

# Fire Behaviour Training in The UK

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**A report on the seminar held at the Fire service College, Moreton, in September 1999 reviewing the current status of Fire Behaviour Training in the UK, where Swedish water-fog techniques are now being used to counter the hazards of flashover and backdraught.**

Currently, fifty seven percent of the UK's 58 fire brigades have sited and are using live fire training systems to introduce the Swedish concepts of flashover & backdraught control to their firefighters. The remaining 43 percent are either sharing neighbouring facilities to train their firefighters or are yet to decide. This follows the loss of three firefighters in two separate incidents that occurred within a three day period during the mid 1990s, where both fires exhibited 'backdraught-like' conditions.

Of the brigades currently operating systems, 17 are using 'carbonaceous' units where greater realism is achieved through lining the 'container' modules with quantities of chipboard. This enables a firefighter to experience fire in its growth and development stages and provides a reliable simulation of how the flashover stages are reached. However, there are environmental concerns and other economic factors and a further 16 fire brigades have opted for the LPG fuelled systems that are supposedly cheaper to run, more environmentally friendly and require no set-up time between burns. However it was the general consensus amongst delegates that gas systems, with all their advantages, fail to provide a truly realistic simulation of compartmental fire development in comparison to the 'carbonaceous' system. It was pointed out though that several brigades were running both types of system as the gas-fuelled modules were considered an effective form of

'follow-up' training once the basic skills had been acquired in a carbonaceous environment. At the Fire Service College Moreton, for example, they currently operate six carbonaceous units but are planning the addition of a gas-fuelled unit to complement their training programme.

CFO Alan Doye of Staffordshire Fire Service demonstrated why firefighters might need training in fire behaviour during its growth and development stages by showing some graphic video footage of a fire in Staffordshire which he termed as a turning point in the brigade's approach to 'realistic' fire training. At the time their firefighters were training in 'Hot Houses' - common to most UK training establishments, where firefighters would undergo familiarisation with heat and smoke conditions. However, it was recognised that this form of training actually taught the firefighter very little about the dangerous build up of fire gases and the related phenomena of flashover/backdraught. Mr Doye suggested it was necessary to introduce this form of training to improve safety on the fireground and that firefighter's should be more able to recognise situations where it is 'safe to enter' or 'time to leave' a fire involved compartment.

CFO Doye then went on to explain the costs of the programme where it will take three years to effectively train his 900 firefighters. Operating under the ISO 9000 creditation for training, he informed of an outlay of about £100,000 to develop and prepare a site for a carbonaceous system that cost £38,000. There was 'additional expenditure' of around £40,000 with a further £50,000 seen as the annual costs of training, including wages of personnel etc. (Other brigades mentioned that they had purchased smaller carbonaceous units for around £10,000 in comparison to a gas-fuelled equivalent costing around £70,000 but the gas system would have much lower running costs). It is of interest to note that Essex County Fire Service have obtained some 'european' funding to advance carbonaceous system standards.

ADO Bob Barlow of West Midlands Fire Service described a joint funded system between his brigade and Warwickshire where both carbonaceous and gas-fuelled units are used. He informed that the local authority had prevented them from using cosmetic smoke to complement the gas-fuelled burns, despite the fact that a carbonaceous system also functions on the same site! Mr Barlow went on to describe how, with a gas-fuelled system, the instructor has greater control over the training simulation where they can 'stop the burn to learn', progressing in stages. He informed that the entire force of firefighters had experienced this form of training twice within three years and in that time had only recorded 13 injuries in the units, mostly slips and trips with no burn injuries. This was somewhat in contrast to Staffordshire who had recorded 22 injuries in 18 months where 21 were reported as 'redening of the skin' and 5 days were lost to sickness. Mr Barlow admitted that the training in gas-fuelled simulators is not truly realistic, even when using cosmetic smoke. However, their programme has adapted and they have managed to fill the gaps created by a lack of 'realism' by using small scale demonstrations, enhancing the important aspects of fire growth and development in association with flashover and backdraught hazards.

Andy Gosse of British Gas Technology described the potential for explosions in gas-fuelled units and used such examples as Flixborough and Piper Alpha to bring the message home. He explained how mathematical models should be used to assess the risk in relation to gas build-up, fire loading and explosions and suggested the risk should be accurately quantified. Units should have explosion relief capability built in with effective ventilation systems and maintenance programmes also a major consideration.

Dave Matthews (National Health & Safety Officer - Fire Brigade's Union) voiced his concerns on the safety aspects of the systems and considered the environmental impact, suggesting that not all brigades should have the system. It was suggested that regionally based systems may be more productive and cost effective. He was extremely cautious in his approach to such training and whilst recognising the benefits, suggested that a serious study should be made of various systems before advancing towards larger units or multi-compartment training systems.

Divisional Officer Dave Turpin of Tyne & Wear Fire Service went on to talk about the potential for linking the tactical use of Positive Pressure Ventilation with the benefits of Fire Behaviour Training and saw a direct link in the use of PPV and water-fog techniques in unison. He stated it was of the utmost importance that the two differing tactical approaches should be seen to complement each other and therefore a joining together of working groups at this stage may be a good thing.

Dr Mandy Sterling reported on her work with Loughborough University in relation to fluid management of firefighters, noting that there were currently no national guidelines for the fire service. She reported her findings that instructors in FBT facilities may be exceeding international guidelines on body core temperature and recommended a maximum two BA wears daily by all involved. Miss Sterling also suggested that clothing beneath the outer protective layer should be changed between wears to promote efficient evaporation of sweat and talked of fans to cool firefighters between wears. She also suggested that any hydration regime should be pre-calculated and operated on the fireground as well as in training situations.

The seminar concluded with working parties and user groups deciding the way forward. It was considered that standards should be set for the construction and use of such facilities but that they should not be so rigid as to prevent advancements being made. Safety aspects were discussed along with creditation of instructors and it was recognised that several brigades, including Essex, West Midlands and Cornwall, had advanced their programmes ahead of others and that they should perhaps take a guiding lead in the formulation of any such standards and advancements. Finally, a discussion was held on the statement given in DCOL 11/99 concerning a paragraph that suggested firefighters should NOT be exposed to simulated flashovers or backdraughts whilst occupying FBT facilities. For the purposes of this form of training it was suggested that 'simulation of flashover & backdraught' is not occurring in occupied FBT facilities as 'true' flashovers are not achievable with the limited fire loading contained within the units being used.

The FBT facilities, along with the Swedish style of applying water in short-burst spray form, were seen as major aids in improving firefighter safety on the fireground. Additionally, it was recognised that technology in relation to nozzles & branches, Personal Protective Equipment, Breathing Apparatus communications equipment and thermal imagers was generally advancing inline with the use of such training facilities.

