

Insights concerning the door entry procedure

A new door entry procedure has been included in the updated firefighters course since 2010. The procedure differs completely from the one that had been taught up to that point. The important difference is that the new door procedure is performed while using a hose line. The underlying message is that you always execute a door entry procedure with a charged up hose line so you can protect yourself against the consequences of fire if necessary.

This article briefly describes the new door entry procedure. A more in depth reading can be found in the firefighters course or in the syllabus "Binnenbrandbestrijding" (see [1]). Also some new insights and considerations will be discussed concerning the door entry procedure.

1 The new door entry procedure

The new door entry procedure is made up of several parts.

1.1 Approaching the door.

The door entry procedure is started the moment the door is noticed by the attack crew. Just as before it's important for the nozzle man to communicate with his colleague. He will relay the fact that he has found a door. Next he will perform a visual inspection on the door. This means he will take a good look at it. He'll look at the circumference for exiting smoke gas (this may or may not be pulsing), glow coming from the bottom, changing coloring, paint coming loose,... It's important to keep in mind here that the door could be a massive wooden door or a fire proof door. In these cases certain signs will be absent. Such a door behaves fundamentally different than a metal door in a fire practice container.



Fig 1.1 Position of the attack crew at a "pushing" door. (Photo: Ronny Bundervoet)



Fig 1.2 Position of the attack crew at a "pulling" door. (Photo: Ronny Bundervoet)

If the room in which the attack crew is seated has a smoke layer, this will present an extra risk. This smoke layer could possibly ignite when opening the door. On top of that, the smoke layer will hide a part of door from sight. Smoke gas exiting at the top of the door may not be visible from beneath the smoke layer. It may even be possible that the top end of the door has been partially burned through.

Next the direction in which the door swings will be determined. This can be done by searching for the hinges. The direction is passed on to the other crew member by naming the door as either a "pulling door" or a "pushing door".

Finally the attack crew assumes a proper position at the door. In case of a "pushing door" the nozzle man takes place at the side of the hinges. The hose man takes place at the door handle (knob). This way the hose man is protected by the wall. The nozzle man is seated in the "line of fire" when the door opens. Then again he has a nozzle for protection. This position also allows him to direct water into the room. It has to be noticed that the position of the nozzle man is the exact opposite of how it was taught before. In the positions of the old procedure it was impossible to get water inside the room. When dealing with a "pulling door" the crew members switch places so that the nozzle man is seated again in the "line of fire".

1.2 The use of water

Especially in the case of smoke exiting at the top or when the room in which the firefighters are located is filled up with smoke, the risk exists for flames to exit upon opening the door. Firefighters need to minimize this risk. This is done by directing two pulses above their heads after which the door is partially opened. To help grease this process, the nozzle man will count out loud. On the count of "ONE" a short pulse is aimed above the head of his colleague. On "TWO", a short pulse above himself. On "THREE" the hose man will open the door for about 30 cm so that the nozzle man can place the nozzle in the room and direct three pulses inward. Afterwards the nozzle is pulled back and the door is closed again.



Fig 1.3 The nozzle man aims a pulse above his colleague ("ONE"), next a pulse above himself ("TWO"), then the door is partially opened ("THREE"). Three pulses are directed into the room after which the door is closed again. (Photo's: Ronny Bundervoet)

While the door is open, the hose man needs to look up to see what's happening at the top of the door. Is a lot of smoke gas exiting? What color is the smoke? Are there any flames exiting? The nozzle man will look into the room while pulsing. Is there a visible

neutral pane? At what height is it located? Can the seat of the fire be seen? Is there a large air track flowing in?

1.3 Communicating

During an interior fire attack it's extremely important for the attack crew to communicate properly. The door entry procedure is no exception to this. After the door has been closed, both crew members will discuss what they have seen.

1.4 Repeating

When necessary, the door entry procedure will be repeated. The door will be opened up once more and water will again be directed into the room. The crew will reassess and discuss the situation again. This procedure is repeated until a safe zone has been created behind the door.

1.5 Entering

At some point the decision to enter will be made. The nozzle man will enter first and will take place out of the direct path of the doorway. He will move forward for about one and a half meters and will wait there for the hose man to join him. His colleague will tap him on the helmet to signal his passing of the door. The nozzle man knows he can now perform a temperature check. This is a single pulse shot straight upwards. The goal of this is to check the heat of the smoke layer above the attack crew. From this position the fire crew can advance towards the seat of the fire with the goal of putting it down. A trend is developing internationally for a third firefighter to be added to the attack crew when dealing with under ventilated fires. This extra crew member can remain at the door to keep it closed as much as possible.

2 Goals of the new door entry procedure.

2.1 Moment of contemplation

Passing a doorway should be a point at which the attack crew asks itself whether it's still safe to advance into the room. Often the answer to this question will be "Yes". Every once and a while, opening up a door will present new information. New information that indicates the fire is much more violent than first presumed. It happens that no external signs are visible at a door, but when opening up a lot of dark and hot smoke is flowing out. If the decision is then made to advance into the room, this new info needs to be relayed to the commanding officer outside.

2.2 Getting water behind the door

In several parts around the world a door entry procedure has been implemented which strongly resembles the one from the Belgian fire fighter course. A common point is that all around the attempt is made to get water behind the door in a controlled way. In Belgium and in other countries, this is done by directing three short pulses into the room. A variation of this method is the use of a single long pulse.

2.3 Allowing as little air as possible

Because the changes in building methods (more insulation, more airtight, ...) more and more fires are underventilated. At such fires the heat release rate is limited by a lack of oxygen. The fire is being controlled by the lack of fresh air. When firefighters open a door leading into the room, smoke will flow out at the top of the door. Fresh air will also be allowed to flow into the room through the bottom (see figure 2.1). The more a door is opened up, the higher the flow rate of air coming in will be.

And the more air is being added, the more the fire will grow. Steve Kerber of Underwriters Laboratories (UL) performed a number of experiments last year in which houses were built in order to set them on fire and examine the effects of ventilation (see [5] and [6]).

These experiments clearly showed that a normal sized door opening is sufficient to allow for ventilation induced flashover to occur rather quickly after opening the door.

The goal of the door entry procedure is to open the door for a very brief period of time. Also the door is opened up for about 20 cm so that enough room is made for the nozzle to be placed into the room. This way only a small amount of fresh air is allowed into the compartment and the fire stays under control.



Fig 2.1 Smoke gas is exiting through the top end of the doorway while the rest of the doorway is being used for the supply of fresh air. This fresh air will allow for a rapid growth of the fire. (Photo: Steve Kerber – Underwriters Laboratories)

3 Considerations/improvements

3.1 Variations

In November 2011 I attended a course with three other Belgian colleagues in Sapjane, Croatia for CFBT instructors from dozens of different countries. While there, we noticed there were small differences in the door entry procedures of different countries. We were able to conclude that a solid door entry procedure contains three important elements: the attack crew observes and is purposely active while performing their tasks, water is being directed into the room behind the door and lastly the air flowing into the room is limited. Any door entry procedure containing these three elements will produce good results. A veteran firefighter will also adapt and modify the procedure slightly to suit the needs of the situation he is in.

3.2 Use of the long pulse

One of the more difficult parts of the current Belgian procedure is the entry of larger or elongated rooms. Our short pulses will only cool smoke that's close to the door. The use

of the long pulse during the door entry procedure will lead to better results in such cases. While executing a long pulse, the cone of the spray will slightly more narrow. An angle of 30-40° is used as reference. The pulse will also be directed a little lower than the short pulse. Finally the nozzle will remain open for a longer period: 2-3 seconds. This method allows for larger volumes of smoke to be cooled and/or to cool smoke that's located further from the door.

3.3 Underventilated vs. Fuel controlled

The door entry procedure contains two parts that are hard to reconcile. It's very difficult to attain information on the situation in the room behind the door, when that door may only be opened for a very short time. It's very important to remember the goal of both actions. The door must not be opened too much in order to avoid air from rushing in. If during the first opening of the door, the nozzle man sees he's probably dealing with a fuelcontrolled fire, there's no need to keep the door as closed as possible. The nozzle man can then decide for the door to be opened up a bit further. That way he will be able to better assess the situation.

3.4 Practice objects

The door entry procedure can be practiced very easily. Most of the fire schools and fire services have practice doors. Figure 1.1 shows a simple model which allows for practice of the basic principles. Building such a practice door is not a difficult job. Every fire service should have one. In an ideal world every firefighter would practice the door entry procedure several times a year. This is best done in combination with a refreshing of the different nozzle techniques.



Fig 3.1 Two firefighters working a practice door simulating the end of a hallway. (Photo: Kurt Vollmacher)

Once the basic principles are known, firefighters can move on to modified practice doors in order to learn how to tackle more difficult situations. The fire service of Ghent has a practice door that simulates the end of a hallway. It forces the fire crew to let go of a drilled procedure and ask themselves things as: "Where will we sit now? How many pulses am I going to give here and in what order? How far does the door have to be opened up?"

By "juggling" these questions, firefighters gain insight into the goals of the door entry procedure and learn to adapt to situations on the spot. They need to perform a door entry procedure which involves thinking and communicating (1), which gets water into the smoke layer behind the door (2) and which allows as little air as possible into the room in the case of an underventilated fire (3).

By using different kinds of practice doors firefighters learn to vary the procedure and adapt to the situation confronting them. For now there haven't been any fire schools or fire services yet that have created a sliding practice door. It would mean a small cost for such a door, but it would allow for yet another situation to be practiced.

When weather permits outside exercises, the space behind the practice door could be marked with marking tape or plastic cones to simulate a room. When performing the door entry procedure, the percentage of floor space covered can then be seen after the three pulses. The effect of shorter versus longer pulses can be studied. The effect of varying the cone angle as well as the angle at which the pulse is given, can be evaluated. By changing the location of the practice door in function of the marked room, it's possible to gain insight into the possibilities of the door entry procedure.

Even more important is that firefighters see clearly that which isn't possible with the door entry procedure. When confronted with large, elongated rooms or rooms in an L shape the smoke in a limited section behind the door will be cooled. That smoke however will quickly be replaced by new, hot smoke flowing outwards. It will be important to start cooling again quickly before starting the advance towards the seat of the fire.

4 Bibliography

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Karel Lambert