TECHNO ECONOMIC HARD BODY ARMOUR

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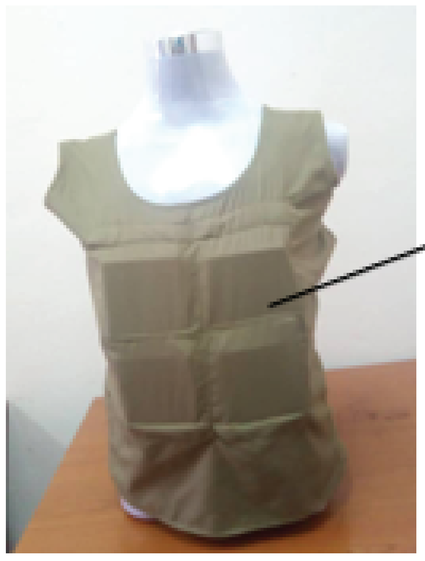

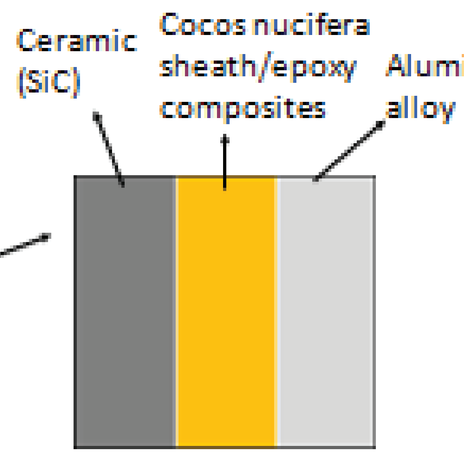

MAS
(Multilayer armour system)

Blunt Trauma measurement
(After ballistic impact)

7.62 mm Caliber

BRIEF TECHNOLOGY

This invention relates to the field of hard body armour in particular multilayer armour comprises of ceramic plate, Cocos nucifera sheath reinforced epoxy composites and aluminum alloy. The proffered techno economic body armour meet the requirements of NIJ level III standards with minimal cost.

PROBLEM STATEMENT & CURRENT ISSUES

Kevlar fabrics are produced from petroleum based resources. Depletion of petroleum based resources and an increase in awareness towards utilization of eco-friendly manufacturing process and products, it is essential to find a sustainable replacement. Researchers have proven that the natural fibers can become an efficient alternate materials to synthetic fibers

INVENTIVENESS & NOVELTY

Multilayer armours (MA) are the efficient personal protective system against high kinetic energy ballistic threats (7.62mm caliber).Generally, MA consist of ceramics (SiC), composites (Kevlar/epoxy) and metal (Al). The major impediments of using Kevlar fabric used in MA are expensive and it pollutes the environment. The notion of this research is replacing Kevlar fabric with a natural textile, so called Cocos nucifera sheath (CNS).Multilayer armour was developed using CNS and tested according to NIJ level III standards at 840-850 m/s using 7.62mm caliber. The results revealed that the ballistic blunt trauma of CNS based multilayer armour is 26.51 mm which is less than the maximum allowable blunt trauma limit (44mm) according to NIJ standards. Also CNS based MA could save 44% of the fabrication cost compared to Kevlar based MA. From the analysis, it has been proven that CNS can be a most promising alternative to Kevlar fabric in the multilayer armour.

USEFULNESS & APPLICATION

Replacing Kevlar/epoxy composites with Cocos nucifera sheath/epoxy composites provides the following advantages

- → Eco friendly body armour.
- → Improved biodegradability
- → Low cost
- → Green innovation
- → Excellent ballistic performance

Application

- Body armour manufacturing industries

IMPACT OF THE PRODUCT

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MARKET POTENTIAL

CNS based MA could save 44% of the fabrication cost compared to Kevlar based MA. From the analysis, it has been proven that CNS can be a most promising alternative to Kevlar fabric in the multilayer armour.

TRL : 7– Demonstration of prototype

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