Accid Anal Prev 2000 May;32(3):407-420

Burn properties of fabrics and garments worn in India.

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ABSTRACT

A full-scale human form dummy was designed for studying the burning of common dress assemblies (i.e. combination of garments) worn in India. The dummy was made in eight parts; each made of a steel shell filled with water so as to replicate properties of skin-tissue combination. Four thermocouples were fixed on the dummy for measuring torso, neck and face temperatures. The dummy was clothed separately in three women's dress assemblies (saree, salwar-khameez and nightgown) and men's dress assemblies (kurta-pyjama, shirt-pant and lungi), and ignited at the feet by a flat flame. The tests showed that loose fitting garments burnt easily. Once completely burnt, all dress assemblies result in third degree burns over most of the body. The burning process of synthetics is radically different from cottons or cotton-polyester blends. However, flame duration and temperatures produced on the skin are not radically different, suggesting that on the whole synthetics are no worse than cotton garments. Thick garments, such as, jeans and khadi, do not ignite easily and are inherently safer than similar garments made of light fabric. The studies show that results of standard flammability tests using single fabric strips do not correlate with the burning observed in garments as part of a dress where multilayering is common. Standards/codes for fire safety of garments and garment-dress assembly combinations need to be evolved to adequately address their fire safety.