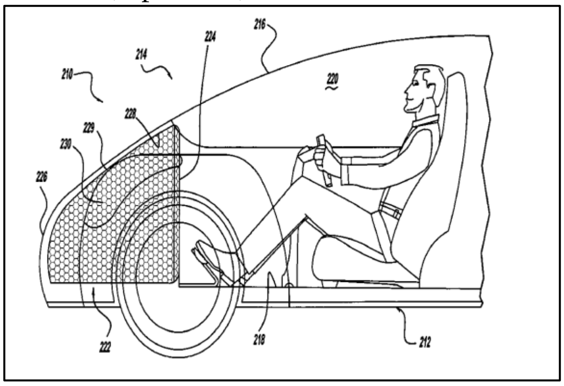



There are known side members of a motor vehicle, wherein beads arranged in the longitudinal direction are provided, and, when an impact load in' the axial direction is applied, an axial compressive deformation is effected to absorb energy of the impact load. However, generally, these conventional side members have been improper in shape, length of beads or pitch in the axial direction thereof, so that it is difficult to stably effect the axial compressive deformation .For example, normally a side member forms a closed section of a rectangular form. However, when the bead sare formed, crossing the opposing corner portions in the vertical direction on one side surface of the side member, the bending strength of the side member is reduced considerably, such that when an impact load is applied to the side member in the axial direction, the side member is bent before the side member is axially compressively deformed over the scope of the total length thereof. The reason for this disadvantage is that when a bending moment acts on a tetragonal closed-section member, the stress caused by this bending moment is mainly borned by the corner portions of the tetragon .As a consequence, when the beads are formed at the corner portions bearing a large part of the stress, the bending stress must be borne by the other portions, causing the bending strength of the side member to be lowered considerably.

The invention concerns impact-absorber devices, an impact absorption method, and a framework and a vehicle including such impact-absorber devices. According to the invention ,the impact-absorber device comprises at least one longitudinal member absorbing by deformation the energy generated by an impact in a given direction, which member is made from thin plate, having a generally triangular crosssection in a plane perpendicular to the direction of impact.



The invention capitalizes upon the absence of an engine compartment forward of the passenger compartment in the vehicle body and provides a frontal impact energy dissipation compartment for of the passenger compartment .The frontal impact energy dissipation compartment is filledWith an energy absorption Structure, Such as an aluminumhoneycomb structure. Alternatively, a bulkhead member extends across the vehicle at the forward end of the passenger compartment to enhance structural integrity of theforward end of the vehicle. The bulkhead member may be integrated with the flow airsystems, cross-car structural sup safety airbags, slid able driver interface, speakers, etc.



## CONCLUSION

From review of research paper, it is found that there are various methods of applying the crumple zone in the automobiles. It is found that the design of the automobiles also plays an important role for the installing the crumple zone, material thickness also matters. Parameters dependsupon the torque and the power of the engine. The mostly used crumple zone is the honeycomb type becauseit has a good mechanical loadabsorption capacity.

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