

The Catalyst

The Official Newsletter of JOIFF

June 2002

www.joiff.com

FROM THE EDITORS

It is hard to believe that this is the June 2002 edition of The Catalyst already !! This edition is full of diverse subjects. Of particular note is an article on the World Trade Centre attack. At the recent Conference of Italian Firefighters in Rome, one of the speakers was Joseph Callan, Assistant Chief Officer of the Fire Department of the City of New York. Chief Callan presented a Paper on his involvement with the tragic events of September 11th and we are privileged to have obtained his agreement to print a Report of his Paper. Our thanks and our thoughts continue go to the personnel in the Emergency Services in New York who have carried out their jobs so professionally under conditions of such trauma, tragedy and sorrow.

In future editions of The Catalyst, we will give details of other Papers presented at the Rome Conference.

September 2001 seems so long ago, but that is when we printed the article by David Meyer, of Orion Australia, on Fire Protection of Large Storage Tanks, which was the opening article in the JOIFF Foam debate. David's article stimulated considerable and at times emotive debate in the pages of editions of The Catalyst that followed - and we have no doubt in many offices and around many tables where Catalyst readers sat and talked about the issue. In this edition, David has written an article responding to some of the criticism received in subsequent

editions and raising some further interesting points. Thanks to David for his excellent articles and for his leadership in setting out his opinions in such a forthright and open minded fashion. The Editors - and our Technical Editor for the Foam debate, Dr. Niall Ramsden - are happy to continue the debate if anyone wishes to contribute.

One of the biggest risks faced by Emergency personnel is that of not being seen, and to highlight these problems and to present possible solutions we are pleased to publish the first of a series of three articles from 3M on visibility of personnel. This first article, has been written by Stephanie Uch of 3M Germany and we thank her for her contribution. Further articles will follow in future editions.

Due to pressure of space in this edition, we have had to hold over the PPE Corner and The Reactor column for future editions. Please keep your comments coming to Mr. R.

The Readership of The Catalyst continues to grow and copies can be downloaded from the JOIFF website. Details of the expanding activities of the Membership of JOIFF are included in the Members Column.

We hope that you will find this edition of interest and we thank our Readers for their support.

ABOUT JOIFF

JOIFF, the Joint Oil and Industry Fire Forum, is a grouping of Companies in High Risk Industry represented by their Emergency Services Manager or equivalent position, and nominated Deputies. A JOIFF High Risk Industry is any Organisation that is engaged in processing, storage, handling or transport of high risk materials and that has nominated personnel as Emergency Responders. JOIFF offers to its members a forum for discussion amongst peers, accredited training, information dissemination and technical advice.

JOIFF welcomes application for Membership from suitable Organisations - contact the JOIFF Secretariat, details on the back page.

Disclaimer:

The views and opinions expressed in The Catalyst are not necessarily the views of JOIFF or of its Secretariat, Fiderium Consultants neither of which are in any way responsible or legally liable for any statements, reports or technical anomalies made by authors in The Catalyst.



MEMBERS SECTION

Report from the JOIFF Secretary, Kevin Westwood C.Eng., M.I.Fire E

REPORT OF THE JOIFF SECRETARIAT FOR THE PAST THREE MONTHS.

1. Presentation of JOIFF.

- All JOIFF Membership Certificates have now been sent out.
- All editions of The Catalyst can be downloaded from the JOIFF Website.
- The web site is being updated on a regular basis.

2. Membership:

Please advise the Secretariat of the names of any Organisations that you think might be interested in becoming a Member of JOIFF.

3. Contact with other Organisations:

Contacts continue to be made and maintained with Regulatory Authorities and Organisations involved in Trades associated with High Risk Industry in Countries where JOIFF has Members and possible Members.

4. Training:

- Members are reminded that they should make every effort to support the JOIFF accredited training events. Dates can be found on the JOIFF web site www.joiff.com
- Details of the Singaporean training event are being finalised. This will be an important landmark for JOIFF once completed and should be the foundation for further global training events .

5. Finance:

- Membership invoices are sent out as payment becomes due.
- JOIFF Training accreditation fees continue to offset the cost of operating The Secretariat.

6. Meetings:

- The Secretariat attended the Members Annual General Meeting and JOIFF was represented, through the Secretariat, at the Conference of the Italian

Firefighters in Rome in April and at the meeting of the new ISO Committee on Firefighters' PPE, in Berlin also held in April.

- The autumn JOIFF meeting date will be concluded following the June JOIFF executive meeting.

Members Annual General Meeting:

21 persons attended the Members Annual General Meeting which took place on 20th March 2002 at the premises of Protector Technologies - previously known as SABRE and now, Protector having been taken over by TYCO, operating under the name "Scott International". JOIFF Chairman, Gary Douthwaite, reported on the development of JOIFF throughout the past 12 months and JOIFF Treasurer Dave Murray reported on the finances of the Organisation. The proposed changes in the JOIFF Constitution were discussed and adopted. The main changes in the Constitution were the introduction of 2 categories of Associate Membership, Corporate and Individual. The procedures to be adopted for these categories of Membership are currently being finalised by the Executive. Another agreed change in the Constitution was the introduction of postal voting. This is necessary to accommodate the growing International Membership of JOIFF. SABRE Protector Training and Services Manager Andy Smith gave an excellent presentation and demonstration on the new UK COSHH Respiratory Protective face masks "face fit" Regulations which was followed by a detailed questions and answers session. Protector Sabre provided lunch and a tour of the plant to all those who attended. Thanks to Protector Sabre for their hospitality.



Students at the first JOIFF accredited Auxiliary Firefighter Course held in Washington Hall, Lancashire from 7th / 9th May 2002

Shown in the picture is Gerry Johnson, Fulcrum Consultants, with Washington Hall Instructors and Students from BP Chemicals Hull, CONOCO, Humberside, and Shell Stanlow.



Students at the recent JOIFF accredited Crew Leaders Course held in IFTC Teesside from 15th / 19th April 2002

Shown in the picture are Students from Irish Refining, Whitegate, Phillips Petroleum, Middlesbrough and Texaco, Pembroke.



GROUND ZERO.

Report of Presentation given by Joseph Callan, Assistant Chief, New York Fire Department, to the Conference of Italian Firefighters "Safety in Rescue Operations" held in Rome in April 2002.

Chief Callan was the Officer responsible for the Firefighting and associated activities in the North Tower of the World Trade Centre and he arrived at the scene shortly after the plane struck the Tower on 11th September 2001. When he arrived, six upper floors of the Tower were ablaze - the 94th up to the 100th floor, a total of 6 floors. Each floor of the Tower was 4000 square feet, which meant that Firefighters were facing an incident comprising 24,000 square feet of fire. From the experiences of the New York Fire Department, they estimated that 1 hand line could extinguish 2500 square feet of fire, 2 lines 5000 square feet, so he quickly formed the opinion that this fire could not be extinguished conventionally.

Factors effecting evacuation / Firefighting operations.

- There were 100 elevators in each of the North and South Towers - none of these were operational. The only way to reach the fire floors was by the staircase, a task that was estimated would take a minimum of 1½ hours. 150 Fire-fighters started to climb the stairs to get to the fire floors - the highest floor that they reached during the incident was the 50th Floor.
- Communications in the building were knocked out by the impact of the crash as was the hand set repeater system - this increases the power of the hand set and without it, communications by hand set was poor and intermittent and in some cases impossible.
- The Sprinkler Systems had been knocked out by the crash and weren't operating.
- The impact of the crash and subsequent fires had caused building movement which was resulting in large glass panels breaking out and falling with

potentially lethal consequences and parts of the ceilings and walls were coming down. At 09.40 hrs., just under 1 hour since the impact, it was decided that it was unsafe to remain in the building and the order was given to evacuate.

Some details of the Incident:

The plane that hit the North Tower was a Boeing 767. Its tank capacity is 24,000 gallons of jet fuel and it was carrying 10,000 gallons. To try to understand the enormous energy created by the burning fuel in the North Tower, compare this to the Oklahoma bombing, where the explosion was estimated to be equivalent to burning approximately 50 gallons of jet fuel.

	North Tower	South Tower
Plane hit	08.46 hrs.	09.02 hrs.
Floors on fire	94 - 99	78 - 84
Building collapsed	10.28 hrs.	09.59 hrs.

Ground Zero is a 16 acre site and after the buildings collapsed, there were 1.2 million tons of rubble 60 feet high and 74 feet deep. After the collapse, 3000 - 6000 people were missing, surrounding buildings were burning and 400 Fire-fighters were missing. The final death toll of the New York Firefighters is 343.

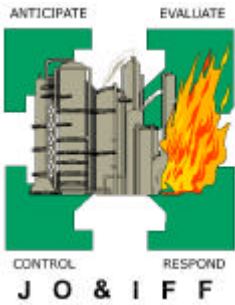
In the North and South Towers, all of those below the fire floors i.e. those who could be saved, with the exception of 80 fatalities, a total of approximately 15,000 people, were saved.

For the first 3 weeks after the attacks, the Incident was a Rescue Operation, then it became a Recovery Operation. Those engaged in the Recovery will reach the basement at the end of May at which time the New York Fire Department will leave the site of Ground Zero.

THIS SPACE COULD BE PROMOTING YOUR ORGANISATION'S GOODS AND SERVICES.

The Catalyst is distributed to and read by thousands of Emergency Services Professionals in positions of authority in Industry, Municipalities and Regulatory Authorities Worldwide. It is also posted on the JOIFF website and read by an indeterminate number of other people interested in Emergency Services.

IF YOU WOULD LIKE TO GET YOUR ORGANISATION'S MESSAGE TO THE READERSHIP OF THE CATALYST, CONTACT THE JOIFF SECRETARIAT.



CONCEPTS OF DAY/NIGHT VISIBILITY.

by Stephanie Uch of 3M

The Risk Of Low Visibility

Imagine the scene of an Emergency: Fire Brigade and Rescue personnel struggle to save lives and to get the situation under control. Fire, smoke and chaos will lead to panic - stress and physical impact reduce a person's ability to act sensibly.

Suddenly the people in charge of getting the chaos back to normal may be in great danger themselves. Emergency activities usually occur in heavy traffic or along with intensive vehicle and other movement e.g. from Firefighters on foot and in Fire Engines all together in the same scene. Or it may be road workers endangered by their own co-workers guiding heavy machinery at a building site.

Although vital, especially in zones of danger, visibility is an underestimated risk. High visibility is a priority need in dark or poorly lit working environments.

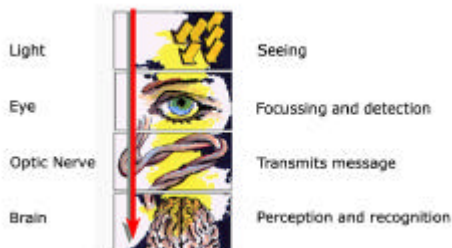
For the working person in action, the need is to be seen by others, during all movements therefore allowing visual communication to a potential driver. The person driving the vehicle is providing the light source, causing the retro reflection on the garment.

From Seeing To Recognition

We might not be aware of it during daily life, but the sense of seeing is our main tool of orientation, much more so than hearing, feeling or smelling. And as a consequence we are living in a visually complex world. We are receiving most of our information via pictures, colours, writing, in short: via light.

Seeing is our strongest and most important sense. But what do we really mean by seeing? Is it purely that something or somebody is there?

Not really, our eyes do not exactly detect everything that is just "there" or not hidden by something else.



What happens when we say: "I did not see him/her?" (which is actually the main "excuse" of people causing and accident, especially at night).

Seeing happens when the eye detects the reflected light of any item or a person. The optic nerve is transporting the information to the brain. Inside the brain the message is perceived and recognised. Only when recognition of the situation has taken place is a person able to react and when recognition takes place

in time to react appropriately, the object is conspicuous.

The time to recognition is necessary to enable a driver to successfully avoid a dangerous situation. How can this time be reduced in order to raise safety at work in traffic?

The answer is by making people (and items) more conspicuous!

The first step is to observe which features are attracting our eyes' attention more than others. The most conspicuous feature is contrast. The recognising mechanism works by distinguishing objects from their environment. Once the item stands out by colour and brightness, the human eye will be able to detect it quickly and precisely.

The size of an object is what creates attention. The larger it is, the easier it will be noticed.

The visual system is stimulated by clearly defined shapes, especially when the visual pattern is already known.

From a vision to real recognition our optical system has some work to do and certain circumstances stimulate our eyes more than others.

The shape, size and the contrast together with the environment determines the conspicuity of a person. During daytime, colour - contrast to the environment - plays a major role, during night-time, the main task is to provide outstanding brightness to promote conspicuity.

Daytime Visibility - Fluorescent Materials

During daytime, the person is embedded into an environment usually rural or urban. These areas are dominated by grey, brown, green and blue colours.

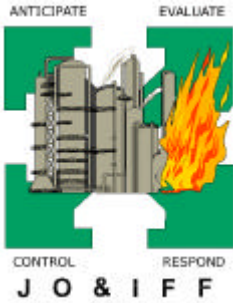
Fluorescent colours are rare in both environments, but these colours provide enhanced contrast and brightness compared to the other colours. In particular, fluorescent yellow, orange and red will not be found in conventional backgrounds.

Fluorescence is caused by special colour pigments converting ultra violet light into visible light of outstanding brightness. Ultra violet light is invisible to the human eye because the wave-length is out of our visible range.

Night-Time Visibility - Retro-Reflective Materials

As we know - because we gather most of the information from the light reflected by our surroundings - orientation during night-time without light or in very limited light conditions becomes a very critical issue. During night-time we are faced with the situation that we are deprived of most of the messages we take in during the day.

Retro-reflective materials illuminated by a light-source, i.e. from vehicles, create contrast, brightness

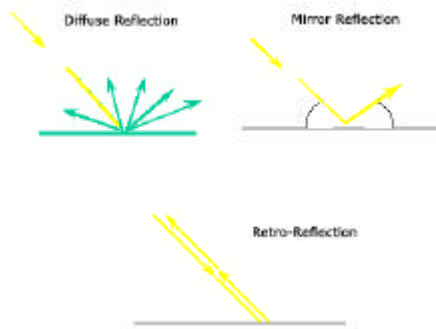


and recognisable shape. Optimised placement of retro-reflective materials ensures the recognition of a person as a human being in visually complex environments.

Retro-reflection means that the incoming light is reflected back to the light source. Retro-reflection is caused by special technologies which bend the incoming light so much that it reflects back to where it came from. This effect is gained by special shaped surfaces, such as repeated micro-spheres or micro-prisms.

Most of the surfaces in our environment cause diffuse reflection, where light is equally scattered in all directions. This effect is actually causing the perception of the different colours.

Another well know reflection is mirror reflection, where incident angle = angle of reflection.



High Visibility Garment Design

High visibility garments must be adapted to a person's risk at work during day-time and night time, making him/her conspicuous from all viewing direction. Designers must consider that people are in motion - movements such as bending or squatting - and the material must still be conspicuous. Also to be considered is that the placement of retro-reflective and fluorescent materials must support the recognition of the person as a human being (shape !). The amount of the material must be sufficient (size !) and bright enough in order to compete successfully with complexly coloured backgrounds or dark

environments that might be partially illuminated by other light sources (contrast!).

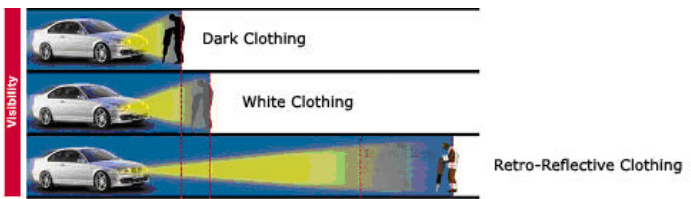
In a word: the high visibility materials shall be applied to attract the attention of the human eye.

It might not be possible to reduce the individual's reaction time, but it is possible to gain more time to react appropriately by understanding the situation sooner.

The distance to recognition can be increased by high visibility garments with retro-reflective materials by as much as more than 200 metres.

At night-time the distance to recognise somebody dressed in conventional garments is only about 40 metres

Typical occupations that require high visibility working



outfits are Fire Brigades, Road Workers, Police and Traffic Rescue personnel, Ambulances and Utility Workers - in short, all work situations where there is a risk of being hit by a vehicle.

It is the Employer's responsibility to conduct a risk assessment of the Work Area and to provide to his/her employees the personal protection necessary.

This is what safety in terms of visibility is all about: being as conspicuous as possible so that one can be seen by a driver in time to protect lives.

About the Author: Stephanie Uch is a graduate in textile engineering (apparel technologies) and has worked for several years in the Workwear Industry. Now with 3M, she has specialised in garment physiology and application engineering for retro-reflective materials for Personal Safety Products.

COMMENTARY ON FIRE PROTECTION OF LARGE STORAGE TANKS USING MOBILE EQUIPMENT

David Meyer, Orion Safety Industries Pty Limited
Email: djmeyer@orionsafety.com.au

As a result of my article in the September issue of Catalyst I have received comments from various people. Some of the comments have been favourable and others negative. I have been most encouraged by the constructive feedback whether it was in support of my thoughts or not. The concept behind the article was to encourage discussion on different approaches to fighting tank fires. I was not proposing that anyone rush out and try the ideas without more supporting data.

Before getting into the technical issues there is a basic philosophical one to deal with. With the advent of a new technology the first version is never the final, optimised version. Basically, we never get it completely right the first time. In support of this consider the Wright brother's first aircraft and the changes that have occurred since, or the first transistor and today's incarnation of it. Consider every technological change you can find and the same trend exists. Something more relevant to our

current case are the two pictures below. Figure one is a World War 1 era 150mm mobile artillery piece. Figure 2 is a Vietnam era 150mm field artillery piece (very similar to today's). Over this period the range of 150mm artillery pieces nearly doubled.

We should bear in mind the lessons of the history of technology before we get locked into one way of doing something.



Figure One.



Figure Two.

use with restricted movement.

Consequently, for this and other reasons I see no reason why a fire fighter should not feel the same way when the cost of adding the greater monitor movement is to have a much less manoeuvrable monitor. The need for a cumbersome trailer only arises when you ask more from the trailer than you should.

It is interesting to see the progression in mobile artillery design illustrated above when the similarities with mobile monitors are so great.

On a more pragmatic note: the design criteria for a mobile field artillery piece such as those above are similar to those of a large capacity mobile monitor. It needs to be easily moved, rapidly deployed and easily pointed in the right direction. I find it interesting that despite the artillery commander having less idea of where he needs to point his weapon in advance than a fire fighter does they don't opt for 360 degree rotation of the artillery piece. Instead they opt for portability and ease of

Dave Murray has published some commentary on my article in the December issue of Catalyst and there are some issues that obviously need to be clarified.

- I am not recommending any particular strategy for people to use when dealing with a tank fire. This can only be the domain of the site management. Local conditions will have considerable bearing on this as will corporate policy and personal preferences.

Hazard Warning Lights

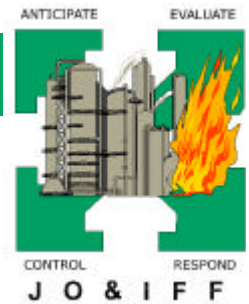
Portable Folding Electronic Flashing Lights. Rechargeable Batteries

Collapsible Cone

Collapsible Traffic Cones Easily Stacked, Reflective

PPE for Emergency Services Personnel

Tallaght Business Park,
Dublin 24, Ireland
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Fax: + 353 1 4137301
Email: info@gdgroup.ie
Internet: www.gdgroup.ie



- My issue with mobile monitors is not that they won't work, but rather they are harder to work than they need to be. Having more monitor movement than is needed results in a monitor that is heavier, larger, more expensive and harder to use than it needs to be. Then, once you have this ungainly monitor you need the 360 degree movement because it is difficult to locate it where you would like it. It is a consistent philosophy, but not the only one, and I contend not the best one.

In my article I asked the very basic question of whether you need 360 degree movement and the -10 to +85 elevation movement. I do not believe you do and if you look at more realistic movement capability for your monitors you can fundamentally change the monitor design to reduce cost, make it more mobile, easier to deploy, reduce training costs etc without reducing your effective fire fighting capability.

See the above discussion on technology and field artillery.

- There is a basic rule for nozzles that more flow at a given pressure will provide greater throw. The benefits from increasing flow produce diminishing returns as you increase flow. For each doubling in flow you do not get the same percentage increase in throw. Some manufacturers, due to design limitations with their nozzle technology, have achieved little or no throw increase once the flow exceeds about 20,000 litres per minute. This is in part due to shortcomings in the technology used. Just because one manufacturer cannot achieve throws of considerably greater than 100 meters does not mean that it cannot be done. At flows of 40,000 litres per minute marine (FiFi 2) monitors achieve throws of over 140 meters.

- On the issue of how many monitors I would recommend for a 270' tank. Two of our 200mm monitors can achieve the required flow so they would have been adequate. They would also achieve throws in excess of 110M and so would not need to be located in the bund. Nothing in my article suggested that anyone would work in the bund and the suggestion does not follow from anything I proposed. Beyond this I am not an expert.

- There is a suggestion that more, smaller trailers would need more hoses. If you are looking for 50,000 lpm of flow you will need about the same number of hoses no matter whether you have one or two monitors in operation. You will have the benefit (with 2 monitors) that they won't all be terminating at the same location thus reducing the spaghetti pile around the monitor.

- Is there a down draft around the edge of a tank? The answer is YES. If there were not, where would the air enter the fire? A close look at any tank fire footage will show this. There is a velocity profile for the air flow from a tank fire with the maximum up draft velocity in the centre and declining towards the

outside. At the tank rim there is a down flow. This same air flow will help distribute the foam towards the centre of the fire.

If you attempt to project a nozzle stream at the leading edge of a tank fire (from the front) the nozzle stream will pass over the tank rim with considerable forward velocity. The stream will impact in the centre or past the centre of the tank unless it is a very large tank, thus travelling through the most destructive part of the fire.

- I have serious doubts about the foot print concept. There is nothing that supports this concept in any conventional foam fire test data. If the foot print philosophy is correct a fixed foam system for a fuel storage tank would be better designed with one large foam pourer rather than the way we currently do it. Why don't we do it this way? The footprint concept is counter intuitive and counter to the large body of foam test data developed over many decades.

- My argument above casts doubt on the foot print method in terms of its efficiency. It does not suggest that method will not work (since it does) but rather that it may not be the most efficient way to fight a fire. I suggest that research into alternative strategies is readily justified.

The reason for writing the first article is to stimulate discussion on alternative methods and equipment. All fire professionals have an obligation to be cautious at the same time as they remain open minded. That past 15 years has seen very rapid technological change in our industry to everyone's benefit. There is no justification for becoming blinkered in this area. That I was asked to write an article to stimulate discussion on this topic is indicative that I am not the only person who is concerned about a narrowing of approaches to tank fire fighting that is occurring.

Lets all keep an open mind and participate in constructive discussion on any issues relating to our profession

Comments from Dr. Niall Ramsden, Technical Editor for The Catalyst feature on FOAM.

It's good to see the debate continuing. David Meyer's final sentence is particularly encouraging - let's keep the debate going - there is no single "right way" for every application. It is only by open debate and learning from each others experience that we can decide which is the most appropriate response strategy for any particular situation.

JOIFF TRAINING NOTES



Training during 2002 to date:

There have been a number of JOIFF accredited Training Courses to date in 2002 and it is pleasing to note that the number of Organisations in High Risk Industry who can boast of JOIFF accredited Emergency Services personnel in their Occupational Fire Brigades, is growing. Training continues to be held in the International Fire Training Centre Teesside and there was excellent feedback from the first JOIFF accredited Training which took place in Washington Hall International Training and Development Centre, Lancashire.

On site Training:

Organisations currently carry out considerable training on site, for which no JOIFF accreditation is given. The JOIFF Training Standards Group has developed modular Training packages that can be used to cross-map training competencies between JOIFF accredited Training and Training that is carried out on site. To improve the quality of Instruction on site, a 2 day JOIFF accredited "Train the Trainer" Course has been developed and this will link into the approved Training to be presented.

JOIFF accredited Training in Singapore:

Arrangements have been finalised with the Singapore Aviation Academy, Singapore for the first JOIFF accredited Training Courses outside the United Kingdom which will take place during August 2002. The Course is a 5 day Command and Control Course directed at Shift Fire Officers who will be in charge of providing first response to Major Incidents in High Risk Industry. The Course includes theoretical and practical exercises dealing with Fire, Search and Rescue, Explosion, Gas release, Toxic release etc. As with all JOIFF Courses, successful Students will be issued with a JOIFF Certificate of Qualification.

The Course Manager and Senior Instructor will be experienced personnel from the United Kingdom. Places on this course are limited so book early.

Please contact Fulcrum Consultants for further detail on any aspect of JOIFF Training - detail at the bottom of this page.

Dates	Detail	Venue
July 9th - 11th	3 day Auxiliary Firefighter Course.	Washington Hall
September 23rd - 27th	5 day Crew Leader Course	IFTC Teesside
October 17th - 18th	2 day Practical Firefighting Course	Washington Hall
October 30th - 31st	2 day Practical Firefighting Course	Washington Hall
November 7th - 8th	2 day Practical Firefighting Course	Washington Hall
November 18th - 19th	2 day Practical Firefighting Course	Washington Hall
November 25th - 29th	5 day Crew Leader Course	IFTC Teesside
December 3rd - 4th	2 day Practical Firefighting Course	Washington Hall

All Courses are JOIFF Accredited. For details on the Fire Extinguisher Instructor Course, contact Humberside Fire Brigade Industrial Training Centre, Tel. 01482 462 815 (Outside UK dial + 44 1482 462 815).

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