

ID 1252

Feasibility Study on Developing Silk Fibers Used for Producing Bulletproof Vests

Sujira Khojimate

Department of Textile Engineering Faculty of Engineering
Rajamangala Institute of Technology

Keywords: silk fibers, bulletproof vest, feasibility

Bulletproof vests used in Thailand are imported from Europe or the United States of America and are very expensive. The Ministry of Defense has been looking for an alternative material that will replace the imported vests. This project is to study the feasibility of developing silk fibers for use in producing bulletproof vests. Experiments already carried out have indicated that vests woven from silk fibers could be employed as bulletproof vests, using a woven fabric (basket 2x2 weave) having 32 warp yarn per inch and 64 weft yarn per inch. The linear densities of the warp and weft yarns used were 455 and 490 denier and the tenacity of the yarns were 120 and 400 psi respectively. The silk fabric was cut into 6x6 inch pieces and plied with alternative layers at 90° to each other. The resulting fabric consisted of 30 to 35 layers of materials. From preliminary studies, it was found that bullets did not penetrate more than 30 layers of fabric, and hence 30 layers of the fabric was selected for the silk vest tested in the subsequent experiments. Two sets of 15 layers of the silk fabric were used to make up the 30 layers adopted for the silk vest. Each layer of fabric was sewn diagonally to the previous layer using zigzag pattern to increase yarn packing and strengthen the fabric. To minimize the number of holes in the outer layer of the fabric, the silk vest was covered with a layer of nylon fabric on both sides. The silk vest was then shot at from 3, 7 and 15 yards using .22 LR, .38 Special and, .45 magnum caliber bullets. The bullets could not penetrate the silk vest under these test conditions.