Helmet Liner Pro system comprises a protective helmet having at least one inner liner for absorbing mechanical energy; and an attachable/attached outer liner comprising shock absorbing material. The attachable outer liner is applicable to an external portion of the protective helmet to provide a shock absorption system whereby a user and others are suitably protected from external impact forces. The shape of the liner may vary depending on whether or not it is covering the entire helmet or just specific areas/regions.
HELMET PRO SYSTEM
CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application is related to and claims priority from prior provisional application Ser. No. 61/298,956, filed Jan. 28, 2010 which application is incorporated herein by reference.

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[0002] A portion of the disclosure of this patent document contains material which is subject to copyright protection. The copyright owner has no objection to the facsimile reproduction by anyone of the patent document or the patent disclosure, as it appears in the Patent and Trademark Office patent file or records, but otherwise reserves all copyright rights whatsoever, 37 CFR 1.71(d).

BACKGROUND OF THE INVENTION

[0003] 1. Field of the Invention
[0004] The present invention relates generally to the field of helmets and more specifically relates to a protective helmet as used to provide a shock absorption system whereby a user is suitably protected from external impact forces.
[0005] 2. Description of the Related Art
[0006] The following includes information that may be useful in understanding the present invention(s). It is not an admission that any of the information provided herein is prior art, or material, to the presently described or claimed inventions, or that any publication or document that is specifically or implicitly referenced is prior art.
[0007] A helmet is a form of protective gear typically worn on a head portion of a user to protect the head from injuries. Further, helmets may comprise a head covering of hard material, such as leather, metal, or plastic, worn by football players, firefighters, construction workers, motorcyclists, and others to protect the fragile tissues such as the brain located inside the head.
[0008] Sports, such as football, require the players to wear safety helmets to protect the head from injury such as temporary and permanent brain injuries such as concussions. Although these helmets offer adequate protection, they are also capable of causing injury to others. The hard outer material of the helmet can severely injure another player when it makes contact with a body part. The material does not efficiently absorb the impact of the hit, which can also cause injury to the player wearing the helmet.
[0009] Therefore, a need exists for a helmet with a cushioned outer liner to both protect others from injury when coming into contact with the helmet along with absorb impact to protect the wearer by controlled sequential deformation.
[0010] Various attempts have been made to solve the above mentioned problems such as those found in U.S. Pat. Nos. 4,937,888; 5,174,155; 5,724,681; 5,525,290; 5,566,399; and 6,272,692. This prior art is representative of helmets. None of the above inventions and patents, taken either singly or in combination, is seen to describe the invention as claimed.
[0011] Ideally, a helmet should operate to provide reliable safety protection and be manufactured at a modest expense. Thus, a need exists for a reliable helmet liner system to absorb impact by controlled sequential deformation when a user encounters direct/indirect contact with the head portion. The helmet, in-use should provide a redundant crush zone via at least one attachable outer liner and an inner liner working in combination with another which serve to avoid the above-mentioned problems.

BRIEF SUMMARY OF THE INVENTION

[0012] In view of the foregoing disadvantages inherent in the known helmet art, the present invention provides a novel helmet liner system. The general purpose of the present invention, which will be described subsequently in greater detail is to provide a helmet liner system designed to reduce the force impact of any object coming in contact with the safety helmet and/or the impact of the helmet itself against body parts. This outer liner may be attached to the exterior of a safety helmet or hard hat and acts as a shock absorber.
[0013] The present helmet liner system disclosed herein comprises a protective helmet having at least one inner liner for absorbing mechanical energy; and an attachable outer liner comprising shock absorbing material. The protective helmet comprises at least one sports helmet such as those used in contact sports or non-contact sports. The attachable outer liner is applicable to an external portion of the protective helmet to provide shock absorption. The shock absorbing material preferably comprises foam or other such deformable material.
[0014] The attachable outer liner may be coupleably-adhered to the protective helmet via at least one adhesive such as epoxy. Further, the attachable outer liner may be coupleably-adhered to the protective helmet having the at least one inner liner (inner layer), with the attachable outer liner and the inner liner preferably creating a redundant crush zone to dissipate forces before reaching the wearer. The redundant crush zone is designed to absorb impact by controlled sequential deformation. The attachable outer liner may be hand-removably replaceable in certain embodiments.
[0015] The outer liner forms a redundant impact layer in combination with the inner liner(s) found on an interior portion of the protective helmet, thereby creating a plurality of impact zones working together to dissipate impact/shock in a series and/or parallel deformation force-absorption configuration.
[0016] A kit is also embodied herein for the helmet liner system may comprise: a protective helmet; a plurality of the attachable outer liner(s); the adhesives such as epoxy and/or glue; and a set of user instructions, and wherein the attachable outer liner(s) comprise indicia. The helmet liner may be manufactured by helmet manufacturers or may be sold in retail/wholesale stores as a kit.
[0017] In accordance with the embodiments of the present invention a preferred method of use is disclosed herein comprising: mounting attachable outer liner to protective helmet; and inserting head of user into protective helmet thereby redundantly-protecting user from impact forces. The user-wearer then wears the helmet and is effectively protected during use.
[0018] The present invention holds significant improvements and serves as a helmet liner system. For purposes of summarizing the invention, certain aspects, advantages, and novel features of the invention have been described herein. It is to be understood that not necessarily all such advantages may be achieved in accordance with any one particular embodiment of the invention. Thus, the invention may be embodied or carried out in a manner that achieves or optimizes one advantage or group of advantages as taught herein without necessarily achieving other advantages as may be
taught or suggested herein. The features of the invention which are believed to be novel are particularly pointed out and distinctly claimed in the concluding portion of the specification. These and other features, aspects, and advantages of the present invention will become better understood with reference to the following drawings and detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The figures which accompany the written portion of this specification illustrate embodiments and method(s) of use for the present invention, helmet pro system, constructed and operative according to the teachings of the present invention.
[0020] FIG. 1 shows a helmet liner system in an ‘in-use’ according to an embodiment of the present invention.
[0021] FIG. 2A shows a perspective view illustrating an attachable outer liner applicable to an external portion of a protective helmet of the helmet liner system according to an embodiment of the present invention.
[0022] FIG. 2B shows another perspective view illustrating the attachable outer liner as applicable to an external portion of a protective helmet of the helmet liner system according to an embodiment of the present invention.
[0023] FIG. 3A is a perspective view illustrating the attachable outer liner having at least two-layers couple-ably-adhered to the protective helmet according to an embodiment of the present invention of FIG. 1.
[0024] FIG. 3B is a perspective view illustrating the attachable outer liner having up to four layers couple-ably-adhered to the protective helmet according to an embodiment of the present invention of FIG. 1.
[0025] FIG. 3C is a perspective view illustrating a pocket for receiving foam or gasses according to an embodiment of the present invention of FIG. 1.
[0026] FIG. 3D is a perspective view illustrating the outer liner fastened to the helmet according to an embodiment of the present invention of FIG. 1.
[0027] FIG. 4 is a flowchart illustrating a method of use according to an embodiment of the present invention of FIGS. 1-3d.
[0028] The various embodiments of the present invention will hereinafter be described in conjunction with the appended drawings, wherein like designations denote like elements.

DETAILED DESCRIPTION

[0029] As discussed above, embodiments of the present invention relate to a protective helmet device and more particularly to a helmet liner system 100 as used to provide a shock absorption system whereby user 160 is suitably protected from external impact forces.
[0030] Referring now to FIGS. 1-3D showing various perspective views of helmet liner system 100 according to various embodiments of the present invention. Helmet liner system 100 comprises protective helmet 110 and preferably attachable outer liner 120. Protective helmet 110 comprises at least one inner liner for absorbing mechanical energy. Protective helmet 110 preferably comprises on safety helmet, a hard hat, or at least one sports helmet as used in contact sports. It should be appreciated that helmets from various industries and applications may use the present system to increase relative safety.

[0031] Attachable outer liner 120 comprises shock absorbing material as shown best in ‘in-use condition’ 130 in FIG. 1. Attachable outer liner 120 is applicable to external portion 114 of protective helmet 110 to provide a shock absorption system whereby user 160 is suitably protected from external impact forces. Attachable outer liner 120 is multi-layered in certain embodiments and preferably comprises up to four layers as shown in FIGS. 3A, 3B & 3C. In this way the impact may be distributed and dissipated using multiple layers/ zones.

[0032] Top layer (outside layer) 140 preferably comprises plastic film including but not limited to polyethylene, polyvinyl. Other suitable lightweight and durable materials may be used. Top layer 140 may be manufactured using any user-preferred color, transparent or opaque. The material on top layer 140 preferably offers dimensional stability and good resistance to wear and may be the most-wear resistant layer of attachable outer liner 120.

[0033] The next layer sequentially down from top layer 140 is second layer 144 that preferably comprises a wide variety of rubberized materials, both natural and/or synthetic. The next layer down sequentially as shown, third layer 148 preferably comprises shock absorbing foam material including but not limited to polystyrene, or polyacrylamide. Lastly, bottom layer 140 or the layer in direct contact with protective helmet 110, forms a pocket that will hold the inner layers (second layer 144 and/or third layer 148). Furthermore, this pocket may hold any kind of gas or air (layer 152) for shock absorbency as shown in FIG. 3B & 3C. It should also be appreciated that more or less layers may be used and will still be considered to be within the scope of the invention and that the layers may be in different orders.

[0034] External portion 114 preferably includes top and/or side(s) portions of protective helmet 110 providing suitable mounting surfaces. The shape of attachable outer liner 120 may vary depending on whether or not it is covering the entire protective helmet 110 or just specific areas, as shown FIG. 2B.

[0035] As shown best in FIGS. 2A & 2B, attachable outer liner 120 may be couple-ably-adhered to protective helmet 110 via attachers such as snaps or buttons. Further, attachable outer liner 120 may be couple-ably-adhered to protective helmet 110 via at least one adhesive in alternate embodiments. The adhesive when used to couple-ably adhere attachable outer liner 120 to protective helmet 110 may include either epoxy or glue, however other suitable adhesives may be used. Attachable outer liner 120 may also be couple-ably-adhered to protective helmet 110 via heat-shrinking in yet other embodiments. It should be noted that attachable outer liner 120 may comprise indicia such as a team name or team logo. It should be appreciated that outer liner 120 may be snapped into place on protective helmet 110 or alternately heat shrunk to protective helmet 110 as illustrated in FIG. 3D. The hook portion is designed to ‘grab’ helmet for example when shrinking (with heat shrink material) and also in versions using adhesive-adhering means (wherein outer liner 120 may be stretched to fit over, thereby putting outer liner 120 in tension). The hook (s) portion may comprise the lower part of protective helmet 110. Outer liner 120 may comprise plastic/foam/plastic layers in certain embodiments and just plastic in other embodiments.

[0036] Heat-shrinking versions may comprise material similar to that used in heat shrink tubing. The material shrinks when heated with an oven, hot air gun or similar tool such as a soldering iron or other). This processes causes the heat
shrink material to contract thereby providing a snug fit that is adhered to the surface of outer liner 120. Heat shrink versions of outer liner 120 may be larger than adhesively coupled versions so that when heat shrink version is heat shrink it shrinks to conform to protective helmet 110. Heat-shrinking material may comprise plastic that further acts as an impact-absorbing means.

Additionally, attachable outer liner 120 may be removable coupleely-adhered to protective helmet 110 via hook and loop fasteners for convenience of the user-wearer and so that it is readily attachable to other protective helmets 110. Hook and loop fasteners may include but are not limited to Velcro®. When using hook and loop fasteners or attachers to removable coupleely-adhere attachable outer liner 120 to protective helmet 110, attachable outer liner 120 is preferably hand-removable replaceable or just removably replaceable.

When attachable outer liner 120 is coupleely-adhered to protective helmet 110 having at least one inner liner, attachable outer liner 120 and the inner liner create a redundant crush zone. This redundant crush zone is designed to absorb impact by controlled sequential deformation. Further, attachable outer liner 120 forms a redundant impact layer in combination with the at least one inner liner found on an interior portion of protective helmet 110, thereby creating a plurality of impact zones working together to dissipate impact/shock in a series and/or parallel deformation force-absorption configuration (both for wearer-user and individuals coming into contact with protective helmet 110).

Helmet liner system 100 according to an embodiment of the present invention of FIGS. 1-3D may comprise a kit. The kit may comprise the following parts: protective helmet 110; a plurality of the attachable outer liner(s) 120; fasteners; the adhesives such as epoxy and/or glue, and a set of user instructions, and wherein attachable outer liner(s) 120 comprise indicia.

Upon reading this specification, it should be appreciated that, under appropriate circumstances, considering such issues as design preference, user preferences, marketing preferences, cost, structural requirements, available materials, technological advances, etc., other kit contents, or arrangements such as, for example, including more or less components, customized parts, different color combinations, parts may be sold separately such as at least logo, fasteners, etc., may be sufficient.

Referring now to FIG. 4, showing a flowchart 450 illustrating method of use 400 according to an embodiment of the present invention of FIGS. 1-3. A method of using helmet liner system 100 preferably comprising the steps of: step one 401 mounting attachable outer liner 120 to protective helmet 110; and step two 402 inserting head 160 of user 160 into protective helmet 110 thereby redundantly-protecting user 160 from impact forces. Other optional steps may include wearing protective helmet 110 wherein user 160 is redundantly-protected from impact forces. User 160 may switch attachable outer liner 120 and other.

It should be noted that the steps described in the method of use can be carried out in many different orders according to user preference. Upon reading this specification, it should be appreciated that, under appropriate circumstances, considering such issues as design preference, user preferences, marketing preferences, cost, structural requirements, available materials, technological advances, etc., other methods of use arrangements such as, for example, different orders within above-mentioned list, elimination or addition of certain steps, including or excluding certain maintenance steps, etc., may be sufficient.

The embodiments of the invention described herein are exemplary and numerous modifications, variations and rearrangements can be readily envisioned to achieve substantially equivalent results, all of which are intended to be embraced within the spirit and scope of the invention. Further, the purpose of the foregoing abstract is to enable the U.S. Patent and Trademark Office and the public generally, and especially the scientist, engineers and practitioners in the art who are not familiar with patent or legal terms or phraseology, to determine quickly from a cursory inspection the nature and essence of the technical disclosure of the application.

What is claimed is new and desired to be protected by Letters Patent is set forth in the appended claims:

1. A helmet liner system comprising:
   a protective helmet having at least one inner liner for absorbing mechanical energy; and
   an attachable outer liner comprising shock absorbing material;
wherein said attachable outer liner is applicaible to an external portion of said protective helmet to provide a shock absorption system whereby a user is suitably protected from external impact forces.

2. The helmet liner system of claim 1 wherein said shock absorbing material comprises rubber.

3. The helmet liner system of claim 1 wherein said shock absorbing material comprises foam.

4. The helmet liner system claim 1 wherein said shock absorbing material comprises plastic.

5. The helmet liner system of claim 1 wherein said attachable outer liner is coupleely-adhered to said protective helmet via snap attachers.

6. The helmet liner system of claim 1 wherein said attachable outer liner is coupleely-adhered to said protective helmet via at least one adhesive.

7. The helmet liner system of claim 6 wherein said adhesive comprises epoxy.

8. The helmet liner system of claim 6 wherein said adhesive comprises glue.

9. The helmet liner system of claim 5 wherein said attachable outer liner is removable coupleely-adhered to said protective helmet via hook and loop fasteners.

10. The helmet liner system of claim 9 wherein when said attachable outer liner is coupleely-adhered to said protective helmet having said at least one inner liner, said attachable outer liner and said inner liner to create a redundant crush zone.

11. The helmet liner system of claim 10 wherein said redundant crush zone is designed to absorb impact by controlled sequential deformation.

12. The helmet liner system of claim 5 wherein said attachable outer liner is removable replaceable.

13. The helmet liner system of claim 1 wherein said attachable outer liner is coupleely-adhered to said protective helmet via heat-shrinking.

14. The helmet liner system of claim 1 wherein said protective helmet comprises a safety helmet.

15. The helmet liner system of claim 1 wherein said protective helmet comprises a hard hat.

16. The helmet liner system of claim 1 wherein said protective helmet comprises at least one sports helmet as used in contact sports.
17. The helmet liner system of claim 1 wherein said attachable outer liner forms a redundant impact layer in combination with said at least one inner liner found on an interior portion of said protective helmet, thereby creating a plurality of impact zones working together to dissipate impact/shock in a series and/or parallel deformation force-absorption configuration.

18. A helmet liner system comprising:
   a protective helmet having at least one inner liner for absorbing impact energy; and
   a removable coupleably-attached via at least one adhesive outer liner comprising shock absorbing foam;
wherein said attachable outer liner is appliable to an external portion of said protective helmet to provide a shock absorption system whereby a user-wearer and another individual is suitably protected from external impact forces;
wherein when said attachable outer liner is coupleably-attached to said protective helmet having said at least one inner liner, said attachable outer liner and said inner liner creating a redundant crush zone;
wherein said redundant crush zone is designed to absorb said impact energy by controlled sequential deformation using gases and/or impact-absorption materials; and
wherein said attachable outer liner forms a redundant impact layer in combination with said at least one inner liner found on an interior portion of said protective helmet, thereby creating a plurality of impact zones working together to dissipate impact/shock in a series and/or parallel deformation force-absorption configuration.

19. The helmet liner system of claim 18 further comprising a kit including: said protective helmet; a plurality of said attachable outer liner(s); attachers; said adhesives such as epoxy and/or glue; and a set of user instructions, and wherein said attachable outer liner(s) comprise indicia.

20. A method of using a helmet liner system comprising the steps of:
   mounting an attachable outer liner to a protective helmet;
   inserting a head of a user into said helmet; and
   wearing said helmet liner system;
wherein said user is redundantly-protected from impact forces.

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