

FIREFIGHTING IN HIGH RISE BUILDINGS

9TH November 2005

Following on from my last report in which I took the ODPM figures published in their reports and calculated pressure losses in high rise buildings using their notional storey height of 3.5metres, I now put forward the following report which takes into account varying storey heights that may be encountered in high rise buildings throughout Hertfordshire.

I have calculated results using floor heights of 2.5m, 3.0m & 3.5m. I used the same formula for my calculations as used in my last report (16/10/05) I believe the results found show that the DM600 is the only branch available in the service to date that will give the flow rate required at certain heights due to pressure losses encountered.

Example:

Notional storey height is 2.5m

Fighting a fire on the 17th floor via a 100mm riser with an inlet pressure of 10.5 bars and using 3 lengths of 45mm hose and allowing for frictional loss through hose line you would achieve a branch inlet pressure of 3.05 bars. Using the DM600 this would give a flow rate of approx 300 l/min (At 3 bar inlet pressure DM600 meets ODPM minimum criteria). Using H500-65f with an inlet pressure of 3 bars you would only achieve a flow rate of 100/110 l/min which does not meet minimum flow rate of 200 l/min required (see previous report).

My results cover all three notional storey heights and have been done for all floor landings and are too extensive to include in this report but I believe they show that we need to reassess our firefighting practices at certain floor levels. I have calculations to show that at varying floor heights it may be possible to deal with a serious fire with the equipment that we have in service today.

However I feel we need to:-

1. Assess all high rise buildings, storey heights etc.
2. All risers tested (rated).
3. Test our hose to 15 bars (see prev report).
4. Pump operator training.
5. Pump operator handbooks.
6. Pump bay pump pressure/flow rate charts (included on 1(i)d).
7. Review ops procedure with regards to branch pressure 4-5 bars, and equipment taken aloft i.e. Dividing breech ?, DM600
8. Possibly lease with Delta fire to increase flow rates at lower inlet pressures through H500-65f if practicable.

If we cannot achieve the above then surely we must inform our crews and educate them in what they may face and the fact that they may not be able to deal with fires in high rise buildings at certain heights in a safe and controlled manner.

Most fires may not need the flow rates I have indicated but we must be prepared for the worst case scenarios without playing catch-up when it is too late. The riser themselves may only be tested up to 10 bars at present but the fact is to commit crews to certain floor levels you would need to give an inlet pressure greater than this. Testing and any risk assessments need to take place now and not as any incident develops.

I know as firefighters we only consider the word B³U¹D²G²E¹T¹S¹ when it means an eleven point score at scrabble, but for the future and to carry out modern firefighting techniques we need to equip ourselves with:-

1. 51mm lay flat hose
2. Branches that give correct flow rates, droplet size etc.
3. For low level compartment fires 25mm bore hosereel tubing (200 l/min).

I am aware the Service is carrying out exercises at Kodak House , Hemel Hempstead and putting the above into practice:-

Assuming a notional storey height of 2.5m

Pressure loss through static head (P loss) = 0.1 bar per metre

Additional pipe work and fittings (RPF) = 1 bar

19th floor with a 100mm riser with an inlet pressure of 10 bars

$$\text{NSH} = 47.5\text{m} = \frac{47.5}{10} = 4.75 \text{ bar loss}$$

$$\text{Inlet pressure to riser } 10 \text{ bars} - 4.75 = 5.25 \text{ bar}$$

$$5.25 - \text{RPF } 1 \text{ bar} = 4.25 \text{ bar}$$

4.25 bar at outlet on 19th floor

18th floor with a 100mm riser with an inlet pressure of 10 bars

$$\text{NSH} = 45\text{m} = \frac{45}{10} = 4.5 \text{ bar loss}$$

$$\text{Inlet pressure to riser } 10 \text{ bars} - 4.5 = 5.5 \text{ bars}$$

$$5.5 - \text{RPF } 1 \text{ bar} = 4.5 \text{ bar}$$

4.5 bar at outlet on 18th floor

It can be seen from the above that using two lengths of 45mm hose (allowing for frictional loss through hose lines) and terminating in a DM600 branch with an inlet pressure of approx 3 bars flowing 300 l/min, an attack can be made on both the 18th and 19th floors. But if three lengths of 45mm hose were required it would become impracticable on either floor.

If the storey heights were assumed to be 3m or 3.5m the outlet pressure on both floors would be less and would make it impracticable to carry out firefighting operations with a riser inlet pressure of 10 bars.

If an attack is to be made from lower floors then other factors need to be brought into account. If a Delta H500-65f were used it would not provide an adequate flow rate at either floor whatever the storey height.

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