Abstract
This study aims to design soft body armour by evaluating the effect of ply configuration and hybridization. UHMWPE and PBO (Zylon®) yarns were used to make fabrics and along with commercially available Dynema® UD SB51 sheet (250 g/m²), 10 different soft armour panels (~4.9 kg/m²) were prepared. The panels varied in the layering sequence of UD fabric, 2D neat and STF treated fabrics and were evaluated for ballistic performance in terms of back face signature (BFS).

The BFS was found to be below 44 mm in all cases. Placing UD fabrics in the strike face is more effective in reducing the BFS. Fabrics having higher modulus with low extension at the front and again at the back resulted in better performance. Finally, panels layer having STF treated fabrics showed lower BFS, particularly when placed as the backing.

Materials and Methods
- Preparation of STF
  - Fabric sett, Circular jaws with porous metallic insertions
- Fabric treatment
  - Diluted thickening fluid
  - Engineered Daniel

Conclusions
- Soft armour panel with areal density 4.9 kg/m² areal density was designed.
- Achievable BFS ≤ 30–32 mm.
- STF treatment reduces the BFS.

Industrial Significance
Soft armour panels with areal density 4.9 kg/m² giving BFS less than 44 mm are achievable with hybridization and STF treatment.

Technology Readiness Level
TRL 3

References

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