

Nottinghamshire's new Scania's put focus on firefighter safety

When the engineering team at Nottinghamshire Fire and Rescue Service sat down to discuss the design of their newest batch of Scania fire appliances, it was with firefighter safety at the forefront of their minds.

In the wake of the tragic loss of two firefighters in a high rise block of flats in Stevenage in 2005, the engineering team embarked on developing a means of monitoring the flow from the pump in order to guarantee sufficient water at the branch, particularly when fighting fires in tower blocks or in other challenging circumstances. It was also important to be able to give the pump operator the information on the flow of water into the pump, given changes in water supply to reduce leaks etc.

Environmental factors also played a part in their decision making, with water usage high on the list of priorities for the team.



Fully flow metered system

The result was the installation of a fully flow metered system measuring incoming and outgoing water from the Godiva 2010 Prima pumps – a first for UK fire and rescue services. The system bucks the trend of measuring pressure in favour of flow, resulting in a more surefire means of ensuring that crews have a sufficient quantity of water for any given situation.

The software also monitors the use of the water so that the service can analyse how much water is used at an incident, or at any point during an incident. This could be very important from an environmental point of view. It will also assist in further developments of pump systems and capture data on water use from various sources such as hydrants or open water.

Group Manager Trevor Tarlton-Weatherall, who heads the engineering section at Nottinghamshire Fire and Rescue Service, explained how the new system came about. He said, "Following the report into the Harrow Court fire, we started carrying out some tests of our own in high rise buildings. We wanted to enable our crews to know exactly how much water they have at the branch, whether it is on the ground or on the fourteenth floor of a high rise building. Traditionally we've done this by monitoring pressure only, but this method relies on calculating pressure loss due to height as well as friction, whereas with flow meters the flow at the branch is measured at the pump.

Audible and visual warning system

"With flow meters on both the outgoing and incoming supplies, we can monitor the available supply and the rate of use. Thus, if we have 800l/min coming in, we know we can have up to 800l/min going out, and the vehicles are fitted with an audible and visual warning system to warn operators if they overrun the supply. We're the first in the country to have this system, but we're hoping that other fire and rescue services may follow suit. It's a simple system that improves firefighter safety, and that's got to be a good thing."

"It has been a pleasure working on the Nottinghamshire contract. They have really pushed the boundaries with the design and the result is the most technologically advanced fire engine we have ever built."

Willie Burns, Director, Emergency 1

As well as the flow meters (purchased from TSI Flow Meters), NFRS has also installed the E1 electronic pump controller, which has been updated to meet the service's requirements with regard to flow. It is the combination of both of these things that make the system so effective. The controller displays all relevant information about the pump as well as giving operators a 'one touch' system of pump operation.

The Godiva Prima 'multi pressure' pump discharges 2000l/min at 10bar pressure and, at the same time, a high pressure discharge of 120l/min at 34bar. Made of gunmetal to help resist the corrosive effects of pumping impure water, it also incorporates a 'round the pump' foam system that inducts foam concentrate into the water discharge to make a water/foam solution. The pump controller has been set up to give one button operation of the required valves to control the flow of foam concentrate and water to the pump. The pump has a continental type delivery and an automatic cooling loop to prevent it from overheating.

While the pump and flow meter technology represents the biggest step forward in terms of appliance design for NFRS, a number of other features help



make these vehicles stand out from the rest.

On the Scania CP31 crew cab chassis sits a one piece moulded GRP plastic body, manufactured in Poland and transported as a single unit to the Emergency 1 factory in Ayrshire, where the fire engines have been built. These are lighter, tougher, easier to repair and more resistant to knocks than their aluminium counterparts, and can also be broken down to their component plastic and recycled.

Risk management data

NFRS has upgraded the Scania interactor to store all of the service's risk management data and included a 12in screen as an interim solution while awaiting the Firelink Mobile Data Terminal (MDT). The interactor will then be used to display additional information to the crew. Eight recordable CCTV cameras have been installed on each appliance for crew safety and emissions on the 15 new appliances registered this year are to Euro 4 standard, while the four due for completion in 2010 will be to Euro 5.

The ladder gantry was purchased from Anderson Engineering and was chosen because of its modern design features. The two most important features for NFRS were the ability to change ladder configurations by using the 't' slot adjustment design and the



unique method of locking the beam down on the rollers removing any noise in the cab. They were also more cost effective than other gantry options.

One of the key objectives of the NFRS engineering team in designing the new appliances was to maximise storage space, enabling crews to carry the right equipment for a range of incidents. Last year, Holmatro medium rescue core technology cutting gear was installed on all of the service's frontline appliances, so that the first two appliances mobilised to road traffic collisions could manage 95% of incidents. This practice has continued with the latest delivery of Scania's but the equipment team has also managed to include five sets of flood rescue equipment as standard – another first in the UK fire and rescue service. Each set comprises a dry suit, thermal undersuit, protective boots, gloves, helmet and PFD flotation device and is designed for use during rescues from flooding and other water related incidents. All crews have received full training in the use of the equipment.

The rear crew cab has five seat belts fitted to enable the crew to be safely seated, and is configured for whether there is a crew of two, three or four in the rear compartment. The back rest has also been designed to support the backs of the crew in any configuration, with the inner two BA sets behind the back rest.

The new Scania's are being purchased as part of a

three year £5m investment in appliances and equipment by Nottinghamshire and City of Nottingham Fire Authority. Of the 15 being purchased in this phase, 11 have already been delivered to the service and will go on the run at stations across the county in the coming weeks. Four more are currently in build and a further four are due for delivery in 2010. The capital replacement programme thereafter will be four per year.

Mr Tarlton-Weatherall added, "I am particularly pleased with the technical developments we have implemented for these appliances. The flow control pumps will be a considerable improvement in firefighter safety. The in cab improvements will also be of great benefit to the crews in operating these appliances."

"The appliances have been designed to allow a wide range of operational use, from fire fighting and foam delivery to RTC and flood response. Through the developments and changes we have made, I believe we are delivering one of the best appliances available to the people of Nottinghamshire, in terms of it being able to respond to their needs and being equipped to deal with any type of incident."

Nottinghamshire Fire and Rescue Service's new Scania appliance can be seen at The Emergency Services Show 2009 at Stoneleigh Park, Coventry from 24-25 November.

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Services go with the flow

Tragedies such as the Harrow Court case have encouraged firefighters to consider whether they have the right equipment for the job of extinguishing fires. For the past two years, TSI Flowmeters Ltd has been working in partnership with East Sussex, Greater Manchester, Hertfordshire, London, Merseyside and Nottinghamshire fire and rescue services to help them improve the fire fighting working conditions of their firefighters.



Last Spring, TSI Flowmeters put flow meters on the low pressure deliveries of seven frontline fire appliances at Hertfordshire. This was followed with a series of training exercises, which resulted in Hertfordshire Fire and Rescue Service adopting flow controlled pump operating procedures. The pump operator now has the information

to utilise the full capacity of the pump with each branch operating at its optimum. "The benefits are increased flexibility of water usage on the fireground and safer firefighter operating conditions," said Tim Carew, Managing Director of TSI Flowmeters Ltd.

Management systems

The company also provided data loggers to record all water usage from the low pressure deliveries and worked with other equipment suppliers to integrate the data loggers with the fire appliance management systems. Hertfordshire Fire and Rescue Service were so pleased with the results that they have ordered flow meters from TSI Flowmeters Ltd for a further 12 fire appliances for delivery in 2009 and 2010.

With Nottingham Fire and Rescue Service, there are now flow meters on 11 of their frontline appliances. A further eight appliances will be kitted out with TSI flow meters in 2010. A number of key innovations have been introduced as a result of the col-



laboration between Nottingham Fire and Rescue Service and TSI Flowmeters Ltd. These include the installation of flow meters on high pressure hose reels; the installation of a flow meter on the hydrant to tank intake; and the provision of gauges in the pump panel showing incoming supply and total volume being delivered. The total gauges are of particular benefit to operational fire fighting as the pump operator can check at a glance whether water supply is balanced with delivery and can inform the incident officer of available capacity if an additional branch is requested. "The addition of a warning alarm when supply is being overrun is especially useful," said Nottingham Fleet Trainer, Nobby Clarke.

Nottinghamshire vehicle

These and other advances on the Nottingham Fire and Rescue Service fire appliances can be seen at Outside Stand 52 during this year's Emergency Services Show. A Nottinghamshire Fire and Rescue Service fire appliance will be parked on the stand for the duration of the show and Fleet Trainer Nobby Clarke will be at the stand both days.

TSI Flowmeters is currently developing a training programme for flow controlled pump operation in partnership with Hertfordshire and Nottinghamshire Fire and rescue services.

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