

# **Modern Safety Suit Design: Innovating Protection for the Future Workforce**

**Khalid Zaman Mumit, Tanzim Hasan, Md Imon Shahriar and Monwarul Islam Emon**

Jashore University of Science and Technology

Bangladesh

[khalidzamanmumit2001@gmail.com](mailto:khalidzamanmumit2001@gmail.com)

## **Abstract**

This project outlines the conceptual design and development of a new type of Modern Fire Safety Suit incorporating cutting-edge materials engineering, ergonomic engineering, and smart safety technologies aimed specifically at the improvement of firefighter safety and operational efficiency. Designed for the IEOM Society Student Chapter Global Design Competition by Jashore University of Science and Technology, the Fire Safety Suit is the first of its kind multifunctional protective suit aimed at solving the critical firefighter suit protective clothing weaknesses crafted through multidisciplinary design. Modern Fire Safety Suit is based on the integration of four different technologies: nanotechnology-based materials with unique thermal-regulating, flame-retardant, waterproof, and breathable characteristics; thin flexible solar panels incorporated on the exterior of the suit that powers the internal electronics and eliminates the need for additional battery packs; adaptive ballistic armor made of polymer materials that absorbs kinetic energy on impact and offers blunt force trauma; and complete IoT integration that offers real-time connectivity to command centers for vital sign monitoring, air supply, and the structural integrity of the building. From the design the approaches used were the advanced design and simulation tools of Computer-Aided Design and Engineering.

## **Keywords**

Safety Suit, Innovating Protection, Future Workforce