Camouflage Textiles with Technical Coloration and Incorporating Illumination under multidimensional combat background

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The demonstration and structure of thesis is covered the design, simulation, formulation for suitability of deceiving materials on textiles substances for high performance camouflage textiles under multidimensional combat background (CB), exposing the concealment, detection, detection, and recognition (CDRI) on spectral, chromatic, and achromatic illumination for camouflaging. The evaluation of camouflage coloration has been critically focused on standard assessments process in ultraviolet (UV), visible (Vis), and infrared (IR) ranges for CDRI of single and simultaneous CB. Present works on camouflage textiles depicts the illumination engineering of camouflage textiles for defence protection in multidimensional CB materials and methodology for concealment of latest surveillance technology. Research and development on camouflage textiles has been exhibited multidimensional CB environment of camouflage textiles such as woodland, desertland, iceland, snowland, stoneland, marine and sky. The reflectance and chromatic profile of camouflage treated textiles has been analysed with the reflectance profile of CB materials. Aluminium, carbon black, chromium oxide have been implemented for trialling of camouflage coloration as deceiving materials. The principle of camouflage coloration has been considered for reflection altering of target signature against CB materials and surrounding CB materials. Experimentation of this thesis has also been judged the alternative way of camouflage assessment in addition of existing color matching principle with CB materials. The potential outcome of this research is not only limited to Vis ranges camouflage textiles in multidimensional CB environments; but also UV-IR ranges for concealment and advancement of digital camera and hyperspectral camera to overcome the present challenge of camouflaging. Primary method of deceiving materials formulation was choosen for encapsulation into polyurethane-based solvent. Secondary method is an application of encapsulated deceiving materials on synthetic and cellulosic fabric such as polyamide 6, 6 (PA 6, 6) and cotton fabric. The achievability and suitability of camouflage coloration against multidimensional CB environments have been experimented by established methods of textile coloration such as coating and dyeing. Camouflage treated fabric has been scanned by spectroscopic, microscopic, and photographic illumination for suitability of

materials, method and, chromatic and achromatic properties of camouflaging. Color measurement spectrophotometer, Fourier transform infrared spectrometry, scanning electron microscopy, digital camera, hyperspectral imaging were used for assessment methods of camouflage identification in terms of chromatic and achromatic characteristics of target signature (camouflage textiles) and multidimensional CBs. The treatment of camouflage materials or similar structure of materials or combination of materials against CBs have been cited for high-performance camouflage research on textile substances in terms of real illumination theory of camouflaging. Therefore, the principle of camouflage technology has versatile applications of defence protection for concealment of target signature against multidimensional CB. (Hossain, 2020; A. Hossain, 2021a, 2021b; M. A. Hossain, 2021a, 2021b, 2021c; Md. Anowar Hossain, 2022a, 2022b, 2022c; Md Anowar Hossain, 2022; Hossain, 2023a, 2023b, 2023c, 2023d, 2023e, 2023f, 2023g, 2023h)

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