

Delft mathematician enhances protectiveness of military uniform

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Until now, little was known about the physiochemical processes that determine the protective qualities of military uniforms (for example, for protection against poisonous gases). Delft University of Technology researcher Michal Sobera has changed all this, however, through the use of computer modeling. He believes that within a few years it will be possible to calculate a realistic model of the human body with protective clothing.

During his PhD research, Michal Sobera studied clothing that protects people against so-called NBC-weapons (Nuclear, Biological and Chemical). This clothing is for example worn by soldiers and fire department personnel, protecting them (as far as possible) against for instance poisonous gases. Sobera conducted his research for, and in close cooperation with, research institute TNO Defense & Safety, and he also worked together with the United States military – to be precise, the US Army Soldier Systems Center, a US Department of Defense research institute that specializes in issues that are directly related to military personnel.

Until now, there was relatively little fundamental knowledge available about how the functioning of this type of clothing is effected by flows and transfers of heat and mass. Sobera's research findings have taken this knowledge to a higher level. Sobera's research was entirely conducted using a computer. No test subjects were used. Sobera arrived at his conclusions via computer modeling of the relevant body parts, the protective clothing and the physical laws that dangerous gasses (and the

like) must adhere to.

A key focal point of the research is determining at which point in time the clothing loses its effectiveness. At a certain point, the absorbent carbon layers in the clothing become saturated, whereby the protective function of the clothing rapidly diminishes. Sobera used his computer models to calculate this moment in time for various situations. This was done using relatively simple models, but Sobera believes that calculations for a completely realistic model of the human body, including protective clothing, will be possible in a few years.

Source: Delft University of Technology

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