



A review on fibrous materials for body armor application

Prayagraj Singh Deora ^a, Monika Khurana ^b, Priya ^a, Ram Avtar Muhal ^a, Dhruv Upadhyay ^c, Chandramani Goswami ^a  

^a Mechanical Engineering Department, ACEIT Jaipur, India

^b Mechanical Engineering Department, Swami keshwanand Institute of Technology, Management and Gramothan Jaipur, India

^c Industrial and Production Engineering Department, Dr BR Ambedkar National Institute of Technology, Jalandhar, India

Available online 17 March 2022, Version of Record 18 May 2022.

Show less 

 Share  Cite

<https://doi.org/10.1016/j.matpr.2022.03.209> 

[Get rights and content](#) 

Abstract

The emergence of novel materials every day, has developed interest worldwide in conducting more intense research in the field of materials and their development, especially in polymer-based composites that possess numerous promising properties (e.g., lighter weight, greater strength, impact resistant, and superior flexural strength) as compared to the other available materials. One of the most important applications is their utilization in the body armor for the soldiers. To protect the soldiers on the battlefield, the body armor has been utilized in personal protection system since very ancient times. To protect security personnel from a variety of ballistic risk during military conflicts and protecting soldiers or security personnel from handgun threats, the Kevlar fibres are the most common and largely used material because of high impact resistance, outstandingly high strength, stiffness to weight ratios and low weight. Kevlar aramid fibers are used widely in defence, aeronautical, bioengineering or medical and automotive industries. The investigation of ballistic application of kevlar fiber with reinforced composites and their development is an important research field. A review of kevlar composites and the ballistic impact on it, is presented in current paper. This paper concludes with the succinct evaluation of the future scopes of work in the field of reinforced-fiber composite for armour applications.

Section snippets

Introduction:

The main functioning of the armour is to prevent the body from casualties and damage from the direct impact of weapons or high-speed projectiles. Probability of confronting trauma injuries are very high for the soldiers due to ballistic impacts and improvised explosive devices (IEDs) [1]. Today's armours shield against high-velocity impacts, but it lacks in dissipating shockwave energy produced during explosive blasts. With this there is an ever-increasing worldwide curiosity in developing a...

Important types of Kevlar fiber reinforced polymer Composites:

Fabrics are the most used material in armours and other applications such as passenger air bags, helmets, aerospace and turbine blade containment systems because of light weight and high strength [10]. To improve ballistic resistance of neat Kevlar fabric, are now treated with Shear thickening fluid (STF) as shown in Fig. 1. The dissipation of high strength was analysed by this method, this study works on investigation of the incorporation of other high strength.