



# NOTTINGHAMSHIRE

## Fire & Rescue Service

*Creating Safer Communities*

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Dear Tim

### **Flow meters on Nottinghamshire Fire Appliances**

Around two years ago, Nottinghamshire's engineering team began to think of how the methods for pumping could be improved. This was following a number of near misses and investigations into incidents such as high rise fires, coupled with the water companies desire to reduce pipe leakage therefore reducing mains pressure.

The result of this was that 'pressure' the traditional method of pump measurement used in the fire service did not actually tell the pump operator how much water was either being delivered or was available to the pump operator.

This thought process lead onto a series of white board drawings and brain storming sessions. These drawings inspired the team into developing a method by which the water both in and out of the pump could be measured.

The primary driver for this work was the safety of firefighters and to ease the operation of the pump if possible. It was quickly established by the team that there were also some considerable environmental benefits from developing flow into and out of the fire appliances. No one had really considered the amount of water we used, where the supply came from and how we used the water.

A number of other FRS's had tried using flow meters in the past. The early versions of these were paddle meters which had proved unsuccessful in fire service use. However there were a few who were using electro-magnetic flow meters that had been designed specifically for use on fire appliances. These had been successful but their use had been limited by services some for monitoring of flow either in or out but not in the full concept method that we were looking at.

Nottinghamshire was about to undertake a major build program of 19 new appliances and the team looked at how the flow meter concept could be worked into these new builds.

It was found that no one company had the full solution, but the combination of TSI flow meters, the bodybuilder E1, together with the engineering team at Nottinghamshire began to work on a practical solution.

TSI were particularly helpful during this development stage and spent some considerable time working with the team to tailor the solution using some existing designs but also developing the products to enable the team to achieve the results we were looking for. We were particularly keen to measure all of the water in and out of the pump including high pressure hose reels.

Nottinghamshire together with TSI began some testing of high pressure applications on existing Nottinghamshire appliances. This testing enabled us to develop the flow meters for this application.

During the build of the appliances at E1 and TSI, the Nottinghamshire team developed the control system via the E1 pump controller and the TSI system which would measure the flow from and into the pump to allow the total flow in and out to be displayed on the pump dash panel. This would make the operation of the pump easier for the operator.

Nottinghamshire also undertook a range of testing at high rise and other sites around the county to further develop and ensure that the concept would actually be transferred into a practical system to operate on the appliances.

During this period Nottinghamshire used the information acquired during this testing to develop the range of firefighting jets and hose size that will fulfil the service requirements for a range of operational scenarios. We also discovered that many long held beliefs, theories and even some fire service manuals were actually not accurate in their assumptions and statements with regard to flow rates that could be achieved.

The results of all this work have resulted in a total flow control system that is now operational in Nottinghamshire. We have 11 appliances in service, 4 more have just been delivered with a further 4 due towards the end of 2010.

The firefighters have taken to the system very well; I was at an incident recently where the flow meters were being used to monitor the water relay in use as well as the water delivery to the fireground and fire fighting jets. The crews are recognising the significant safety improvements that flow brings to their operational incidents.

The team have also used the flow system to determine whether the existing equipment available in Nottinghamshire is being used to its full potential.

The Nottinghamshire team are now working with TSI to further develop the flow system to allow the data from the appliances to be seen virtually 'live' via a GPRS uplink to the internet. This will allow the service to use the data to establish operational and training water use by linking the data to our incident data. We will also be able to use the data to see how we use water and further develop the system and introduce any improvements and efficiencies into operation.

We could if required analyse the data for any particular incidents to investigate the incident to see how the water was used at any stage of an incident. It is also possible that a hazmat officer from a remote location such as the service control room could access the data to see what water is being used and any environmental impacts regarding

contamination and run off water. They could then work with other agencies such as the EA, with this accurate data, to enable correct decisions to be made.

We are also working with TSI to develop the system to allow live data to be available during an incident within the Nottinghamshire Fire & Rescue Service Command Unit. This will allow the Incident Commander or Water Sector Commander to see what the current water situation is and plan for any additional resources/ sectors to be brought into use. They would also be able to recognise if they could have some significant water supply issues and also run off water/pollution or other environmental problems.

What has become very apparent to the team during this development is that flow is very much the future with regard to development of the use of water in the fire service. Nottinghamshire displayed an appliance at the Emergency Service show in November 09 and it was very well received by people who saw the flow control system.

Since then a number of Fire & Rescue Services have visited Nottinghamshire where we have been able to fully demonstrate the advantages that flow control bring to the fire and rescue service.

The introduction of flow control by Nottinghamshire has also been cited as a notable case study on the CFOA website.

The BBC in the East Midlands have also recently spent some time with the team filming the flow control system and comparing this to the pressure system of pump operation.

E1 and TSI have been a major assistance to Nottinghamshire Fire & Rescue Service throughout this development and we look forward to continuing this excellent relationship in working on future projects and development of flow.

I would like to pass on my personal thanks for the assistance I and my team have received during this development program. I have spent nearly 30 years in the fire service and I am convinced that the development of flow control is one of the most significant safety improvements for firefighters during my career. It has the potential to bring many more significant benefits into the future.

Yours sincerely



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