

Explanation of the research by the Safety Region of Utrecht

The fire brigade scaled up to an 'extremely vigorous fire', the crisis organisation scaled up to GRIP 2. In conformity with the evaluation policy¹ GRIP incidents are routinely reviewed to identify any lessons to be learned with which the multidisciplinary crisis organisation's input can be improved in the combating at future incidents. In an initial analysis of the multidisciplinary actions, various possible lessons to be learned came to the fore, which were examined in more detail in this assessment study, on commission for the director of Risk & Crisis Control. This evaluation is geared towards the multidisciplinary input from the moment of the public reporting system (Dutch acronym is OMS) notification to the scaling down to GRIP 0.

Explanation of the research by the Fire Service Academy

For the purposes of content development of lessons and course materials, the Fire Service Academy has been able to undertake studies into educational fires with its own resources and in cooperation with the relevant safety region since 2013. This investigation has taken place in view of this aspect. That means that the research questions, the conclusions and the recommendations must also be seen in that light. Conclusions should sooner be seen as being observations because, in order to draw conclusions in respect of the contents of the education material 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 material. The determining of the eventual contents of the education material is subjected to an own validation process, which narrowly involves professional practice.

The fire brigade deployment in IJsselstein provides interesting lessons to be learned in the fields of smoke control, input strategies according to the doctrine of the fire brigade, risk management and safe repressive action, which can also be used by the safety region in terms of the fire brigade deployment.

Explanation of the research by the Fire Investigation Team (TBO)

The main purpose of the fire investigation is to draw lessons from fires. This boils down to the finding of the cause of the fire, the identifying of the behaviour of the fire, the determining of the effectiveness of fire preventative facilities and learning about the combating of fires. These findings put the fire brigade in a position to engage in fire safety activities, to learn about fire fighting and to encourage expertise in the field of fire behaviour.

¹Set down in the DT (management team?) of 17 July 2013, implementation as from 1 January 2014.

Management Summary Evaluation Report. Extremely vigorous fire GRIP 2, Zomerdijk IJsselstein, 22 June 2013

The focus of this evaluation report is the fire that occurred in the multi-tenanted business premises at 11 Zomerdijk in IJsselstein on 22 June 2013.

Various parties participated in this investigation:

- Safety Region of Utrecht (Dutch acronym is VRU). The region wants to learn about the multidisciplinary aspects of the crisis control and of the risk management, as well as the taking of safe repressive action. It's for this reason that the VRU have initiated an investigation and have asked the research groups of Fire Sciences and the department of Fire Prevention at the IFV (Fire Service Academy) to participate in part of the investigation in the context of education material content.
- The Fire Investigation Team (Dutch acronym is TBO) of the Safety Region Gooi & Vechtstreek and Safety Region Flevoland. The TBO was asked to conduct an investigation into the cause of the fire, the behaviour of the fire and the influence of preventative and repressive measures on the behaviour of the fire.

The investigations by the VRU, the Fire Service Academy and the TBO are consolidated in this single evaluation report. The VRU has geared itself towards the multidisciplinary aspects of the crisis control and the IFV and the fire investigation team have concentrated on the mono-disciplinary aspects of the fire brigade.

1. Purpose of the evaluation

The purpose of the evaluation is to identify lessons to be learned and to detail these into recommendations which can improve the multidisciplinary input of the crisis organisation and the prevention of future incidents (fire squad deployment).

2. Description of the incident

On Saturday 22 June 2013 at about 09:20 hours the Regional Alarm Centre received a warning that there was a fire at the gym situated along Zomerdijk in IJsselstein. The gym was housed in business premises that accommodated approximately sixteen tenants. The building was built in 1975, and major renovations had taken place in 1987 and 1993 in which an extra floor was built on top of the existing building. In conformity with the station order table, the fire alarm was signalled in the first instance to the IJsselstein fire station. On arrival of the first fire engines at the scene, the staff from the gym said that the fire was at the meter box of the sauna. At the meter box nothing was observed, but on the thermal imaging camera, spots were visible above the ceiling at the sauna. On opening up the ceiling, there was indeed a fire, which was extinguished immediately. When the deployed squad wanted to go to the floor above the sauna room, they walked straight into a wall of smoke. Soon thereafter action was upscaled to a 'moderately vigorous' fire ranking.

In order to combat the fire, a 'highly vigorous' fire ranking was ascertained at 12:42 hours, immediately followed by an 'extremely vigorous' fire ranking. The thatched-roof fire-fighting squads from Werkhoven and Kamerik, also known as the 'thatcher squads' were also alerted. The consideration by the Duty Officer (OVD) to alert these 'thatchers' was because they would be able to approach and extinguish a fire in the interconnecting floor area with their *fognails*.

Shortly after the outbreak of the fire the mayor was informed. At about 13:30 hours the crisis organisation was upscaled to GRIP 1 (coordinated regional incident prevention procedure), after which the CoPI (incident place command) met with each other eighteen times during the afternoon and evening. Despite the municipal processes of communications and relief facilities already having been started up, the mayor wanted to assemble the (core) municipal policy team (GBT). At 17:43 hours the crisis organisation upscaled to GRIP 2, because of the persistent smoke and the effect region.

During the incident, the dilemma whether to evacuate or not, continuously played a role amongst the squads. In the course of the evening it was decided not to evacuate the residential suburb, but to maintain the previously given advice to keep 'windows and doors closed'. At the beginning of the evening, around 19:00 hours, the 'all clear' signal was given. Bringing the fire under control lasted until the next morning. After midnight, at around 00:55 hours, the crisis organisation scaled down to GRIP 1 because there was no effect region anymore. However, it was decided to maintain the status GRIP 1

due to the possible developments in the DIY store situated in the multi-tenanted business premises: at about 00:00 hours it was known that there were still bottles of turpentine and turpentine-based paint stored at the DIY on the ground floor. Based on this information, the Duty Officer had a soil dam constructed to prevent a spread of the fire as a consequence of any pool fire, and as a preventive precautionary measure, a foam-extinguisher vehicle was alerted. At 03:32 hours, when there were no further risks at the DIY store anymore, a further down-scaling to GRIP 0 followed.

3. Conclusions of evaluative research by the VRU

The key question for the evaluation of the multidisciplinary aspects of the crisis control is: **What lessons can be learned in the field of multidisciplinary crisis control from the development of the fire along Zomerdijk in IJsselstein?**

3.1. Did the scaling-up to GRIP 1 and GRIP 2 comply with the pre-determined criteria and what considerations were taken into account?

The criteria for upscaling to GRIP 1 and GRIP 2 were complied with in accordance with the GRIP regulations. The decision-making about the GRIP upscaling took place at the proper level and was taken by the right experts. The mayor launched a number of processes and assembled a (core)GBT before upscaling to GRIP 2. In retrospect it can be stated that various of the crisis control processes of the columns should sooner have had attention paid to, which would have sooner qualified for an upscaling to GRIP 1 and GRIP 2. It is further concluded that communications about the scaling up and scaling down, as well as which squads were active, probably didn't run very smoothly.

3.2. In what way did the coordination happen within the CoPI, the ROT and the (core)GBT, as well as amongst the CoPI, the ROT and the (core)GBT relative to each other? What were the dilemmas and questions within the teams and how was this dealt with?

In respect of both the CoPI and the ROT (regional operational team) it can be concluded that the conceptualization as well as the coordination amongst each other, was not perceived unambiguously. It is therefore absolutely essential for all team members to realise that information is not interpreted in the same way by all the team members.

3.3. In what way did the harmonisation and coordination regarding the processes of evacuation, relief facilities, safeguarding & securing and crisis communications occur?

There were lengthy discussions amongst the GBT members about the contents and method of delivery of the letter to the residents. Within the GBT attention was paid to operational issues which could have been dealt with within the ROT.

3.4. How did the relief of (fire squad)units occur and what consequences did this have for the residual coverage?

In respect of the relief it can be concluded that this was not tackled in a structured manner, but they mostly waited until the squads or officials had asked to be relieved or that colleagues had offered to take over from them.

3.5. In what way did it come about within the teams to have a clear picture available of the course of the incident, and in what way can that, if needed, be improved for a future incident?

All teams have a properly operating National Crisis Management System (LCMS) at their disposal, but within the teams an inadequate amount of attention was paid to the method of input into the LCMS. This led to confusion about the status of the information. Hence there was not a clear picture within the teams in respect of the development of the fire, the quantity of paint, turpentine and the presence of fireworks, but neither of the status and progress of deployed actions and decisions amongst the various teams. The moment that information is retracted or revised and this is not communicated (sufficiently), the conceptualization worsens.

3.6. In what way did the squads pay attention to their (own) safety and safe repressive action? See conclusion 4.4. What lessons are there to be learned by the fire squad in respect of safe repressive action?

3.7. Reporting, warning and the turnout

Technically the warning occurred in conformity with procedures. However, there was a lack of clarity about the method of informing the ambulance dispatch centre (MKA) from within the common incident room and about the warning of the 2nd Advisor on Hazardous Substances (Dutch acronym is

AGS)/MPL from the Regional Alarm Centre (RAC). This lack of clarity did not lead to major issues, but the confusion and delay that arose could have been avoided.

3.8. Crisis communication

Finally, for the fire in IJsselstein it was investigated whether the communications process had accomplished providing clear and reliable information to the involved citizens about the fire, the measures to combat the fire and about action prospects. From the evaluation it appears that extensive crisis communications took place. The operational spokesperson twittered a great deal. In spite of this it is concluded that the advice to stay away from the smoke was inadequately communicated, not only to the residents but also to the own personnel.

4. Conclusions of the evaluative research by the Fire Service Academy

The key question for the investigation by the Fire Service Academy is: **What lessons can the fire brigade learn as a result of the fire that occurred along Zomerdijk in IJsselstein on 22 June 2013 pertaining to smoke control, deployment strategies according to the doctrine of the fire brigade, risk management and safe repressive action?**

4.1. To what extent did the smoke development have an impact on the environment, were measures taken to contain the smoke dissipation, and what was the effect of those measures?

In the first few hours of combating the fire the smoke development was still relatively contained. After the smoke development became more intense, an AGS had the measuring crew from the Warning and Reconnaissance Services (Dutch acronym is WVD) carry out measurements in the residential suburb. At various places in the suburb an increased concentration of carbon monoxide was discovered, the presence of increased concentrations of other combustion products was not ascertained. As far as is known the smoke did not lead to severe health problems for the neighbours other than itchiness to the eyes and throat. The measuring crew's secondary aim of importance was to allay the fears of the residents. In this a concession was made for their own safety (not to carry breathing apparatus) in order to 'reassure' the neighbours. The fact that the measuring results, other than an increased concentration of CO didn't show any further disconcerting values, does not mean that the situation is safe. For the enhancement of a plume rise it was decided after 14:00 hours not to spray water unduly onto the fire and not to 'precipitate' the smoke cloud with a screen of water. This decision seems to be a contradiction to the fact that the sprinkler was only switched off at 17:00 hours.

4.2. What lessons can the fire brigade learn in view of repressive deployment strategies from the doctrine of the fire brigade, and which dilemmas played a role in this?

The tactics used by the fire brigade for the deployment can be entered into the quadrant model. In addition, for the deployment of the fire squad a couple of dilemmas came to the fore. The dilemmas are:

- With the actions that were rapidly started up – being an indoor deployment in the form of demolishing, extinguishing and ventilating – was there enough room to consider the merits of possible alternatives? Was there enough insight into the dangers of the indoor deployment for the deployed squad?
- For every deployment of the fire brigade with access to standard equipment, the chance of a contained fire development is very remote for an inaccessible and atypical fire. Although the long-term and varied indoor deployment, in a positive sense, can be considered as decisive, tenacious and inventive, it is questionable whether this risky indoor deployment is in proportion to the realistic deployment options at that point in time.
- The strategy followed is not explicitly mentioned and communicated. This has led to an obscure and therefore potentially dangerous situation.
- Various indications that evidenced a long-term and extensive fire were observed, but not interpreted as such. In psychological terms it is generally known that people are more inclined from a 'confirmation tendency' to pay more attention to information that confirms the theory and hence allow themselves to be influenced by this.
- Despite the indoor deployment being obstructed by the water from the activated sprinklers, there was a lengthy hesitation to switch off the sprinkler. The dilemma confirms the notion that for the repressive service on a national level, more knowledge is needed about the presence and operation of fire preventative measures.
- For the repressive deployment, account was kept of the risk of fireworks being present or not, and repressive measures were taken in response to the commotion surrounding the unknown

extent of the storage of turpentine bottles and turpentine-based paints. In hindsight, these time-consuming precautionary measures are not in proportion to the expected risk.

4.3. What lessons can the fire brigade learn in view of risk management, and to what extent have the preventative facilities had an effect on the fire development and the repressive action?

In view of the risk management and as regards the impact of preventative facilities, the lessons to be learned are shown below:

- At these premises a schedule of requirements (Dutch acronym is PvE) and the subsequent certification was carried out by the same inspectorate. In the Netherlands a large number of existing premises have been certified pursuant to the same system. That is why the safety regions would have to pay more attention to such risks.
- At this particular fire the seat of the fire was situated in the upper floor above the sprinklers. Within the current regulations (construction and sprinkler regulations) such a fire cannot always be prevented.
- Due to the connection between the existing part and the 'newly' built part being a problem, a lot more attention would have to be paid to this in the process of granting a permit for such connections.

4.4. What lessons are there to be learned by the fire brigade in respect of safe repressive action?

As for the safe repressive action, the lessons to be learned are:

- Despite the extent of the fire and the exact location of the seat of the fire being unknown, as well as there being indications of a highly advanced fire, the squads made an extreme effort to be able to extinguish the fire. The urge to extinguish the fire has (in retrospect) led to a risky indoor deployment.
- Insufficient attention was paid to the relief process: squads and individuals themselves had requested to be relieved and the actual take-over sometimes meant waiting a long time. In view of 'safe repressive action' this is undesirable.
- Some people used more than two respiratory cylinders (self-contained breathing apparatus). In view of safe repressive action (heat build-up in this case) relief is recommended after two respiratory cylinders.
- At a complicated and complex fire in which many different squads are deployed, the proper sharing of crucial information is of vital importance. This happened to an insufficient degree at different times.
- The fact that the OVD of the Fire Brigade had to be available for the consultations with the CoPI, as well as for the commanding officers to which he was responsible, caused a major dilemma for him: this is a problem nationwide. Various safety regions have therefore adapted their upscaling procedures to such an extent that, on deployment of a CoPI, there will always be a Duty Officer available in the field.

5. Conclusions of the TBO evaluative research

5.1. What was the cause of the fire?

The fire probably came about in the light wall construction in the men's changing room of the gym, as a result of brazing activities on the piping. The men's changing room was near the sauna on the first floor. Then the fire spread further via the timber upper floor.

5.2. What was the behaviour of the fire?

When the fire brigade arrived it looked like it concerned a starting fire, because detection of the fire was signalled by a sprinkler and the fire squad arrived at the scene quickly. At the beginning of the afternoon it was observed that the fire raged across a large part of the interconnecting area. From the investigation into the cause of the fire it appeared afterwards that on arrival of the fire brigade, the fire had already spread for 17 hours in the interconnecting area of the upper floor.

5.3. What influence did the operational action by the fire squad have on the behaviour of the fire?

After holes had been sawn in the floor to get a view of the seats of the fire and to be able to extinguish these, the fire was fuelled at those places. Afterwards it appeared that the fire, at that point in time, had already spread across the entire floor construction. Because the sprinkler continued its operation

long after the choice was made for a defensive external combating, the fire was partially cooled until the sprinkler was switched off. Hence the fire could not develop itself from a smouldering fire to a fully developed fire. It's for this reason that the repressive fire squad action possibly lasted longer.

5.4. Have the fire preventative facilities been effective and what was their influence on the behaviour of the fire?

From an interview with a staff member from the prevention department it appeared that the premises complied with the requirements as stipulated in the building permit. The constructional situation in combination with the sprinkler system, however, did not have the envisaged effect. The activated sprinkler system has, most conceivably, hardly had any influence on the fire development. The top end of the upper floor where the fire raged, was implemented for 60-minutes fire-resistance. At the initial fire squad deployment, holes were made in the constituted floor construction for the extinguishing activities. This also caused more oxygen to be introduced at the seat of the fire, whereby the fire could develop itself further.