

NEW ADVANCED MATERIALS FOR HELMET SYSTEMS

Problem

Soldiers often carry heavy and bulky equipment in addition to their weapons, which can be physically exhausting and limit mobility. This can impact their performance in the field and increase the risk of injury. When it comes to the head system (helmet), the Army must trade off between three things: weight, capability and level of protection.

Need and relevance to Defence

This development would contribute to soldier survivability and mobility without compromising ballistic protection for the soldier.

1. *Enhanced Movement:* Good mobility enables soldiers to move quickly, effectively, and safely to complete their missions.
2. *Increased Agility:* With good mobility, soldiers can quickly change direction, overcome obstacles, and adapt to changing battlefield conditions.
3. *Improved Endurance:* Good mobility helps soldiers maintain energy levels and physical endurance during long missions.
4. *Reduced Risk of Injury:* Good mobility helps soldiers avoid injuries from falls, strains, or other physical stress.
5. *Enhanced Operational Readiness:* Good mobility helps soldiers remain physically fit and capable, improving their overall operational readiness.

Research question

Can we reduce the weight of the helmet (as a system, which includes shell materials, mounts, padding and harness) and maintain the same level of protection (NIJ Standard 0101.06, IIIA) or increase the level of protection (equivalent to III+) using new materials/manufacturing processes/techniques.

Expected outcomes

A lighter, robust helmet system that reduces the physical burden on the soldier but maintains the same level of ballistic protection (or increases the level of ballistic protection). This technology can then also be applied to body worn armour.

Understanding of the process/manufacturing needs of new advanced materials in ballistic protection - whether current methodology still works or whether new methodology for processing and manufacturing needs to be developed.

Methodology/approach

Explore new and upcoming materials available for experimentation.

Experimentation would include.

1. Understanding ballistic properties of the material
2. The ability to process the material and create the geometry needed to create helmet shells and body armor (looking at the ability of the material to create complex curvature and still retain the properties needed to adhere to ballistic standards).