Review Of Research
Vol. 4 | Issue. 6 | March. 2015
Impact Factor : 3.1402 (UIF)
ISSN:-2249-894X Available online at www.lbp.world

ORIGINAL ARTICLE

DESIGN AND FABRICATION OF FOLDABLE HELMET CARRIER AS A BIKE ACCESSORY

Harbhinder Singh
Department of Mechanical Engineering, UIET, Panjab University, Chandigarh.

ABSTRACT:

Helmets are life savers in the event of an accident, but often people neglect this and don't wear them causing unfortunate deaths. One of the major reasons for people not wearing a helmet is that there is no proper storage. Helmet locks are prone to breakage and sabotaging whereas helmets are bulky to carry around. Time and again, inventors have tried making foldable helmets that fit into bags without compromising structural integrity. However, college students just carry a small notebook with them therefore, require a storage space on the bike itself, that is theft proof. So a foldable helmet carrier was designed and fabricated.

KEYWORDS : Design and fabrication, foldable, helmet.

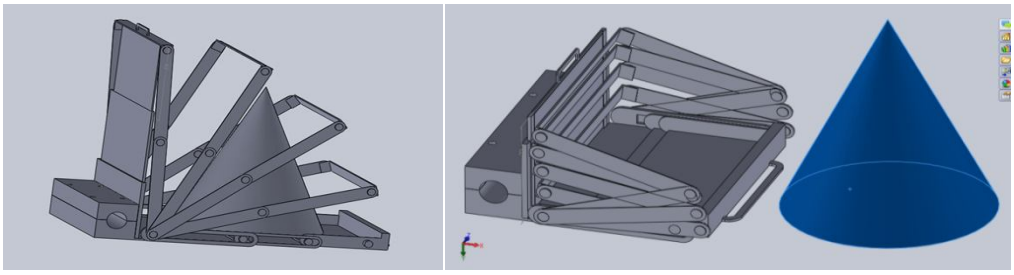
1. INTRODUCTION

As helmets is necessity for life saving during accidents, but riders not prefer helmets as there is no space provided by most of the two wheeler manufacturers. Although efforts had been done in this direction by many manufacturers but a final output is not accepted by riders yet. In this paper/project effort has been done to get a better solution for this problem.

Present work: The basic design requirements were:

The mechanism should collapse into a small space when not in use. When open, the mechanism should completely enclose the helmet. The mechanism should have a locking mechanism for theft protection. The mechanism should provide cover for helmet from outside environment. Mechanism should be easily operable by user and be

ergonomic and safe. Mechanism should be look aesthetically good when attached to bike/scooter.



(a) **(b)**

Figure 1 Software design (a) Carrier open, housing helmet inside (b) Carrier closed and folded

2. MANUFACTURING PROCESSES

In our feasibility study we had concluded that Aluminium was the more economically viable material for efficient light weighting as well as structural integrity. The next step was to cut the aluminium sheet into different pieces for the different parts of the slider mechanism. We used a hand cutter with aluminium oxide cutting wheel. Straight cuts were made by a cutting press. Grinding was important to improve the rough finish of cutting aluminium with the cutting wheel. The chips being formed during cutting process tend to fuse with the cutting material and the job sides and makes for a rough finish. Therefore, grinding was necessary to smooth out the edges and give a good finish. Polishing was done to improve the shine and look of the sliders. Holes of 6mm were required to insert the rivets that would act as pins into the sliding components. Additionally, holes of 3.5mm were required to insert the split rivet to connect the links of the helmet cage. 2 additional holes had to be made for mounting the lock on the top sliding part.

Total holes made: 8(6mm) , 2(3.5mm for lock), 32(3.4mm for split rivets).Bending was needed to create a 90 degree angle between the base and the plane where slotting would be done. The aluminum sheets were bent by a hydraulic sheet bending machine which had a V groove at the base. The ram would press the sheet into the V groove, creating the 90 degree bend.Slots had to made for making the slider in both the horizontal as well as vertical direction. These slots were made on a vertical milling machine with a 6mm milling cutter. Cutting oil had to be added to prevent aluminum chips from sticking to the surface of slot. The slots for the latch of lock and keyhole were punched from the aluminum sheet. The horizontal and vertical sliders had to be joined at 90 degrees to each other. TIG welding was performed at the junction that gave it a good finish as well as joint strength. A continuous weld was performed along the length of joint.6mm aluminium rivets were used to make the pins that would slide in the slots of the sliders. Washers were inserted to provide proper guide to the sliding elements. Split

rivets were opened and sealed by hammering. They formed the turning joints of the cage mechanism.Rubber was used as the material to make the mounts for holding the structure in place with the handlebar of the bike. The rubber had to be adhered to the aluminum plate on which it was supported. Both surfaces were cleaned by a primer and then industrial grade rubber based adhesive was applied and both surfaces stuck together. Pressure was applied at the joint to obtain good bonding.

The process of assembly involved the following sub-processes:

1) Riveting the pins of the sliders after packing with washers,2) Cutting the pieces of rubber for the mounts and creating countersinks for the M8 nuts,3) Pasting the rubber mount on the aluminum plate with adhesive,4) Making the cage with the aluminum strip linkages and split rivets,5) Inserting the lock and fastening it with M3 nuts and bolts,6) Try assembly with M8X120 nuts and bolts with the rear handlebar of bike.

(a) **(b)**

Figure 2

3. DISCUSSIONS AND FUTURE PLANS

Currently, this prototype weighs 3kgs and with the helmet, the total load becomes 5kg. Due to this and the design of the rubber mounts, a large space is required. This has to be taken care of by designing the product in plastic material to be manufactured by injection molding. This would reduce the weight significantly but marginally increase the cost. In order to protect the helmet from environmental factors, a canopy of waterproof fabric has to be attached to the helmet cage, such that it is fully covered from the environment. Product was for its ability to take up shocks that are transferred from the road to the vehicle body. Also, mounting has to be made such that it does not rattle or produce noise. Work already started on modular design where people can choose which parts they would have as per their helmet choices. Different sized helmets would have different sized accessory parts.