Sächsisches Textilforschungsinstitut e.V.

Affiliated institute of the University of Technology Chemnitz

Managing Director: Dr. Heike Illing-Günther
Annaberger Straße 240 | 09125 Chemnitz | Germany I Phone: +49 371 5274-0 | Email: stfi@stfi.de I www.stfi.de

SecTex – Ballistic composite textile

Objective

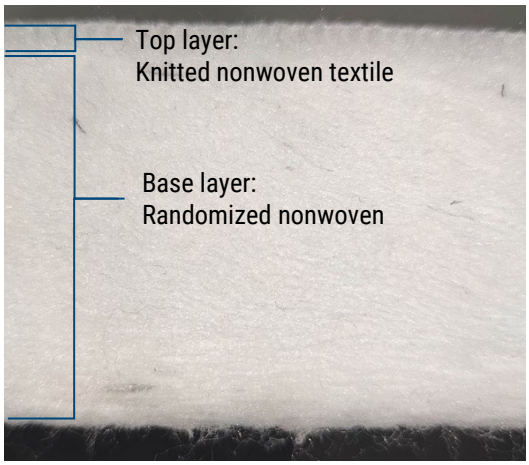
Indoor shooting ranges – that is, enclosed facilities with bulletproof floors, walls and ceilings – are used for training and instruction for police and military purposes, as well as in the civilian sector for sport shooters and hunters. Many of these shooting ranges are currently outdated and no longer meet the requirements of real-world operational conditions (such as during a mass shooting or terrorist attack). The aim of the research project was to develop a ballistic composite textile based on nonwoven fabrics, which, through its shape and design, can be used to reinforce structural elements, particularly the interior areas of buildings, especially shooting ranges.

SEQPROTECT

TENOWO NONWOVENS

Approach and results

The research resulted in a three-dimensional, pressure-resistant and rigid nonwoven composite. During the course of the project, various nonwoven production and consolidation processes were tested, leading to the creation of a wide range of composite samples. The preferred option was a thermally bonded, three-dimensional randomized nonwoven fabric produced using the airlay process, with a nonwoven base material forming the decorative layer. The selection of a suitable fibre polymer for both the top and base layers contributed to achieving fire behaviour class B1 in accordance with DIN 4102-1. Compared to conventional cladding materials for shooting ranges, the nonwoven panels have the advantage of being extremely sound-absorbent and providing very good damping in critical frequency ranges. A ballistics expert fired at the nonwoven panels using various weapons, including different ammunition and angles of impact, to test their suitability for indoor shooting ranges. In order to install the nonwoven panels in indoor shooting ranges, the final substructure must be adapted to prevent the ricochet of bullet fragments. In a recycling process, production residues from the nonwoven panels were shredded, turned into reclaimed fibres and formed into three-dimensional randomized nonwovens in a second manufacturing cycle.



Cross-section of a three-dimensional nonwoven composite called 'SecTex' (Source: STFI)

INNO-KOM

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The final report on this project is available on request.

Contact: Dr.-Ing. Barbara Schimanz Phone: +49 371 5274-202 Email: barbara.schimanz@stfi.de
Patrick Engel Phone: +49 371 5274-209 Email: patrick.engell@stfi.de

www.stfi.de

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