Paradox of protective clothing

In the UK, the ongoing modernisation of the Fire Service recognises that much of the work undertaken is search and rescue rather than fighting fires, creating a unique paradox for protective clothing, writes **David Frodsham**

NONE WOULD ARGUE that the last 15 years have seen the biggest advances in protective gear and clothing, possibly more than in the entire previous history of the Fire Service. Most of the key milestones in the development of major incident and disaster response capability follow very closely from a significant incident that has incurred loss of life. As lessons have been learned and new innovative solutions sought, firefighters are better protected than ever before. It is only 17 years since the King's Cross incident which proved to be a catalyst for development in the UK; at that time firefighters wore PVC leggings and wool tunics.

Protection

One of the drives in protective clothing development has been the introduction of the European EN 469 standard that ensures a level of protection from heat and flame. There is no question that firefighters now benefit from clothing systems, which effectively protect from extreme fire conditions with specialist fabrics like Nomex and the introduction of durable, breathable and waterproof moisture barriers such as GORE-TEX fabric. However, how does this fit into a modernised fire and rescue service?

There are any number of statistical sources published recently which back up the claim that search and rescue makes up to 60 per cent of the work that firefighters do, rather than actual firefighting. By its very nature, search and rescue work demands biological pathogen protection. However, all structural protective fire kit is designed and tested to meet a standard that was developed for protection against heat and flame, not biological pathogens.

In the USA, NFPA 1951, which is the standard for search and rescue clothing, and NFPA 1971, which is the standard for structural kit, both include protection against blood-borne pathogens and common chemicals.

While NFPA standards are not a legal requirement in the US, almost every Fire Service ensures compliance. The UK is seeing a much more focused approach to protection, based upon risk assessment that will ensure that firefighters are wearing clothing that is most appropriate to the task that they are undertaking.

As this photo from RAPID-UK shows, when faced with urban search and rescue operations such as the recent earthquake in Pakistan, today's structural fire kit is really not the best solution, see page 18 for full report

The Integrated Clothing Project recognises the need for the appropriate protection for search and rescue work. It also identifies the risk of exposure to injury, due to contact with biological pathogens as far higher than the risk of exposure to injury from heat or flame.

Structural fire kit

While today's structural fire kit offers outstanding protection against fire, it is really not the best solution for search and rescue work. Not only are there obvious practical difficulties that come from the sheer bulk of the clothing, but there is also the lack of biological pathogen protection. In some instances the very kit designed to protect the firefighter will put them at greater risk from heat strain.

In the past, the UK market has been asked to develop products for structural fire kit. At present the market needs to catch up. This explains why there is currently a lot of work going on in partnership with the Fire Service, to create a modern SAR solution that will satisfy all the issues identified in the risk assessment.

Without protection from biological pathogens, rescuers are at risk from viruses, the most serious being Hepatitis C and B and HIV. The most effective method of protecting personnel from these viruses, as well as from other common chemicals, is the incorporation of a moisture barrier with enhanced performance.

In the same way that the breathable moisture barrier in structural kit reduces the risk of heat stress for firefighters, a similar solution will meet the urban search and rescue challenge.

Gore has developed the Crosstech moisture barrier, a specialised fabric that is similar to the original Gore-Tex fabric in that it is durable, breathable and waterproof, yet it also offers protection from blood borne pathogens and common chemicals. Crosstech meets the NFPA requirements and has been in used in the USA since 1994.

Crosstech is also rigorously tested to exceed NFPA standards. In testing it is exposed to viral testing after extensive washing and exposure to heat, that recreates conditions of constant usage. A surrogate microbe that is the same size of the smallest viral microbes is used to test against viral penetration.

The recognition of the Fire Service's search and rescue role has been a long time coming, and it is clear that the risk assessment approach to protection must deliver an appropriate modern solution. It is also clear that this won't be using structural firefighting kit, which will however, still be essential for fighting fires. CRJ

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