Explanation of the research

This research focuses on a nationwide scope of lessons learnt from the ‘Maxum Megastore Brielle’ case. The research was carried out in conjunction with the Institute for Physical Safety of the Fire Service Academy of the Netherlands and the Fire Investigation Team at the Safety Region Rotterdam-Rijnmond. This joint report includes the regional lessons learnt insofar as they are relevant on a national scale. The lessons that were learnt which only apply for the Safety Region Rotterdam-Rijnmond are dealt with separately on a regional scale.

Explanation of the research by the Fire Service Academy

The Fire Service Academy is developing contents for education materials. This is done with assistance from practical experts and by using research literature, amongst other things. Since 2013 incident investigation has also been added as input, in light of which this research has taken place. That means that the research questions, the conclusions and the recommendations should also be seen in that light. So it does not entail a fully comprehensive investigation into the incident like, for example, for investigations with a particular emphasis on ascertaining the truth and the drawing of lessons from the incident that has taken place. This also means that research questions are focused and restricted, and in many cases do not encompass the entire spectrum of the incident and the incident control. Conclusions should sooner be seen as being observations because, in order to draw conclusions in respect of the contents of the education materials to be developed, more input is necessary and more incidents in common practice will have to be analysed. Recommendations serve as a frame of reference for the developers of the contents of the education materials. The determining of the eventual contents of the education materials is subjected to an own validation process, which narrowly involves professional practice.

Explanation of the Rotterdam-Rijnmond research

The Safety Region Rotterdam-Rijnmond conducts research to learn from incidents. This provides information about causes of fire, behaviour of fire, human behaviour during a fire, the operation of fire-prevention facilities and operational actions by its own personnel. The research findings contribute to quality assurance, working safely and it makes up an empirical basis for legislation and regulatory requirements in terms of fire prevention facilities and precautionary measures. The research takes place on the basis of the Fire Investigation Research Programme of the Fire Service of the Netherlands, and the results are captured in the Institute of Physical Safety's national database ‘Learning from incidents’. So nothing in this document can be used to determine liability or to apportion blame in the case of a fire. For this, reference is made to the investigation conducted by police and the insurance company. It is for this reason that nothing from this publication may be copied, stored in an automated data file or made public without prior written consent from the Safety Region

Rotterdam-Rijnmond. The Safety Region Rotterdam-Rijnmond cannot accept any liability for possible damages emanating from this report.

Management summary

In the context of developing contents for education materials for lessons and course materials, the Fire Service Academy conducts research in conjunction with the relevant safety region into instructive fires. The Fire Service Academy and the Fire Investigation Team of the Safety Region Rotterdam-Rijnmond have jointly conducted an investigation into the major fire at the Maxum Megastore in Brielle situated at the industrial area of 't Woud on 11 June 2013. The reasons for this investigation were the circumstances of the fire, which included the rapid fire development in a large fire compartment, the hefty smoke development with a societal impact and the presence of large volumes of synthetic foams. In this investigation the primary focus was the cause of the fire, the behaviour of the fire, the fire preventative condition of the building and the mono-disciplinary behaviour by the fire brigade.

On 11 June 2013 at about quarter to two in the afternoon, a fire broke out at the Maxum Megastore, a furniture store with a warehouse. The premises had been built in 1992 and the two building layers were connected to each other via an indoor stairwell. The premises had a total usable area of 3,665 m². In the granting of a licence, use was made of the Containment of Fire (BvB) method. Here the choice was made for a package of precautionary measures no. 1, also indicated as the ‘burn down scenario’. Hence there were no particular requirements for the supporting structure which relate to escaping safely and a safe repressive behaviour.

The fire originated on the first floor and developed rapidly. After the first fire-fighting unit appeared at the scene it rapidly became clear that, due to the hefty smoke development, it was no longer justified to go inside. On the arrival of the fire brigade at the scene, the Duty Officer informed the units that a ‘burn down scenario’ was applicable for the premises and that nobody was allowed into the building. His provisional plan of approach was then geared towards the precipitation of the smoke in order to limit the nuisance for the surroundings as much as possible. The precipitation of the smoke did not have the desired effect. So the windows were smashed in order to provide the fire with more oxygen so as to create a better burning with less smoke. It could not be avoided that a large part of the industrial area and the city centre of Brielle located behind it, were caught in the thick of the smoke. The downwind high-voltage pylons also had to be protected from the impact of the smoke and soot particles, in order to prevent the ‘breaking down’ of the insulators. Since the police could no longer reach the premises of the surrounding industrial area because of the large volumes of smoke, it was decided to deploy a second platoon to check out and to evacuate the industrial area further. At about 21.30 the fire had passed its peak. So at about 22.00 the signal was given that the fire was under control and the fire brigade that was present, was potentially scaled down. The following morning at about 9.30 deployment was ended.

The research gears itself towards lessons learnt for the fire brigade in terms of addressing risk control (particularly for the containment of fire), the repressive deployment in terms of the observation, assessment and decision-making processes, smoke developments and combating, safety and the relationship between risk control and the repressive deployment. In the search for answers, the history of the development of the fire, and the process of sounding the alarm and escaping was investigated.

Research question 1: Where did the fire originate, what was the cause of the fire and how did the sounding of the alarm and the escaping occur?

From the technical investigation it appeared that the fire must have started on the 1st floor. The cause could not be traced as a result of the structural condition of the premises after the fire.

It apparently concerned a rapid fire development with hefty smoke development. Due to the fire load and the insulation of the premises, the fire was ventilation controlled for a long time. Only after a number of openings were created did the fire become fuel-controlled and could burn out. The fire alarm was sounded by the owner. He and two other people present were able to vacate the premises.

Research question 2: Which lessons can be drawn in view of the risk control, particularly for the containment of fire?

1. The starting points of mirror symmetry could lead to risks of fire spread. The performance requirement of the Buildings Decree can be complied with, while the functional requirement is not complied with. In point of fact, the building is then actually positioned closer to another building than assumed in the calculations.
2. Compliance to the building regulations does not automatically lead to a containable fire in practical terms, also because of the lack of safety margins.
3. The (building)regulations do not keep account of environmental impacts. Hence the calculation method falls short of the repressive reality and an incident could have a major societal impact with greater fire brigade deployment than reckoned in the method. Because of this deficiency, the results of calculations are barely reflective for the required fire brigade deployment to control an actual incident.
4. The starting points and input values of the calculations in practical terms are simply exceeded, because they're difficult to live up to and to check. In cases of a fire this could lead to repressive problems. This is particularly a point of emphasis when the outcome of the calculated values is just below the limit values.

5. The BvB method assumes an unrealistic fire scenario. This could cause a (major) variance between the calculated and the actual duration of the fire and could mean a (serious) environmental impact caused by smoke.
6. The BvB method does not keep sufficient account of an outdoor storage facility or a parking lot. Especially when the required resistance to fire penetration and flash-over is recorded with a ‘sufficient distance’ away, then it is doubtful whether a fire in a building beside a parking lot can be contained with 1 fire engine.

All things considered, it can be concluded that the determining method for the containment of fire is far removed from what happens in reality, which the fire brigade has to deal with in repressive common practice.

Research question 3: Which lessons can be drawn for the repressive deployment in terms of observation, assessment and decision-making, smoke control and safety?

1. The package of precautionary measures no. 1 does not necessarily lead to a defensive outdoor deployment. On the basis of what the fire fighters observe at the scene they could deviate from this under the strict condition that the risks are kept to a minimum for the deployed personnel.
2. For the fire brigade there are currently no effective methods available for smoke control. The method of precipitating smoke with water does not give the desired effect.
3. Attention is necessary for safety risks in supplying oxygen to develop a fire. This concerns both the risks taken during the smashing of windows as well as the utilisation of a shovel operator without breathing air.

Research question 4: Which lessons are there in the relationship between risk control and repressive deployment?

1. Experiences have been gained with the availability of preventative information in the repressive phase. Brief, actually applicable preventative information can support repressive supervisors with preventative knowledge during the deployment.
2. There are big differences between the theoretical starting points of regulations and the practical situation during a fire. That is why the fire brigade at the scene is faced with problems which were not foreseen beforehand or were envisaged otherwise.
3. There is a difference between the results of the theoretical calculation of the risks for the high-voltage cables beforehand, and the estimation by TenneT and the fire brigade during the fire as regards the hazardous threat of the high-voltage cables. It cannot be determined whether these are or were actually a risk, although it was actually a focal point in the deployment.
4. Assumed public, managerial and internal pressure led to the carrying out of actions which have no other function but to create a positive conceptualisation.

In summarizing, it can be stated that in this case analysis, there were major differences between the starting points for the risk control (in the preventative phase) and the actual situation during the fire (in the repressive phase). It would be a good idea to base the starting points for risk control on realistic fire situations. In addition, it was noted that improvements are necessary in the supply of information about the choices and consequences correlated with the package of precautionary measures no. 1, both between the licence applicant and (future) users on the one hand, and alternatively between the building plan appraisers/maintainers and the repressive service from the fire brigade.

Further, it is noted that the combating of smoke pollution in this case, was a focal point for the deployment. It would be wise to include the knowledge about non-effective methods in the lessons and course materials and in the professional development courses, and to undertake further research into methods of effective smoke control. It would also be a good idea if the fire brigade could take a critical look at the current actions which are meant to influence the conceptualisation. In this the focus could lie on the assumed and actual effects of such actions and possible alternatives in the form of communications.