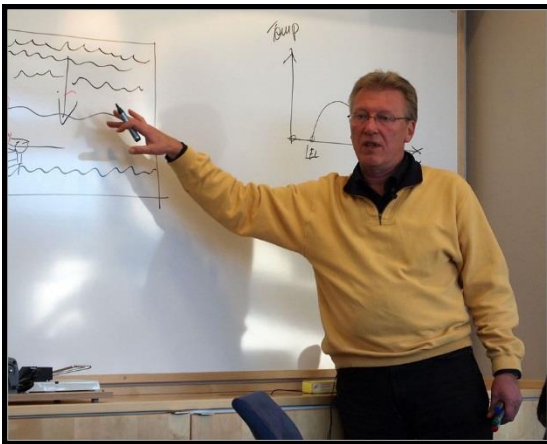**Fire(fighter) Behaviour -** John McDonough

The date is October, 2001. I sit at my desk. I am a Station Officer in charge of a urban fire station in Sydney, Australia. I stare at the memo that lies in front of me. It asks for reports relating to improving training and capability within the organisation. It offered overseas study for the successful applicant. Opportunity knocks...

I had just finished reading a book called, 'Fog Attack' (1992) by a retired English firefighter (now Fire Engineer), Paul Grimwood. Every so often one reads a book that has a lasting effect. This was one such book. It was basically a comparison of how firefighters fought fires in different parts of the world. But that was not all. Most interestingly it looked specifically at new ways of fighting fires that had been pioneered by the Swedish in the early 1980's and in particular by fire engineers Krister Giselsson and Mats Rosander.

These 'new ways' placed a great emphasis on understanding fire behaviour and the development of fire within a compartment. This was driven in part by a need to increase the safety of firefighters exposed to events leading to rapid fire progress and in particular 'flashover', backdraught' and 'fire gas ignitions'. This early research included the development of hose steam techniques designed to cool flammable fire gases, commonly known as 'gas cooling'.

When I looked at my own organisation it soon became apparent that although we compared well in some aspects of fire service work, in the area of fire behaviour training (both in a theoretical and practical sense) we had much room for improvement. I identified this in a report that recommended investigation into these new methods for not only fighting fires but of realistically training firefighters to safely do so. In July 2002 I travelled to Sweden to learn from Nils Bergstrom, lead fire instructor at the Swedish Rescue Services Agency, Sandö (now known as Swedish Civil Contingencies Agency).

On my return to Australia it became my role to change the way, in not only how we fought fires, but also how we trained firefighters for that task. Between 2003 and 2006 this involved the introduction of a basic compartment fire behaviour training program for both recruit and operational firefighters and officers. But despite the introduction of this new knowledge and a practical 'live fire' training program, it became apparent that something was missing.

That 'something' was what I term 'firefighter behaviour'. It is my belief that we had ignored an important element in the decision making process. An element that was so powerful that in many cases it was the defining reason for how a firefighter responded to a given situation despite these actions being contrary to what they had been taught.

In reaction to an identified lack of fire behaviour knowledge we had introduced a system of thinking based solely on the 'scientific method', concentrating heavily on the physical variables of fire behaviour and applying a cold, calculating element to how fire should be viewed. In doing so we neglected the less tangible but equally important variables that make up the mental thought processes of any given firefighter. These processes are instrumental in why firefighters act as they do. These processes are not normally based on the measured collection of scientific data that can be 'placed under the

microscope' before being clinically peer reviewed. They are developed over long periods by culture, tradition and expectation not just for any one individual but also as the way in which our society thinks as a whole. These processes may also varying greatly from firefighter to firefighter based on personal experience or the credible experience of a colleague. They may also have been passed down from generation to generation from a time so long ago that no one can actually lay claim to the reason for their existence. Nevertheless, this 'mind set' plays a major role in how information is assessed and acted upon, especially during times of crisis.

In an effort to identify the major factors that were influencing their actions during time critical moments on the fire ground, I started asking firefighters who were studying to become officers what were some of the elements influencing their decision making process. During these discussions the following factors repeatedly emerged:

- the public (including the media)
- their own sense of duty
- the culture and traditions of their organisation
- the standard operating procedures of their organisation
- the expectations of their colleagues
- and lastly, the prevailing fire conditions

It soon became apparent that despite the effort that we making to improve fire behaviour knowledge, the 'prevailing fire conditions' was only one of many factors, and it could be argued, not the most important factor when it came to the actions of firefighters.

There is no doubt that the 'public' have strong expectations when it comes to what they expect a firefighter will do when they they arrive at a fire. These expectations have been developed and reinforced ever since fire brigades were first formed. The image of an heroic figure emerging from a fire ravaged building, rescued victim cradled in his arms is a powerful cultural icon that seems as strong as ever. This image is constantly reinforced by the media who feed this need for a 'hero', and take any opportunity to manufacture one if they can. The speed at which the media will label anything at all a hero (let alone a firefighter) can be seen in the following true story,

'Hero pet rabbit saves family from house fire ... then dies of smoke inhalation. A pet rabbit is being credited for saving its owners from a house fire in south eastern Alaska before it died of smoke inhalation. The rabbit woke up the homeowner in Anchorage, Alaska, early on Tuesday morning by scratching on her chest, the Ketchikan Fire Department said in a statement.'

It seems firefighters are not the only heroes...

Firefighters have become synonymous with such terms as 'duty' and 'valour'. Firefighters in New York more often than not being referred to as 'New York's bravest'. The Fire Department of New York has six core values including 'bravery', honour' and 'dedication'. How can this not be an influence on the 'mind set' of a firefighter? How does the firefighter meet these demanding expectations?

Firefighters themselves are also part of the 'public' and to some degree will also share the same expectations of those around them. Their own sense of what it is to be a firefighter is a product of the society's culture and their own experiences. Their image of what a firefighter must do and how they must act under certain circumstances may well have formed as a young child.

The organisation that they are a part of also demands that firefighters act in a certain way. There is not a fire service anywhere in the world that does not have a set of operational guidelines that are to be followed. These are usually expressed by some type

of standard operational procedure or guideline (SOP). These SOP's are designed to provide a standard response to certain types of incident. By having all firefighters follow these guidelines, the organisation seeks consistency and routine. In most cases these procedures are clearly defined and prescriptive in nature to try and provide clarity during complex and time critical situations. Often this is at the expense of flexibility and can never hope to encompass all situations. At best it can provide a 'standard' response to a 'standard' incident but it is well known that no two incidents are ever exactly the same and in many cases firefighters find themselves dealing with new and unforeseen circumstances.

The problem with many existing firefighting procedures is that they are predicated on a fire that we no longer have. In 1970 the time to flashover was approximately 17 minutes. That time is now four minutes. Previously our compartment fires remained fuel controlled longer with the contents comprising 'natural' products like wood, cotton and wool. For the last forty years there has been a steady move to plastics and synthetics increasing the fuel load for firefighters considerably. This has meant that our 'window of opportunity' in which to achieve our objectives has narrowed considerably.

Like the public, the fire service also possesses a culture and tradition that will impact on a firefighter's actions. Proud traditions of selfless service to the public reinforced by literature, popular cinema and newspaper headlines. Stories of danger and risk taking passed on by older 'veterans' to younger firefighters. These traditions are powerful motivators and informally set expectations.

Implicit in this culture and tradition is how firefighter's view each other and what they expect from each other. No firefighter would want to be perceived as afraid or weak by a colleague. This notion can have profound consequences on the way in which firefighters act around each other. I can remember many times in my own career when rather than talk to my partner about retreating from a fire, I chose to say nothing instead of the chance I may appear to be weak or afraid. In hindsight, I have no doubt that he was thinking the same. How many times has this lack of communication compromised the safety of a fire crew?

So how do all these elements come together to effect the way firefighters act on the fire ground? Which are the most powerful and do they create a conflict with regards to our training in fire behaviour? I believe these questions can be answered in a simple hypothetical fire incident that we ask our new officers to investigate.

Firstly they are asked to view two identical images of a working fire. The images show thick black smoke issuing from the front of a single storey residence with a car in the driveway. The fire officers are asked to pretend that these fires are the exactly same fire but in alternate universes – universe 'A' and universe 'B'.

Universe A

Universe B

The officers are asked to imagine themselves as having just arrived and in charge of this incident. No other resources have arrived and they have one hoseline at their disposal. First they are asked to look at universe A. Hot, dense, black fire gases are issuing from the front door, consistent with a ventilation controlled fire somewhere in the structure. The neutral plane is low and turbulent. Lighter colour pyrolysis smoke issues from gaps in the roof as combustibles within the house breakdown due to heat from the fire, windows are blackened and covered in products of combustion. Air enters from the open doorway giving vital oxygen to an ever increasing fire.

As the officer sizes up the incident crews stretch a hoseline, prepare their equipment and wait for final orders. The officer knows that the fire will soon rapidly escalate and is trying to decide whether it is safe for the crew to enter. At this moment the house owners arrive and confirm that there are no people inside the house - themselves and the children are safe.

At this point most officers would breathe a sigh of relief and tell their crews to standby as they reassess the situation. The fire is showing all the signs of rapid fire progress driven by impending flashover. They would be 'insane' to send their crew in now. Minutes later the front of the house flashes over. Given the external warning signs shown by the fire behaviour, this was not surprising but in fact expected. Given that the crews were kept from entering, a dangerous situation has been avoided.

Now let's look at Universe B and its identical fire. This time there is one significant difference. As the officer sizes up the incident the house owners arrive but instead of telling him that the house has no life risk, they say that their son is missing and believed to be still inside the structure. Does the officer in universe B still tell his crew to standby as he reassess the situation or has he already made up his mind? Have the crew already entered to search for the child? Is this officer 'insane' for sending his crew into the structure to search for a victim?

| Universe A – Flashover! | Universe B – Flashover! |

The important thing to note is that the fire behaviour is the same in both universes. It has the same potential and reacts in the same way regardless of whether there is anyone missing or not and yet many firefighters (if not most) would believe it would be justified to enter in universe B but not universe A despite the fact that both are showing the same fire behaviour. It is therefore evident that the prevailing fire behaviour is no longer the key consideration in deciding whether to enter the structure or not.

Another example of this unresolved conflict was highlighted when a colleague contacted me to discuss a recent fire. He explained that they had attended a house fire the day before at six in the morning. There was a car in the driveway and a fire at the rear of the structure. In many ways the fire he was describing was similar to that in universe A and B. On arrival they entered with a hoseline through the front door. My colleague stated that there was light smoke in the hallway and that he could hear the fire in what was most likely the kitchen at the rear of the house. It was then that asked him to stop because I was now going to tell him what he did. He was a little taken back

at first but was interested to see what I thought he did next. I replied, that he searched the first room on the left. He then laughed and agreed that was exactly what he did.

I then asked him to imagine that he was attending the same fire but this time they entered the structure two minutes later. Perhaps they were caught in traffic or perhaps they had knotted the hose and needed to unravel it before they could flow water. I now began to describe a very different scene inside to that, that he had described to me. I told him that he was now forced down by heat from a low a turbulent neutral plane comprising of thick, dark smoke. As he looked down the hallway he could see flames issuing from a room at the end of the hall which had now flashover after the window had failed. Through the smoke, flames are starting to roll down the ceiling towards him. What would he do now?

My colleague hesitate for a second or two and answered, 'search the first room on the left'. In other words he would continue to do the same thing. In effect I had just described the signs of impending flashover. I knew that he also knew these signs because it was I who had trained him some years before. But once again, regardless of the fire behaviour, he had chosen to ignore what the fire was telling' him because it conflicted with another objective. Ultimately if this is the case with the majority of firefighters why do we bother teaching about fire behaviour if it is ignored? Ignored when it should be the most important indicator by which to set strategies and tactics.

This is a clear example that the powerful influences that define the culture and traditions of the fire service have not been resolved with regards to modern fire behaviour and that the need to commence 'hands on' rescue regardless of the fire conditions is the 'routine' response under these conditions. The need to 'rescue' often dictates whether or not firefighters entered a burning structure. It also dictates what they did once inside. The need to fulfil this objective often meant that the fire itself and how it presented on arrival, was not the key consideration in formulating tactics. It also meant that key indicators of rapid fire progress may be ignored because they conflict with other objectives.

How can firefighters impact on such a situation? Do they just accept a higher risk as part of the job? Or by training hard to be the firefighter who has the knowledge and power to control and work within such an environment (and know when they can't). And whose actions are determined by the prevailing fire conditions, not the prevailing human condition. In the past firefighters had the time to take the victim away from the fire.

It is also critical that fire behaviour training programs understand and resolve the conflict between the traditional and cultural expectations and what we can do given our modern fire environment. It is a subject that must be discussed. All firefighters need to understand how best to achieve the rescue objective given a very narrow window of opportunity and realise that in today's fire perhaps the best way to achieve the rescue objective is to take the danger (fire) away from the victim by allocating initial resources to extinguishment of the fire. In this way the interior fire environment can become a safer place for both the firefighter and those needing our help.

John McDonough - 2013