B63 The Effect of Aqueous Foam Concentrate-380 Blast Suppression Foam on Latent Fingerprints

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Learning Overview: After attending this presentation, attendees will understand the effect that Aqueous Foam Concentrate (AFC) blast suppression foam, specifically AFC-380, has on latent fingerprints that have been deposited on various substrates.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing fingerprint examiners with new information regarding latent fingerprint evidence recovery and interpretation after exposure to aqueous blast suppression foam.

In addition to having blast mitigation properties, AFC-380 blast suppression foam is designed to capture aerosolized chemical, biological, and radioactive particles with over 99% efficiency during render-safe procedures of explosive devices.[1] The chemical composition of AFC-380 foam is similar to many commercial firefighting foams, with surfactants chemically similar to those found in liquid soaps and shampoos.[2] Unlike firefighting foams, AFC-380 is designed to delay water drainage from the foam matrix; consequently, dissipation of the foam takes several hours and any forensic evidence present at the scene will likely be exposed to the foam for several hours before the items can be collected safely. Exposure to aqueous environments may negatively affect preservation of fingerprint evidence and the effect of AFC-380 foam on the preservation of fingerprint evidence has not yet been investigated.[3,4] The purpose of this study is to assess the potential success of fingerprint evidence recovery and interpretation after exposure to AFC-380 foam.

Sebaceous fingerprints from a single donor were deposited on galvanized metal pipes, galvanized metal end caps, galvanized metal flats, PVC pipes, PVC flats, glass microscope slides, pieces of plain copy paper and cardboard, and both the adhesive and non-adhesive sides of pieces of electrical tape, packing tape, extra strength duct tape, and regular strength duct tape. The samples were divided into two identical experimental groups and a control group before being exposed to AFC-380 foam as part of a training exercise. One group of experimental items was placed next to a simulated radioactive dispersal device ("dirty bomb") and exposed to both AFC-380 foam and an explosive charge as part of the render-safe process. The second group of experimental items was placed in a large plastic tub, which was then filled with foam and placed a short distance away from the explosive device to simulate a successful render-safe procedure using non-explosive methods. Altogether, the experimental groups were exposed to the foam for approximately three hours before being removed from the foam and air-dried for 48 hours.

Non-porous items were first examined for ridge detail visually and under both ultraviolet (UV) and laser light sources. Except for the adhesive sides of the tape samples, the items were then processed using cyanoacrylate fuming and examined for ridge detail before being treated with cyanoacrylate fluorescent dye and examined again for ridge detail under both UV and laser light sources. The adhesive sides of the tape samples were processed using WetWop and examined visually. Porous items were examined visually and under both UV and laser light sources before being processed with indanedione and reexamined using UV and laser light sources.

Ridge detail was developed on 29% of the non-adhesive sides and 57% of the adhesive sides of the recovered tape samples, with no differences in print development frequency observed among the four types of tape or between the two experimental conditions. In contrast, ridge detail was not developed at any point in the processing sequence on any other experimental item. Fingerprints were developed on all control items. These results indicate that exposure to blast suppression foam may result in differential preservation of fingerprint evidence depending on the deposition substrate. Potential explanations for this are being investigated.

Reference(s):

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3. Sutton R, Grenci C, Hrubesova L. 2014. A comparison on the longevity of submerged marks in field and laboratory conditions. *Journal of Forensic Identification* 64(2):143-156.
4. Maslanka DS. 2016. Latent fingerprints on a nonporous surface exposed to everyday liquids. *Journal of Forensic Identification* 66(2):137-154.

Fingerprints, Blast Suppression Foam, CBRN