



THE DUTCH
SAFETY BOARD



Fire at Chemie-Pack Moerdijk

FIRE AT CHEMIE-PACK MOERDIJK

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The aim in the Netherlands is to reduce the risk of accidents and incidents as much as possible. If accidents or near-accidents nevertheless occur, a thorough investigation into the causes of the problem, irrespective of who is to blame for it, may help to prevent similar problems from occurring in the future. It is important to ensure that the investigation is carried out independently from the parties involved. This is why the Dutch Safety Board itself selects the issues it wishes to investigate, mindful of citizens' position of dependence with respect to public authorities and businesses. In some cases, the Dutch Safety Board is required by law to conduct an investigation.

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* Due to involvement in his capacity as director of the COT Institute for Safety and Crisis Management, professor E.R. Muller, board member of the Dutch Safety Board, has decided, pursuant to Section 15(2) opening words and (c) of the Dutch Safety Board Act, not to participate in the discussion of the investigation into the fire at Chemie-Pack.

This report is published in Dutch and English. In the event of any discrepancy between these versions, the Dutch text shall prevail.

CONSIDERATION

1. Introduction

On Wednesday, 5 January 2011, a fire broke out at approximately two thirty in the afternoon while employees were working on a pump at Chemie-Pack in Moerdijk. The fire at the pump spread quickly on the property, where plastic intermediate bulk containers (IBC's) melted and the contents caught fire. The fire intensified within a very short period of time and spread quickly to the storage warehouses. The fire caused a large cloud of smoke that moved over the Hollands Diep water towards the Hoeksche Waard and Dordrecht. The residents in some areas in that region were warned of the fire and advised to stay inside and close their windows and doors. The fire fighters decided to allow the fire to burn out on its own under controlled conditions. At approximately eleven o'clock in the evening, they started to extinguish the fire with foam. Just after midnight, the fire brigade reported that the fire had been contained and was under control.

The fire did not cause any injuries or deaths. In the days after the fire, health services received 545 reports of health complaints.¹ There was significant material damage – besides Chemie-Pack, the company located next door also went up in flames – and environmental pollution. The area surrounding the fire zone was subjected to severe pollution. The damage to the environment resulted in high costs, but in the end, there were no damaging effects on the food and water supply. In retrospect, the fire did not possess the characteristics of a national disaster or crisis.

The fire caused unrest among the public and was headline news for many days. There was a lot of consternation, even at the Dutch government level, which resulted in a number of different initiatives. Members of Parliament asked questions and government officials announced new measures. The Minister of Infrastructure and the Environment decided to conduct an investigation into the safety conditions at high-risk companies in the Netherlands. The Minister of Security and Justice announced a review of the division of roles between the national and regional parties when it comes to handling large-scale incidents like this.

The Dutch Safety Board has researched the facts, causes and circumstances related to the fire.² Furthermore, the Board has also conducted an investigation into the crisis communications. The investigation focused on the communications piece because it became evident during the event that communications were difficult. The Safety Board focuses on the lessons that can be learned from this event. Other matters, such as who was at fault and who can be held liable do not form a part of this investigation in any way.

The Board was not the only institution to conduct an investigation into this event. Upon the request of the Lower House, the government commissioned a number of different government inspectorates to investigate elements of the fire in Moerdijk and the safety of high-risk companies in other parts of the Netherlands. This involved investigations by the VROM Inspectorate, the Public Order and Safety Inspectorate and the Labour Inspectorate.³ Assessments were also being performed at the local and regional levels. Furthermore, the Public Prosecutor has instigated a criminal investigation.

1 GGD West-Brabant and GGD Zuid-Holland Zuid, *Rapportage actieve registratie meldingen van bezorgdheid en gezondheidsklachten na de brand bij Chemie-Pack te Moerdijk (Report on active registration)*, April 2011. See appendix 9 (not translated).

2 The Dutch Safety Board is required to investigate this fire in accordance with article 8 of the Dutch Safety Board Decree.

3 The national inspectorates have new names as of 1 January 2012 due to merging services together. The VROM Inspectorate and the Transport and Public Works Inspectorate now form the Human Environment and Transport Inspectorate. The Public Order and Safety Inspectorate and the Sanctions Inspectorate now form the Security and Justice Inspectorate. The Labour Inspectorate, the Social Intelligence and Investigation Service, and the Work and Income Inspectorate now form the SZW Inspectorate. The new Food and Consumer Product Safety Authority is now called the Dutch Consumer and Product Safety Authority. This report uses the old names because it refers to the period prior to 2012.

The investigations have led to meaningful insights and the Board has done its best to bundle these insights in this report, which it has referenced for its own investigation where appropriate.⁴

Nevertheless, we must ascertain that the high number of investigations has led to questions regarding organisation and coherence of the investigations that were instigated by the government. The Board reiterates here its origin. The Board's origin lies in the desirability to safeguard that this type of investigations are orderly, efficient and complete.

2. The company and legislation⁵

Chemie-Pack, a company that has declared bankruptcy in the meantime, was a company with approximately fifty employees. They processed and stored chemicals. Business activities consisted of mixing, distributing and packaging powders and liquids. Chemie-Pack did not actually produce any chemicals. The company began operations in the agricultural sector with the packaging of food and pesticides in the fifties in Valkenburg (South Holland). During the seventies, the company started to process chemicals. Also in the seventies, environmental legislation went into effect that required companies to obtain a permit for working with hazardous materials. In 1982 Chemie-Pack Nederland B.V. was founded and the company established operations in the industrial estate of Moerdijk.

1982 is also the year that the first European directive was approved to prevent serious industrial accidents and to limit the consequences involved for people and the environment. This directive was put into place following a serious accident at a chemical plant near the Italian town of Seveso, where a lot of dioxin was released into the environment. Over the past thirty years the government has established that companies working with hazardous materials have had to comply with increasingly stricter safety and environment-friendly requirements.

In 1999, the BRZO Decree governing the risks of serious accidents went into effect. The BRZO is the Dutch implementation of EU laws concerning work safety, environmental safety and disaster prevention. The purpose of the BRZO legislation is to provide structure to the job of regulating all relevant safety elements related to high-risk companies. Furthermore, the BRZO Decree calls upon companies to take overall responsibility and to justify this responsibility. More than four hundred companies in the Netherlands, from complex refineries to simple storage companies, are affected by this decree. The BRZO Decree has been implemented in the Netherlands for the purpose of consistency, and has to be enforced by a number of different, existing supervisory institutions and within the existing division of responsibilities.

For Chemie-Pack the BRZO meant that it had to take the necessary measures, including the implementation of a safety management system. In other words, the company had to map out the safety risks beforehand and come up with a plan of how they were going to limit these risks. In the legal system, "taking responsibility" is a central theme: companies must prevent undesirable events; and if such an event does occur, they must manage the event as effectively as possible and limit the effects.

Permit

Environmental permits for high-risk companies are issued by the municipality or province, depending on the type and quantity of hazardous materials the company works with. At the time of the fire, Chemie-Pack held a valid permit that was issued by the municipality of Moerdijk in January 2009. The process leading up to the permit being issued lasted no less than six years. The fact that this process took six years was due to the company's incessant procrastination, their requests for extensions, which were granted, and the incomplete information they provided. The municipality played along and saw no reason to urge the company to take action more quickly.

4 Section 8 of this consideration provides a summary of measures and investigations after the fire.

5 This section is based on our own investigation and on: VROM Inspectie, *Chemie-Pack Moerdijk. Feitenrelaas inzake de vergunningsituatie en het toezicht, March 2011.*

The permit process began in 2003 when the municipality of Moerdijk ascertained, upon inspection, that the lay out of the company had changed so much that the existing permit no longer covered all its activities and therefore was not up to date. The municipality requested Chemie-Pack to apply for a new permit by 1 October 2003 at the latest, which would reflect the company's situation at that time. The analysis by the VROM Inspectorate shows the details of how this process evolved.⁶ The municipality was slow and too accommodating according to the Board.

Monitoring and enforcement

The duties and responsibilities associated with monitoring and enforcement at high-risk companies are not in one place, except for the role of authority. The municipalities are increasingly outsourcing the tasks of monitoring and enforcement to specialised services, where expertise is bundled, and this leads to more independence in enforcement. Chemie-Pack was monitored by a Regional Environmental Service on behalf of the municipality of Moerdijk, the Major Hazard Control department of the National Labour Inspectorate, and the local fire brigade. These parties together form the BRZO inspection team.

The people in charge of enforcement identified many violations of the safety regulations over the past years, as evidenced by the investigation conducted by the VROM Inspectorate. The company corrected the deficiencies that were observed upon being pressured to do so. For a long time, the pattern of violations – and the fact that the solutions were often not structural in nature – still did not make these organisations think that the company had inadequate risk management measures in place, or that more stringent enforcement was required.⁷ All inspections at Chemie-Pack were announced beforehand. If an inspection did not fit in the company's schedule, a new appointment was made. This inspection method made it possible for Chemie-Pack to simply not work on any jobs on inspection days that were not in compliance with the provisions of the permit. It took until the spring of 2010 before the BRZO inspection team realised that the problems at the company were more serious. One inspection report shows that there is too much disparity between the company's actual activities and what was written in the documents.⁸ The inspection team referred to it as a "paper tiger", which meant that the safety plans had little or nothing to do with reality. After that, things settled down again and a follow-up inspection was agreed for the spring of 2011.

The Board has the impression that there was absolutely no sense of urgency and that the government organisations responsible for inspections worked slowly and were much too accommodating. The Board believes that a more varied inspection pattern, including unannounced inspections, would have projected a much more realistic image of the actual situation at the company. As evidenced here, the approach of always announcing inspection visits beforehand, gave the company the "wrong type of freedom." An important lesson to be learned from the fire in Moerdijk is that – independent of a company's own sense of responsibility – monitoring must include unannounced company inspections in order to really find out whether a company's safety policy is more than just a piece of paper.

The Dutch Safety Board has found that the municipality, the inspection services and the business sector have started to work intensively on measures, studies and action plans since the fire.⁹ Two months after the fire, the VROM Inspectorate reported that there are many more companies where major deficiencies exist in safety.¹⁰ It surprised the Board that this could be determined so quickly after the event, since it was unknown prior to the event that there were significant safety issues in this sector.

6 VROM Inspectie, *Chemie-Pack Moerdijk. Feitenrelaas inzake de vergunningsituatie en het toezicht*, March 2011.

7 The municipality of Moerdijk had imposed nine penalties on Chemie-Pack during the 2002 – 2010 period and actually collected a total of Eur 13,000.

8 The BRZO 1999 inspection report, Chemie-Pack Nederland B.V. Moerdijk, inspection date 22 March 2010. Final report, 19 April 2010.

9 See the summary in section 8.

10 VROM Inspectorate, *Quickscan BRZO*, 27 February 2011.

3. The fire on 5 January 2011

Wednesday, 5 January 2011 was a partly cloudy winter day with a maximum temperature of 3 to 4°C. People at Chemie-Pack were working on a number of different projects that day, both inside the buildings and outside on the yard where too much working stock was stored. Approximately 250 IBC's were estimated to have been on the property that afternoon, along with fifty 200 litre steel drums. The content consisted of flammable materials such as xylene, hydrocarbon H and 2-EHN. The latter substance in particular, which is used to improve the combustion of diesel, is extremely dangerous. 2-EHN spontaneously combusts at a temperature of 130°C, and is especially susceptible to explosion when heated. It also emits poisonous gases during combustion.

How the fire started

The fire started outside on the yard, while resin was being pumped from a IBC into another IBC . However, due to safety risks, liquids were not permitted to be pumped from one container into another on the property. The reason being, there was no equipment available on the property to manage a incident, such as leaks or fire.

There were no problems while pumping at first, but due to the cold weather conditions, the pump's exhaust silencer began to freeze up after a short period of time, whereby the resin no longer flowed out of the pump. After consulting with a supervisor, an employee thawed the exhaust silencer with a gas burner. This method was often used because the equipment would freeze every winter. The use of a gas burner was against the company's own rules and against the permit regulations. This was a big risk due to the direct proximity to flammable xylene – which was used to clean the pump – in the collection tray under the pump. According to the environmental permit Chemie-Pack was not permitted to work with open flames, except in the smoking area, and in the area where packaged products are shrink-wrapped.

Once the resin stopped flowing again, the employee consulted with colleagues and the supervisor, after which it was decided to heat the middle of the pump with the gas burner. This resulted in flammable xylene catching fire in the collection tray under the pump. The employee immediately picked up the fire extinguisher that was hanging next to the tank, but forgot to switch off the pump and the tank equipment with the emergency stop switch. He also did not activate the alarm. A colleague saw the fire starting to burn and alerted the receptionist via the intercom and also tried to put out the fire with a fire extinguisher. The receptionist immediately alerted the supervisor, the company's emergency response team and the fire brigade by calling 112. It was 2:26 pm at the time.

The employees' first attempts to extinguish the fire failed because the powder extinguisher did not work. The other attempts mainly failed due to the continuous flow of burning resin. The resin continued to flow because the pump and the tank equipment had not been switched off. It has also been determined that another employee sprayed a forceful stream of water into the fire, with the opposite effect: burning resin and xylene were sprayed away, which caused the fire to spread.

Chemie-Pack did not have a company fire fighting unit – this was also not obligatory in the past. In 2008, the municipality of Moerdijk decided that all high-risk companies in the municipality had to have a company fire fighting unit. This was implemented in phases. Chemie-Pack was part of the second phase that received notification in September 2010. The company had until February 2011 to submit a response to the municipal notification.

Intensification of the fire

Immediately after the fire started, the connector broke off between the pump that was still active and the discharge pipe to the tank equipment. This probably happened because the resin in the discharge pipe cooled down, thickened up and formed a plug. The pressure from the compressed air also increased to force throughput. This increased the pressure inside the discharge pipe so much that it broke a joint in the connector between the pump and the discharge pipe. This caused resin to leak, which was ignited by the burning xylene. The closest IBC's became so hot from the burning resin that was coming out that the plastic inner walls melted within one minute, after which the flammable contents of these IBC's flowed directly into the fire, resulting in a pool fire that was quickly increasing in size.

The fire developed so quickly and forcefully that fire extinguishers were not of much help. The employees of Chemie-Pack could not do anything except to leave the scene and move to safety. The fire spread to other parts of the property and to the surrounding storage warehouses where many more containers of hazardous materials were located, many of them stacked five or six containers high.

Vulnerability of plastic containers

The Dutch Safety Board paid particular attention to the vulnerability of IBC's – so-called IBC's¹¹ – in part based on British research.¹² IBC's are commonly used for storing and transporting liquids, but it is not common knowledge that they are extremely vulnerable in the event of a fire. A plastic IBC that is subjected to fire will succumb within one to ten minutes, after which the contents will flow out of the container. This is due to the polyethylene, the type of plastic the containers are made of. This plastic is very resistant to chemicals, but not to high temperatures; it becomes soft and loses its shape at temperatures exceeding 70°C and it melts at a temperature of 105 to 130°C.

The amount of time it takes a IBC to succumb to fire not only depends on how hot the fire is, but also on how thick the walls are, the type of polyethylene used, and the liquids that are in the container. A low viscosity liquid with good heat conduction and high specific heat, like water, will absorb the heat from the wall and remove it more easily, whereby the wall will remain intact for a longer period of time. However, a syrupy liquid with poor heat conduction and low specific heat, will cause the local temperature of the IBC to increase quickly and the wall will disintegrate, with possible serious consequences if the contents are flammable.

Chemie-Pack's safety approach

Management and employees of Chemie-Pack appeared to have little risk management processes in place, which was evidenced by the following points:

- Performing prohibited work: storing hazardous materials on the property, working with an open fire, not cleaning up flammable xylene
- The manner in which the employees reacted to the fire proves that there was insufficient training to respond correctly: they forgot to switch off the pump and the initial response to the fire did not put out the fire, rather it contributed to further spreading
- Chemie-Pack did not take any safety precautions to manage the dangers of fire and explosion with xylene during cleaning. The tank equipment as a whole was not suitable for holding materials susceptible to explosion because it had not been made explosion proof and it had not been earthed. The pump had also not been earthed. Furthermore, the containers of xylene, the pump and the tank equipment were not located in a (temporarily) enclosed area. The purpose of an enclosure is to alert everyone to the fact that people are working with hazardous materials.

The management of Chemie-Pack received support for different aspects of their safety policy from external advisors. In 2005 the company asked a consultancy firm to assess the fire safety of the tank storage and the liquids room. The advice to substantially reduce the number of containers under the roof (from twenty containers to three) due to a fire hazard, was not adopted. Another advisory report from 2008 advised the company to implement additional fire control measures, such as installing foam fire extinguishing equipment under the cover. The report also pointed out that there was insufficient water and water pressure and that the connectors for the extinguishing system were not easily accessible. There was also no follow-up to this advice.

11 IBC (intermediate bulk container): a cube shaped container made of plastic in a steel frame, for the storage and transport of liquids or powder. The standard content is one cubic meter (1000 litres).

12 Health and Safety Executive: the British regulator for health and safety. See section 2.3 of the report (section 2.3 is not translated).

4. Fire fighting services by regional fire brigade¹³

The Public Order and Safety Inspectorate has conducted an investigation into fire fighting services in Moerdijk. Nine minutes after sounding the alarm, the first fire truck arrived from the Middle and West Brabant Safety Region, followed by six tanker trucks and a foam extinguishing vehicle 8 minutes later. The officer on duty determined that the big pool fire on the property could not be controlled by the equipment on the scene. This was reported to the emergency control centre. In anticipation of additional equipment, immediate measures were taken to prevent the fire from spreading to the storage warehouses and surrounding companies. A tanker truck was also connected to Chemie-Pack's foam extinguishing equipment. Under the direction of a Chemie-Pack employee, the fire fighters also began to cool down an ocean container of highly flammable isopropylalcohol on the property.

Since this was a big fire that involved hazardous materials, the fire fighters decided it would be better to maintain the incineration process so that the hazardous materials could burn as completely as possible and the smoke would rise up high in the atmosphere. With this "controlled fire" the water for extinguishing the fire was only used to cool down objects in the area. At approximately 10:00 pm when the intensity of the fire started to diminish, the fire fighters decided to extinguish the fire with foam. Personnel and equipment had to be readied for this process. Extinguishing fires with foam is not without risk. The centre of combustion will cool down whereby the incineration will be less complete. This can cause a temporary, significant increase in the emission of hazardous materials and smoke. Thus, it was important to first warn all residents in the direct area and in areas that were in the smoke's path. All ships on the Hollands Diep and all rail and road traffic in the area had to be halted. It took about one hour to implement these precautionary measures. At 11:00 pm, fire fighters started spraying with foam and just after midnight they gave the sign that the fire was under control. The inspection report shows that the company could not be saved very soon after fire fighters arrived on the scene.

The Dutch Public Order and Safety Inspectorate finds that there are deficiencies in management and in the capability of the safety region to draw up a current and complete picture of the incident. The inspectorate further concludes that the fire brigade used more water to extinguish the fire than was necessary.

5. Measurements

There were explosions and heavy smoke associated with the fire, which resulted in unrest among the public. To inform the public and social workers about the situation and the necessary safety measures, it was essential to collect information immediately concerning the presence and the risk of hazardous materials. The regional fire brigade also used the materials list provided by Chemie-Pack.

Measurements: Who did what?

The Safety Board has mapped out which parties took air, water and soil measurements during the fire.

- The fire brigade in the two safety regions – Middle and West Brabant, and Zuid-Holland Zuid, measured air quality with "gas measurement tubes" during the fire, which showed the results immediately. The fire brigade's measurement team took air samples and measured the four toxic materials that were most probably released: carbon monoxide, sulphur dioxide, hydrochloric acid gas and nitrous oxide, near the site of the fire, at the Hollands Diep and at a number of locations in the Zuid-Holland Zuid region. None of the measuring tubes changed colour; therefore, the fire brigade concluded that the results of the measurements had not exceeded the applicable limits.

13 This section is based on: Public Order and Safety Inspectorate, *Brand Chemie-Pack Moerdijk, de bestrijding van de effecten van het grootschalig incident*, August 2011.

- The Environmental Incident Service of the National Institute for Public Health and the Environment (RIVM) has more advanced measuring equipment available, which they used to take air measurements and measurements of fallen soot particles on the day of the fire and the days following the fire. The purpose of these measurements is to measure the consequences to health.
- A differentiation can be made between measurements that produce immediate results and measurements that require further analysis in the laboratory. For example, it takes approximately one week to determine the concentration of dioxins. The results of the RIVM investigation show that the air, vegetation, playground equipment, outdoor furniture and other, similar items were hardly contaminated by the fire and the risk assessment shows that this contamination had no adverse effect on health or food safety. The RIVM Environmental Incident Service took grass samples on the day of the fire and the days thereafter. Measurement of one of the grass samples showed extremely high levels of lead and another sample showed an elevated level of dioxin. Other measurements did not show any elevated levels of materials.¹⁴
- After the fire, the *nVWA* – new Dutch Food and Consumer Product Safety Authority (under the responsibility of the Ministry of Economic Affairs, Agriculture and Innovation) took samples of vegetables and animal-based products in the affected area up to ten kilometres from the location of the fire. Based on these measurements, the *nVWA* advised at the end of January that agricultural products from this area were safe for consumption.
- The Brabantse Delta Water Regulatory Authority tested the surface water near the location of the fire. These tests showed that the ditches surrounding the property were seriously polluted. The water regulatory authority discussed the information with operations management of the Midden and West Brabant Safety Region, who decided not to publish the results yet because the interpretation of the results was not yet available, which could lead to unnecessary unrest. On 7 January, the NOS published these test results. The NOS referred to cancer causing agents and had a toxicologist speak about the results. This person stated that the amounts released were “alarming”.
- The NOS also had a few soil samples tested in the area to the north of Moerdijk. On 28 January, the NOS came out with the news that highly concentrated aluminium compounds had been found in the soil.¹⁵
- Lastly, the water companies Evides and Watermet took samples of the surface water at the location of the fire and from the drinking water reservoirs. The sampled surface waters did not contain any contaminants related to the fire, except for one reservoir to the north of Dordrecht.

Neither of the two safety regions had control over collecting the measurement data that were necessary for communications with the public.

Interpreting the measurement data

The multitude of organisations that were involved in measurement and testing, resulted in the availability of a lot of test and measurement results and analysis data. In order to prevent the government from issuing conflicting recommendations, a central office was established – the so-called Policy Support Team for Environmental Issues (BOT-mi) – where test and measurement results and recommendations from the different specialised organisations, including the RIVM, are collected and combined into a coherent recommendation.¹⁶

Despite this central office, confusion and obscurity ensued.

14 Lead: On 5 January 2011 extremely high levels of lead were measured at one site. Measurements taken the next day did not show such high levels. According to the RIVM, this was extreme and is not typical. Dioxin: at one site in the area the measured levels of dioxin were found to be above normal. This measurement was performed on grass samples taken right after the fire. Measurements a week later did not show any substantial increase in the levels in the grass (this means: above the standard levels during the winter). When considering all the measurement data collected, it is not clear to the RIVM whether or not the measured dioxin levels were related to the fire.

15 The RIVM indicates in its response to the NOS that it doubts whether there is a correlation between the measurement data found and the fire. The fact that aluminium compounds were found at a depth of 30 to 50 centimetres actually indicates that the substance had already been in the ground a while, since marine clay slowly washes it down. Besides, the measured values are not abnormal for marine clay according to the RIVM.

16 The BOT-mi operates under the Ministry of Infrastructure and the Environment (‘system responsibility’) and prepares recommendations from a technical expertise point of view (and not from a management / legal perspective) of measures to be taken by emergency services. BOT-mi recommendations are not binding; the competent authority retains the responsibility for making decisions in terms of managing an accident or disaster and for communications to the public.

Neither of the safety regions was in control of the BOT-mi reporting process. Despite the cooperation agreements between the safety regions and the BOT-mi as well as their authoritative powers according to the Dutch Safety Regions Act, the Bot-mi (operations) management was interpreted differently by the safety regions, the national parties and the BOT-mi itself. The result was that it was not clear to the BOT-mi whom they should report to, when measurement and testing results were going to be ready and who was going to interpret the data. The two safety regions expected to receive recommendations from the BOT-mi much quicker than the BOT-mi was able to provide them. Specialised measurements and accurate analysis in a laboratory take time. The regions also expected the BOT-mi to provide specific action guidelines (*what does this mean for you?*), but that turned out not to be the case. The safety regions did not give themselves enough time to interpret the information and to translate the information into specific recommendations for the public due to the press conferences the regions had planned.¹⁷ This resulted in information being released before it had been sufficiently studied and interpreted. The effect of this was that external experts and the media started to interpret the measurement and testing data themselves, whereby the government no longer had any influence on the news being presented to the public (also see section 7 regarding crisis communications). There was also a lack of proper, formal agreements between the experts, who could interpret the test and measurement data, and the authoritative powers, which were in charge of communicating the information to the public.

The Board finds that not only the safety regions, but also the National Crisis Centre had set their hopes too high of what they could expect from the measurements and tests and how long it would take to obtain the results. The analysis of the Chemie-Pack materials list performed by the RIVM was conducted differently and not as quickly as the National Crisis Centre expected. The materials list was fifty pages long. Each time the National Crisis Centre contacted the RIVM regarding the nature and the danger of the materials, the time the report would become available had been moved back.

6. Scaling up the authority

The Dutch Safety Regions Act establishes that “authoritative power” lies with the mayor of the municipality where the disaster or crisis takes place. The mayor is tasked with emergency and crisis management. He must also ensure that the public receives information about the source, the scope and the consequences of the disaster or crisis, as well as the course of action to be taken. If a disaster or crisis reaches beyond the local level, the responsibility then goes to the head of the safety region.

Since a large plume of smoke rose from Moerdijk and spread towards Zuid-Holland, and possibly further, it quickly became clear that the fire was more than just a local incident. It also meant that the central government’s official involvement had to be “scaled up” to the safety region of Midden and West-Brabant (chairman: the mayor of Breda¹⁸), the source area, and the safety region of Zuid-Holland Zuid (chairman: the mayor of Dordrecht), the area where the effects of the incident are present.¹⁹

This incident was handled differently. The incident had already been scaled up to the highest level (GRIP4) in Zuid-Holland Zuid at approximately 3:43 pm, while Midden- and West-Brabant did not scale up to the same level until approximately 7:30 pm, after being pressured to do so by a number of different parties.²⁰ Therefore, this process was not synchronous for almost four hours. The municipality of Moerdijk was not easily accessible, which caused problems in coordinating crisis management efforts and internal and external communications.

17 The safety regions have in-house expertise in this area in the person of a hazardous materials health advisor.

18 The mayor of Tilburg is officially the chairman of the Midden- and West-Brabant Safety Region; however, he was on holiday so the mayor of Breda assumed this task.

19 In the end, nine safety regions in six provinces as well as a number of national parties were involved in the fire.

20 The upgrade process in the Netherlands has four levels, which are designated as GRIP1 through GRIP4. See section 3.2 of this report for more details. (section 3.2 is not translated)

The Safety Board notes with the Public Order and Safety Inspectorate that scaling up the event to GRIP4 was justified, not only because of the size of the fire but also due to the increasing need for coordination between operations and management levels, the national image of how the country deals with the incident and the media attention. When the event was not scaled up at first, this resulted in unnecessary confusion and discussion, both at the Midden- and West-Brabant Safety Region and between the safety regions involved. The municipality of Moerdijk and the safety region of Midden- and West-Brabant did not act in accordance with the seriousness of the events on the 5th of January. Even though better coordination between the safety regions in terms of scaling up this incident would not have led to better results in fighting the fire according to the inspectorate, the investigation conducted by the Board proves that the non-synchronous timing of scaling up the incident did have consequences for the (inter) governmental coordination of communications with the media about the consequences of the fire and the safety risks for the public.

That afternoon, the national government was already becoming more and more involved in the case, as if it were responsible for crisis management. The national government was also involved due to its responsibility for special services. These special services come together in the above mentioned BOT-mi that serves to support the local/regional responsibilities.

This national involvement also led to mixed communications, which resulted in confusion in terms of duties, procedures and information flows inside the districts and municipalities.

The Safety Board finds a lack of role consistency visible at all levels of the government: it took Midden- and West-Brabant too long to begin the upgrade scale up process, while the national government interfered in the processes in different ways even though this was not a national disaster or crisis. All in all, there was a lot of "governmental pressure" that took the focus away from the actual work, which was to get the fire under control and to communicate with the public.

The Board notes that a "government whirlwind" was ignited soon after the fire began, and that the government was not sensitive to the fact that the two safety regions were actually supposed to be in charge. The municipality of Moerdijk and numerous government services operated with the best of intentions, but got in the way of the regions several times. The Board also found that the Safety Regions Act does not specify how the safety regions are supposed to coordinate their activities with one another if an incident spreads beyond the region's boundaries, but does not constitute a national disaster or crisis.

The fire in Moerdijk forms a reason to study in more detail how to determine where the boundaries lie between the national and the regional level. This particularly relates to the organisation of crisis communications and the involvement of the national advisory and measurement services such as the BOT-mi and the environmental incident services.

There were two safety regions and multiple municipalities involved in the crisis response. Even though this was not a national disaster or crisis, the national parties also played a large role in this incident. The collaboration and cooperation among the parties involved was hindered by the lack of knowledge of the assignment of duties and authoritative powers, such as determined in the new Safety Regions Act, and due to a lack of role consistency for performing these duties.

Furthermore, the job of measurement and testing by the specialised service teams is organised differently than the job of responding to a crisis. The services involved in this incident fall under different ministries, depending on their area of attention related to system responsibility. This also made it difficult for the safety regions to manage the incident and it affected the clarity and timeliness of communications (see section 7).

All in all, the Safety Regions Act is obscure about the following points in situations that do not involve a national disaster or crisis:

- The action plan and management cooperation in the event of incidents that involve more than one region
- The duties and authoritative powers of the different government ministries
- The operations management of national advisory bodies and measurement services

The Board believes that a possible implementation of a so-called GRIP5 with national governance and involvement will not solve the above issues. With or without GRIP5, it will first have to be clarified how the different parties at the local, regional and national levels are to work together from each party's level of involvement and responsibility.

This is reason enough to look into the announced, independent evaluation of the Dutch Safety Regions Act as soon as possible.

7. Crisis communications

In the event of a large fire at a chemical company, the government cannot limit itself to just putting out the fire. The public, emergency response teams and companies need information about the nature and the size of the fire, and the effects on health of the substances that have been released into the environment. The government must first gather the relevant data (for example by measuring hazardous materials) and then it must interpret these data: what do the measurement results mean to the area population and to the emergency response teams? Both aspects were discussed in section 5. The third step is to communicate the interpreted information to the public. The Safety Board has analysed these "crisis communications" and reconstructed the media reports.²¹ The Board concludes that there were a number of bottlenecks in terms of the methods used for organising communications and determining the content of the communications (the "message").

Process: Who is in charge of communications?

The Dutch Safety Regions Act states that the mayor who has the authoritative power is the one responsible for crisis communications. Nevertheless, there was confusion about who was in charge of communications to the public. Different government departments – municipalities, the fire brigade, the Dutch water authority, safety regions, the new Dutch Food and Consumer Product Safety Authority – all published information independently from one another without any common line. This prevented clear, easy to understand and timely communications. The area public received different pieces of information from different "government bodies". These pieces of information were not in line with one another and some contained conflicting information. The parties were also taken by surprise by the communications published by others. For example, the new Dutch Food and Consumer Product Safety Authority issued an advisory to put farm animals inside and to not consume kale and Brussels sprouts, without consulting with the safety region.

Organising communications and information was also a problem for the national government. The first press conference given by the mayor of Moerdijk came as a surprise to a number of other parties involved. The director of National Security and the head of the National Crisis Centre requested the regions not to issue their own press releases, or in any case to consult with the National Crisis Centre before doing so.

Both of the safety regions that were officially responsible for crisis communications did not have control over communications due to a number of factors. There was insufficient coordination between the regions: the process of scaling up the incident did not proceed simultaneously and there was no common strategy in the communications to the public. Furthermore, the regions had no control over the interference of other government organisations who each published their recommendations and measurement results. As a result: the management commotion as to who was supposed to be managing became apparent to everyone.

21 See chapter 3 of the report (not translated).

Message

The Safety Board has come up with three observations concerning the messages that have been communicated. The first involves the crisis communications during the acute phase that was characterised by a strong, internal focus: the government informed the public about the information it had available at that time. The message did not meet the public's needs: specific information about what happened and what it means for the people. The measurement data had not undergone sufficient interpretation, which meant that the media provided their own interpretation of the data and the government no longer had control. Note that most of the information the government issued was not incorrect, but was interpreted differently by the media, which caused confusion.

Secondly, the crisis organisation did not succeed in its attempt to properly explain the consequences of the fire and smoke and why the risks were limited. The main message from the government ("no dangerous levels of hazardous materials have been measured") was understood to mean "there is no danger".

The message issued by the mayor of Moerdijk was reported incorrectly by several media. According to some media, the mayor said that "no hazardous materials were released". However, it is obvious that hazardous materials are released with this type of fire. The point is to see the concentrations of these hazardous materials in combination with exposure to them. This message was not communicated well.

Thirdly, little information about the process was given. Not enough attention was given to the strategy of allowing the fire to burn out on its own under controlled conditions, and the public was not given any explanation about the fact that it takes approximately one week to determine the dioxin concentration in the deposition samples.

Communication about incidents involving hazardous materials

The Board sees that crisis communications about incidents involving hazardous materials often leads to problems. According to the Board, this is due to a number of different characteristics of these types of incidents. First of all, there is a fire, and a lot of smoke, which can be seen from far away. Therefore, many citizens and the media are wondering what is going on. Secondly, the smoke is spreading through the air over a relatively large area; therefore, this forms an apparent risk for many people. Thirdly, the risks for citizens and emergency response teams resulting from the release of hazardous materials are not clear for them. Research shows that there are factors that increase the severity of the risk, such as unfamiliarity with the risk, their own control over the risk and their own assessment of the severity of the threat. This makes people worry more, which results in their need for more information. Measurements can provide them with an explanation as to whether or not the smoke is actually dangerous. However, it always takes time to obtain the results of these measurements and this is a challenge for the government to inform the public appropriately even though the results are not yet available.

Communications related to fire involving hazardous materials often neglect the fact that smoke is always dangerous and that it is always appropriate to advise the public to stay away from the smoke.

The next important element is whether people will also be exposed to dangerous levels of concentration from this smoke. The closer the person is to the smoke, the more likely this will be true.²² Therefore, it amazes the Safety Board that almost all the press releases issued by the government states that no hazardous materials had been released during the fire, while what they should have said was that the amount of materials released during the fire does not form a health hazard for the public. This seems like a minor nuance, however, this commonly used standard sentence "no hazardous materials have been released" raised a lot of suspicion surrounding the fire in Moerdijk.

22 Research by toxicologist and environmental expert Greven (April 2011) shows that emergency responders are more harmed by the effects of smoke inhalation than was previously thought.

Dual role of regional broadcasters

During the fire in Moerdijk, it became obvious that the two roles of the regional broadcasters – the emergency broadcasting station for the government versus the independent duty of the media – can be at odds with one another. As an emergency broadcasting station, regional broadcasters have a specific responsibility to act as the voice of the government. During the fire in Moerdijk, Omroep Brabant and RTV Rijnmond were the designated emergency broadcasting stations on the air.²³ Furthermore, the broadcasting stations maintained their role as an independent news station. During the fire in Moerdijk, it was unclear which role Omroep Brabant was playing. The media reporting by both stations did not always match the government reports that were communicated via the same station. The Safety Board is of the opinion that the public cannot be expected to be aware of both the roles the regional broadcasters play. The Safety Board wonders whether the role of emergency broadcast station can be combined with the freedom of information.

The Safety Board has determined that the public hardly knows that regional broadcasting stations fulfil a double role during an incident. In campaigns (including *Denk Vooruit* – Think Ahead) and protocols from the government, the public is normally referred to the emergency broadcasting station for more information about an incident and about what actions they should take: “Listen to the emergency broadcast station and follow the instructions” and “If the alarm sounds, the radio will assume the role of the official emergency broadcasting station”. There is no mention anywhere that regional broadcasters also serve as a news broadcaster at the same time.

This standard message can evoke the idea among the public that regional broadcasters are the channel to listen to or watch during a crisis for more information from the government. At the same time, research shows that only six percent of the persons surveyed knows that the government provides information about a disaster via the regional broadcasting station.²⁴

Role of the media²⁵

The news from the government to the public was generally accurate, but did not have the desired effect. Government has not been the only entity to publish communications during an incident for years. Government and private media both play a role in crisis communications.

The government has no guarantee that the message will be interpreted as intended. Private citizens and the media gather facts and opinions from many sources, and government communications is only one of these sources. Therefore, the government only has a limited influence on the type of information private citizens and the media read and listen to, how they use that information and the effect the information has on them. On top of that, the media landscape has changed drastically these past few years. New technologies have sparked a situation in which all types of information from any source can be accessed at any time. Everything that takes place in public can be put on the internet immediately, where everyone has access to it. Private citizens are not only news consumers, they have also become news producers thanks to the technologies available to them, such as mobile phones with cameras, YouTube and Twitter.

Also after the fire in Moerdijk, private citizens were actively communicating with one another. The first news about the fire appeared on Twitter, only shortly after the fire was reported to the alarm centre. One hour later, at approximately 3:30 pm, more than 2500 tweets had been sent in about the fire. A few citizens set up the Fire Alarm Centre of Moerdijk on the internet where people could log their complaints related to the reports and news published about the fire in Moerdijk. On 17 March, the initiator presented the report “*Alarm een ramp*” – (alarm a disaster) to the Public Order and Safety Inspectorate.²⁶

23 The municipality of Moerdijk states that it did not request Omroep Brabant to fulfil the role of emergency broadcast station. Omroep Brabant states that the municipality did request it to fulfil the role of emergency

24 Ministry of and Kingdom Relations, *Onderzoek beeldvorming crisiscommunicatiemiddelen*, December 2010.

25 Section 3.3 reconstructs the media reports about the fire in Moerdijk (not translated).

26 Appendix 8 provides a summary of the report. (not translated)

In this complex world, the government is only one of the many players. It will have to attempt to ensure that its own message is received well and to correct inaccurate reports in the media where necessary. Nevertheless, the Safety Board found that actual incorrect reports in the media were not rectified, not by the government nor by other media.

The Safety Board is of the opinion that communications resources (including the emergency broadcasting station) must be kept up to date during a crisis, considering the new technologies available and knowing how citizens search for information. The resources the government can currently employ are diverse and there are increasingly more resources available that can be used to communicate with citizens at a more personal level. Consider social media, the internet, text message alerts and an NL alert.²⁷ Besides resources, there are also other types of media that the authorities can use. A lot of people watch the (additional) news broadcasts of the NOS and RTL4.

Website accessibility

Another factor that affected crisis communications was that the parties involved did not make enough use of websites and information lines. The municipality of Moerdijk asked the National Crisis Centre to activate the crisis.nl website and the national information number 0800-1351 at 4:45 pm.

This national number is then transferred to the municipality, who must ensure that there are people to handle the calls. However, the municipality had little capacity and not enough information available to answer questions. People who called in had to listen to a recorded message. One hour later, the crisis.nl website was available, but it encountered technical difficulties later in the evening. Due to human error, the crisis.nl website was transferred to the incorrect address. The crisis.nl website did not go "on the air" until 7:45 pm. Since crisis.nl was not working, the public turned to the websites of the municipality of Moerdijk and the disaster broadcast stations. However, these websites are not set up for high volumes of visitors. Therefore, they became difficult to access.

8. After the fire: reports and actions²⁸

An incident like this fire immediately becomes a subject of public debate in our society. There is an enormous need for knowledge about what happened, how it could happen and how it can be prevented in the future. The Safety Board believes this is a part of a standard and desirable process that will continue to be discussed in detail in the political field. Questions will be asked in connection with the responsibilities of the parties involved in the incident when it began and ended. It is understandable that the incident led to a series of comments from the public and some that are political in nature. In this section, we will list the main comments for the sake of providing complete information.

First political responses

On 12 January 2011, the Minister of Public Health, the Minister of Security and Justice and the state secretary of Infrastructure and the Environment provide a response to the fire in a letter addressed to the Lower House.²⁹ As requested by the House, the letter contains the actions that have been taken as a result of the fire. Actions refer to the short term and long term health risks and the effects on the environment, the crisis communications, and the responsibilities of the ministries involved. The letter also discusses the investigations that will take place. The letter refers to the fire in Moerdijk as a "disaster". The letter also discusses the results of the BOT-mi recommendations regarding the effects on health that were available at that time. The investigation by the Dutch Safety Board will also be announced as it relates to the other investigations.

27 NL-Alert is a warning service and alarm service of the government for mobile telephones.

28 These opinions, conclusions and recommendations were not formed by the Safety Board, but by the organisation involved unless specified otherwise.

29 Lower House, business year 2010–2011, 26 956, No. 75.

On 22 February 2011, the Minister of Security and Justice wrote a letter to the Lower House in which he commits to present a proposal before the summer of 2011 to reinforce the management role of the national government in the event of a (threatening) crisis.³⁰ In any case, this will be explored for crisis communications, the actions to be undertaken by the national operations services and the incident upgrade process.

8.1 Regulation and monitoring of high-risk companies: reports and actions

While investigating the fire, the Safety Board reviewed the reports and the actions to be taken by the parties involved. Here below is a brief summary of these statements and others.

Monitoring services by the municipality of Moerdijk

On 15 February 2011 the DCMR environment service pays a friendly visit to the municipality of Moerdijk. The purpose of the visit was not to see if there were any shortcomings, but to provide recommendations for improvement. The DCMR determined that the municipality of Moerdijk fulfilled the national requirements in terms of its monitoring services, but that enforcement was mainly aimed at the official aspects.

One of the areas for improvement for municipal oversight is to improve the culture of maintaining safety at companies. As a result of this recommendation, the municipality of Moerdijk decided to perform more inspections and unannounced inspections.

Reports from the VROM Inspectorate

In 2010 the VROM Inspectorate had investigated a few environmental services that monitor companies that are subject to the BRZO Decree (Decree governing the serious risk of accidents). This investigation also involved the Regional Environment Service that monitored Chemie-Pack on behalf of the municipality of Moerdijk. The inspectorate determined that there were no issues.

On 27 February 2011, the VROM Inspectorate publishes the summary of the so-called "BRZO quick scan".³¹ It evaluates safety assurance by BRZO companies based on their score obtained during their last inspection. Out of the 387 available inspection reports from the 416 BRZO companies in total, 25 companies score poorly for the implementation of their safety policy. Chemie-Pack is not one of these 25 companies.

On 4 March 2011, the VROM Inspectorate publishes a series of facts about the permit and monitoring activities at Chemie-Pack. See section 2 of this consideration.

30 Lower House, business year 2010–2011, 30 821, No. 12.

31 VROM Inspectorate, Quickscan BRZO, 27 February 2011. Investigation in response to a motion filed by Member of Parliament Van Tongeren, which contains a request to conduct a quick scan into the safety conditions at companies in the same danger category as Chemie-Pack. Report based on inspection results from 2009 and 2010.

The VROM Inspectorate and the Public Order and Safety Inspectorate conduct a second investigation into the safety conditions at the Dutch BRZO companies on 30 June 2011, random survey 2011. This investigation shows that the 27 companies investigated had one or more deficiencies during the 2009 – 2010 period. Deficiencies included an out-of-date emergency plan, incomplete identification of risks, the lack of a maintenance management system and the lack of a procedure for analysing accidents and near-accidents. These facts led the inspectorates to the conclusion that the corresponding companies have not sufficiently mapped out the safety risks or they have insufficient control of these risks. The investigation also shows that enforcement information about high-risk companies is not available in the central BRZO database. Therefore, the capability does not exist to quickly present a current, national picture of compliance by and enforcement at these companies. Furthermore, the report shows that the safety regions do not have disaster recovery plans for all companies. There are also no specific risk and risk communications plans for high-risk companies and during the implementation phase of the Safety Regions Act, the safety regions are working with the existing general plans instead.

In June 2011 the VROM Inspectorate has determined in a different report that the environmental permits of 14% of the 338 companies that store hazardous materials do not contain the correct regulations.³² Enforcement cannot be upheld if the regulations are not correct. There are 146 companies that cannot prove that their fire safety equipment has been approved. Furthermore, the VROM Inspectorate intervened in the municipalities and provinces where the enforcement process for 146 high-risk companies has not yet been completed. The VROM Inspectorate is monitoring the municipalities and provinces for ensuring the deficiencies at these companies are handled.

Temporary permit advice

As a result of a motion filed by Member of Parliament Ouwehand, the state secretary of Infrastructure and the Environment conducted a study to gain an understanding of the advantages and disadvantages of issuing temporary permits for high-risk companies.³³ The study concludes that, based on existing laws, a temporary permit can hardly play a role in enforcing permit compliance. In order to improve compliance activities, it would be more obvious to focus on improving the implementation of monitoring and enforcement powers in the field.

Reforming monitoring activities of high-risk companies

The government's responsibility for enforcing the environment and safety laws has been the subject of discussion for quite some time now. The main topic of this discussion was and is about ensuring the presence of the special expertise that is required for responsibly issuing permits and enforcing their provisions. Expertise is not the only subject that requires attention, the independence the government can have to deal with the companies is also an important factor. Companies have been pushing strongly for more cohesion and expertise the past few years. The differentiation between internal safety (work safety) and external safety (surrounding areas) also led to the fact that it was difficult to integrate the different approaches within the Dutch governance relationships.

In 2008, within the context of the introduction of the cohesive-oriented environmental permit, the Mans commission recommended assigning monitoring responsibilities to "environmental services", later referred to as regional enforcement services.³⁴ This would ensure improved cohesion, independence and expertise. In a general meeting in the Lower House on 15 September 2011, the state secretary of Infrastructure and the Environment indicated that he agreed with the pleas made by a few factions for centrally monitoring BRZO companies.³⁵ On 8 December 2011 the state secretary of Infrastructure and the Environment announced in a letter to the Lower House that BRZO company monitoring services will be assigned to specialised regional enforcement services (RUDs) in five days.

32 VROM Inspectorate, *Stand van zaken brandveiligheid bij opslagen van gevaarlijke stoffen*, June 2011.

33 University of Amsterdam, *Regulering van milieugevolgen van bedrijven met een tijdelijke vergunning?*, September 2011.

34 Commission for restructuring enforcement system of VROM regulation (Mans commission), *De tijd is rijp*, July 2008.

35 Lower House, *Verslag van een algemeen overleg*, Business Year 2011-2012, House Minutes 22343 No. 270.

He also announces a separation between the bodies that will issue the permits and the bodies that will enforce the provisions of the permit. The competent authority will remain with the municipalities and provinces.

The Safety Board notes that it is still unclear how the national services that inspect the high-risk companies (such as the SZW Inspectorate, the Major Hazard Control department) will be involved in creating the regional enforcement services. The state secretary will leave further details up to the other areas of government. The state secretary clearly stated the direction, but the details will still have to answer a lot of questions. Considering the urgency of improving the structure of these governmental duties, the Board is not entirely confident without a more explicit description of what exactly is needed, that this development will lead to the desired objective: a limited number of powerful, professional and, in particular, independent services that can adequately perform these high quality duties.

If a new structure is to be successful, it will be of utmost importance to gather all necessary expertise and disciplines into a single organisation. The Board recommends an integral, cohesive approach of the BRZO companies and of their affiliated companies and activities. Furthermore, the Board believes it is important to report on the safety of these companies on an annual basis in a "high-risk company safety report".

Initiative by the chemical industry and VNO/NCW

Branch organisations of the chemical industry and VNO/NCW have come up with ten action items to improve safety in companies that work with hazardous materials.³⁶ The main theme is a "solid safety culture" at the member companies.

The branch organisations in the chemical industry shall:

- Encourage their members to practise good leadership.
- Encourage their members to continuously improve the quality of their safety control systems.
- Explore together with their members what information they are going to collect in order to monitor safety performance at the branch level.
- Ask members to provide this information on an annual basis to their branch organisation.
- Publish safety performance progress aggregated at the branch level each year based on this information.
- Motivate their members to ensure that their employees have the required skills to safely perform their duties.
- Encourage companies to ascribe high value to the subject of safety in Dutch education.
- Encourage their members to join a safety network and to communicate that information to others.
- Reinforce the work of safety networks where possible.
- Motivate their members to ensure that the chain of companies they do business with in the Netherlands has a solid safety culture.

36 VNO-NCW, *Veiligheid voorop*, September 2011.

The Board acknowledges these action items, but raises the question whether these items paint the right picture of the actual safety conditions within the chemical industry in the Netherlands. In the Board's opinion, most chemical companies in the Netherlands strive towards working in an acceptable and safe³⁷ manner and the action items do not involve that part of the industry, except for the monitoring part. The Board is of the opinion that the sector should ask itself the question of how to effectively handle the "stragglers" (both members and non-members of branch organisations) in this business industry, which can potentially harm the reputation of the entire sector, and what agreements would be required.³⁸ The Board subscribes to the desire to come up with a systematic monitoring system and believes that the business sector and the government must work together to make it work. Then, each year the "safety balance sheet" can be drawn up and action can be taken. It is important that monitoring takes place at the company level because the company will have to serve as the beginning point for any interventions.

8.2 Crisis management and communications: reports and actions

During the investigation into crisis management and crisis communications, the Board took note of the reports and actions in this area by the parties involved. Here below is a summary of these other references.

On 15 February 2011 the Rotterdam-Rijnmond Safety Region issues a report about the fire at Chemie-Pack. The report assesses the effectiveness of the warnings given to the public and media, the methods of communication and the scope and quality of the assistance and support provided. The assessment report is limited to the multidisciplinary actions and management within the Rotterdam-Rijnmond region. The report states that it was difficult for the region to gain access to relevant information about the fire because the Midden- and West-Brabant and Zuid-Holland Zuid regions were hard to get a hold of. The report also states that RTV Rijnmond was the emergency broadcast station for two different regions (Rotterdam-Rijnmond and Zuid-Holland Zuid). Therefore, it was sometimes unclear who the target audience was. Furthermore, the region expected more support and information from the Interdepartmental Crisis Management Commission. As a result of this assessment, the region has made agreements with RTV Rijnmond whenever it serves as the emergency broadcast station for two regions. The region is also working on a plan to reinforce communications during inter-regional incidents by deploying "liaisons".

On 24 August 2011, the safety regions of Midden- and West-Brabant and Zuid-Holland Zuid also issue a report as a result of the fire.

The Midden- and West-Brabant region commissioned Crisisplan to study the internal organisation of crisis communications in the region. The report recommends making agreements at an early stage of a crisis regarding the desired level of uniform communications (preferably during the preparation phase) for crises that extend beyond one region. Other lessons for the future relate to the lack of attention for the image projected by the media in the operations team and the policy team, the interpretation of specialised knowledge such as measurement data and communicating this information to the public, and unfamiliarity on the part of the public and the media regarding the role the safety region plays. The study has also determined that there is a lack of role consistency. It was determined that the content of the communications should be geared towards the citizens' perception of their environment.

37 In technical terms: risks should be ALARP, as low as reasonably practicable.

38 Chemie-Pack was not affiliated with a branch organisation.

On 24 August 2011, the Midden- and West-Brabant region issues an administrative accountability report as a result of the fire.³⁹ In this report, the region concludes that not only operations, but also the administrative and social impact of an incident can be of vital importance for grading up an incident within the GRIP structure.

The region states that the method used for scaling up the incident has not led to problems in fighting the fire and collaborating with Zuid-Holland Zuid.

The Zuid-Holland Zuid region commissioned Crisisplan to prepare a summary of the actual crisis communications for this region. The Safety Region Midden- and West-Brabant and the Safety Region Zuid-Holland Zuid also requested Pricewaterhouse Coopers to prepare a summary of the actual decisions made and crisis management at the strategic level.

The Public Order and Safety Inspectorate has conducted a study into the preparations of a large-scale incident such as the one that occurred at Chemie-Pack, the fire brigade and the inter-regional cooperation, and the national involvement.⁴⁰ In its report from the 24th of August, the Inspectorate comes to the conclusion that the municipality of Moerdijk first dropped the ball and later on, the Midden- and West-Brabant Safety Region also dropped the ball in preparing for real risks within their own regions. They did not fulfil their responsibilities as well as they should have. Furthermore, the municipal authorities of Moerdijk came up short in fulfilling their obligation to get their basic fire fighting facilities in order. The Midden- and West-Brabant Safety Region should have assigned a higher priority to fulfilling expected quality levels during preparation – in particular after the agreement they had concluded with the national government.

Lastly, the inspectorate has come to the conclusion that a number of different activities have been developed at the national level, but that there is a lack of direction when it comes to collecting information. This led to unnecessary pressure on the management system at the safety regions involved. The incident in Moerdijk forms a reason for the inspectorate to study in more detail how the duties are communicated between the regional and national level.

The inspectorate has come up with the following recommendations:

To the safety regions:

- Make standard agreements about the information exchange process in the event of incidents that extend beyond the region's borders.
- Make standard agreements about the cooperation and decision making process in such cases. Include the upgrade process here.

To the Minister of Security and Justice:

- Reassess the mutual division of duties and roles between the NCC, the LOCC and the ICCB in terms of collecting information and communicating this to the safety regions.
- Bring the contents of the situation reports by the NCC more in line with the information needs of the safety regions.

To the Minister of Security and Justice and the safety regions:

- Use the report drawn up by the Dutch Safety Board to study the best way to establish a communications process between the regional and national levels.

39 Safety Region Midden- and West-Brabant, *Bestuurlijke verantwoording naar aanleiding van de zeer grote brand op 5 januari 2011 in Moerdijk*, August 2011.

40 Public Order and Safety Inspectorate, *Brand Chemie-Pack Moerdijk, de bestrijding van de effecten van het grootschalig incident, augustus 2011*. Section 4 and 6 of this consideration discuss this report in detail.

The Labour Inspectorate has determined that the emergency services provided during the fire in Moerdijk did not fulfil their duties in accordance with the legislation governing the working environment.⁴¹ This applies to the fire brigade, the police and ambulance service. Firemen and police officers inhaled smoke and chemical fumes. Furthermore, the firemen worked without special chemical-resistant gloves in polluted water. Firemen and police officers were eating and drinking at the site of the fire, some of them without washing their hands beforehand. None of the emergency service personnel paid enough attention to decontaminating clothing or materials. Due to the presence of hazardous materials in the water used for fighting the fire and in the atmosphere surrounding the site of the fire, the Labour Inspectorate considers this to be a serious deficiency.

On 24 August 2011, the Minister of Security and Justice, in part on behalf of Social Affairs, responds to the investigations by the Public Order and Safety Inspectorate.⁴² The Minister indicates that the results of the IOOV investigation are alarming. Despite the fact that the parties involved do not agree with all the conclusions, they will accept the recommendations from the investigations conducted by both inspectorates. The Minister of Security and Justice states further in his policy response that a reassessment will take place of the division of tasks and roles among all the parties involved concerning mutual information exchange and coordination. Together with the Council of Public Safety Regions (the organisational layer above the safety regions) the existing GRIP structure will be reorganised to provide a more standard procedure for safety regions to scale up incidents together. The national government will also have a role in scaling up incidents that extend beyond a single region or in the event of (inter)national impact (GRIP5).

The Midden- and West-Brabant Safety Region and the municipality of Moerdijk took action in a number of areas after the fire. There will be more fire fighters available for the Moerdijk industrial estate; they have started with an accelerated tender for specialised fire fighting materials; and they have made agreements about advice and support with the Rotterdam-Rijnmond Safety Region and the DCMR environmental service. They have also established a plan for multi-disciplinary training and education. According to this plan, an integrated training session will take place each year, which will also include the up scaling and down scaling process. The safety region has also stated that it will improve its cooperation agreements with the bordering safety region, the water authority and the national government, including services such as the RIVM and the new Food and Consumer Product Safety Authority. The region has also stated that it will implement the recommendations provided by Crisisplan. They will also give more attention to the role of the emergency broadcast station, the use of crisis.nl, social media and the quality of necessary communications services and facilities. They will also invest in expertise and in refining processes and protocols of communication.

The municipality of Moerdijk has announced that it will work to improve crisis communications by implementing "media-watching", using social media, the municipal website and services for external parties that will be involved in the crisis.⁴³

9. In conclusion

Crisis management system

Although the fire at Chemie-Pack was headline news for a number of days, it was a relatively limited incident with substantial local damage, but there were no deaths or injuries. The Safety Board notes that a complex structure is put into motion in the Netherlands as soon as a crisis occurs that spreads beyond a single municipality or safety region. The complicated system and the many bodies and people who have a job to do, or who think they have a job to do, make the communications of such an incident vulnerable. The "scaling up" of the incident due to the spreading of the fire did not occur simultaneously by both the safety regions involved.

41 Labour Inspectorate, *Veilig werken door de hulpverleningsdiensten*, 24 August 2011.

42 Lower House, business year 2010–2011, 26 956, No. 110.

43 Board's informational letter from the board of Mayor and Aldermen to the municipal board, August 2011.

The cooperation between the parties was hindered due to a lack of knowledge of the other party's duties and authoritative powers, which are explained in the Safety Regions Act and other documents, and due to inadequate role consistency. There are also insufficient legal and organisational regulations for crises that extend beyond a single region.

Furthermore, both safety regions had no control over the collection of test and measurement data. This can partly be explained by the lack of clarity on the part of the National Crisis Centre and the safety regions about operations management of the (national) measurement services and the Policy Support Team for environmental incidents (BOT-mi) and what can and may be expected from these measurements.

Despite the fact that the fire in Moerdijk was in no way a national disaster or crisis, the national parties played a major role. In fact they stirred things up in a forceful way. Since this was not a national crisis, the national services did not receive any leadership. Therefore they felt free to act on their own, also towards local government. The role of and coordination by the national government during crises that extend beyond the borders of a single region should be made more explicit.

Crisis communications

The complexity of the crisis management structure is also visible in crisis communications during this incident. The described obscurity surrounding the management process of measuring samples, collecting the measurement data and interpreting the results has had direct consequences for crisis communications.

Even though the messages issued by the government were correct, the communications did not match what the public was experiencing. The communications did not do justice to the seriousness of the fire as perceived at that time by the public. Therefore, the news regarding the nature, control and consequences of the fire were perceived to be unclear and even unreliable. This provided room for the public and the media to come up with their own interpretations. It created an image of a failing government that was withholding information.

The Dutch Safety Board concludes that there was a lack of direction in terms of crisis communications and that there was no consistency in the message from the different government bodies. Furthermore, they did not pay enough attention to what the public was feeling and experiencing, and inaccurate information was not corrected. The obscurity surrounding the role of the emergency broadcast station added more problems to an already problematic crisis communications process.

In light of the importance of professional information supply in the event of a disaster or crisis and considering the fact that these types of events are rare, the Board would like to suggest having national expertise in crisis communications on hand to assist the safety regions that have been affected by a crisis or disaster.⁴⁴

Improvements

The Board has determined that many of the parties that were involved in the fire have already announced improvements in cooperation and communications. The solution can often be found in new plans regarding cooperation, and in the coordination and exchange of information. The Safety Board can imagine that the recent experiences can lead to improvements in existing procedures. However, the Board is also wondering how it can prevent insufficient knowledge of all the new plans or how it can ensure that these new plans provide the necessary guidance when the next crisis occurs. It is impossible for leaders, emergency responders and public relations officials to know and remember all the plans, in particular when an incident occurs.

44 The Dutch Safety Board is aware that there was a service in the past, which was the Expertise Centre for Risk and Crisis Communications (ERC). The ERC had been established to provide information about risk and crisis communications to government organisations and services. The Board is aware this service has been dissolved. Furthermore, a National Information Centre (NVC) was established in 2000. The NVC takes action as soon as a crisis becomes a national event and affects multiple departments.

There were a lot of good rules, regulations, handbooks and plans in place at the time of the fire in Moerdijk, but they were not always followed. Besides, the Board is already concerned about the fact that all the different parties have their own plans, rules and agreements, which can lead to problems again the next time the regions have to work with one another. The Board and others (such as the IOOV, the Council of Public Safety Regions and the Nicis Institute) have already noted that solutions in safety are always sought in creating plans that are even more detailed and meticulous, but which are not, or hardly, implemented when a crisis or disaster strikes.

FINAL CONCLUSIONS

SOURCE OF FIRE AND CIRCUMSTANCES OF COMPANY, ISSUING PERMIT AND ENFORCEMENT

The investigation into the fire at Chemie-Pack resulted in the following conclusions.

Direct causes of the fire

1. The fire at Chemie-Pack was caused by people working there with an open fire, which is against the provisions of the permit. The fire was able to escalate because there were many flammable materials on hand and Chemie-Pack could not put out the fire when it first began.
 - a. Upon heating up a cold membrane pump with an open fire, the xylene that was present in the collection tray caught fire and a liquid fire started in the collection tray.
 - b. The pump was not switched off once the fire started.
 - c. The seam in the discharge pipe of the pump broke off after the fire started. The resin came under pressure and was pushed out with nothing to stop its flow. This resin was then ignited by burning xylene.
 - d. The company emergency response team at Chemie-Pack could not put out the fire when it first began.
 - e. The fire was able to spread and it turned into a large, uncontrollable pool fire due to streaming, burning resin, very close to 120 containers filled with flammable liquids, which was against the provisions of the permit.

Underlying causes of the fire

2. It has been determined that the underlying causes of the fire were due to the fact that Chemie-Pack did not exercise adequate risk management procedures.
 - a. Chemie-Pack did not comply with the provisions stated in the permit, with its own policy, or with the procedures. The permit application did not mention storage of containers with flammable liquids on the property, pumping resin on the yard working with open flames or cleaning with xylene.
 - b. The fire was able to escalate because the pump had not been switched off as soon as the fire broke out. It appeared that the employees had not been instructed what to do in the event of serious problems.
 - c. The company's technical and organisational risk management processes did not live up to the levels expected of a BRZO company. For example, Chemie-Pack was lacking systematic, good quality, and above all, reliable equipment management.

The fire escalated because hundreds of IBC's (IBC s) filled with flammable liquids were in prohibited areas. Chemie-Pack did not listen to the warnings issued by the consultant engaged by the company and it did not comply with the recommendations provided by this consultant.

- d. An IBC filled with resin that Chemie-Pack was working with, succumbs to the fire within one to ten minutes, resulting in a pool fire.
- e. The potential dangers of IBC s used in the industry were not managed by Chemie-Pack, despite the fact that the company had been made aware of the dangers. The plastic in the IBC s is very vulnerable in case of a fire. The danger not only applies to flammable liquids, but to all liquids.

Conclusions regarding the government

3. The government conducted an investigation into the permit that was issued and into enforcement in order to find out the underlying reasons for Chemie-Pack's non-compliance with the control measures. The investigation resulted in the following conclusions.

Issued permit

- a. The process of applying for and obtaining the permit from the municipality of Moerdijk that was applicable to Chemie-Pack in January 2011 took six years to complete. The municipality encountered problems at different times with the application, including inadequate information. The municipality of Moerdijk fulfilled its role as the authoritative power in accordance with the regulations and experience of having issued permits to similar types of companies.

The Board sees an attitude that is too accommodating, which involved a lot of time, and that, in the Board's opinion, was not appropriate when dealing with high-risk companies.

Monitoring and enforcement

- b. The violations that have manifested over the years at Chemie-Pack, such as a lack of safety measures, the repetitive patterns, the violation of regulations and problems that are not solved in a structural manner, did not form a reason for the government to believe that Chemie-Pack had poor safety management, and these violations did not lead to a different approach to enforcement. The mentality necessary for effective intervention was simply not present.
- c. BRZO inspections and environmental monitoring activities were announced to Chemie-Pack beforehand, giving Chemie-Pack the opportunity to forego performing any duties that were beyond the scope of the permit.

The Board believes that, considering the on-going series of enforcement activities that were required to keep Chemie-Pack on track, a more complete assessment would have been appropriate. Inspections and monitoring activities did not include any unannounced inspections / assessments to understand the company's true state of affairs.

The Board is of the opinion that enforcement was also slow and too accommodating.

- d. The purpose of the BRZO regulations is to see a company as a unit and to be able to evaluate it more as a whole. However, the organisation of (safety) monitoring of BRZO companies is fractured in the Netherlands. The government has assigned these monitoring duties to different organisations, along with associated partial responsibilities. Even though the supervisory bodies work together, it is difficult to gain and maintain a "complete" understanding of the company due to the fractured organisation.

Conclusions with respect to the government

Even though the fire at Chemie-Pack in Moerdijk was headline news for many days, this was a relatively limited incident, even though there was considerable local damage, but no deaths or injuries. The Safety Board finds that, in the Netherlands, a complex process starts up as soon as a crisis occurs that extends beyond the boundaries of a single municipality or safety region. The complicated system and the many bodies and people who are involved, or think they should be involved in the process make communications about the crisis vulnerable. The Board has come to the following final conclusions in terms of crisis communications related to the fire in Moerdijk:

4. The municipality of Moerdijk and the Midden- and West-Brabant Safety Region, who were responsible successively for crisis communications according to law, did not act in accordance with the seriousness of the events on 5 January (in terms of the number of parties involved, the extensive media attention and the unrest that the fire caused among the public). Even though the regional fire brigade requested backup right away from neighbour regions, the response was not scaled up soon enough. The result was that the crisis organisation was not set up with adequate power.
5. Regions Act made the cooperation among the parties more difficult. Insufficient role consistency also impaired communications clarity and timeliness. This resulted in initial communications being issued independently from one another by the municipality of Moerdijk, the Midden- and West-Brabant and Zuid-Holland Zuid safety regions, the water authority, the National Crisis Centre (at crisis.nl) and the new Food and Consumer Product Safety Authority.

Despite the fact that the Minister of Security and Justice did not scale up the incident to a national crisis, national services still played a major role. There was a lot of governmental commotion, which complicated matters in terms of crisis communications and gathering information about the spread of hazardous materials.

6. With the fire in Moerdijk, the role of the parties at the national level was not clear. These parties included the National Crisis Centre, the Interdepartmental Crisis Management Commission and the Ministry of Security and Justice. Furthermore, they changed their roles as the incident progressed. Initially, they played a facilitative and informational role; later in the day and in the period after the fire, they started moving towards a managing role. This led to confusion among all the parties and they were unclear about how the duties and authoritative powers were assigned. The Board also finds that there is a lack of role consistency with the parties involved.

In order to come up with good input for crisis communications in the event of accidents with hazardous materials, it is essential to gather and interpret information regarding the possible effects on public health. There were problems with both processes during the fire in Moerdijk. Due to the complex structure of the crisis management system, there were many organisations with different ministerial responsibilities that tested and measured samples.

7. Both safety regions had no control over the collection of measurement data by the Environmental Incident Service and the reports of recommendations issued by the Dutch policy support team for environmental incidents (BOT-mi). This information was necessary as input for communicating with the public. Despite the cooperation agreements between the safety regions and the BOT-mi and the authoritative powers resulting from the Safety Regions Act, operations management of the Environmental Incident Service and the BOT-mi were interpreted differently by the safety regions, the national parties and by the BOT-mi itself. Due to this lack of clear (operations) management, the BOT-mi and the two safety regions did not make any agreements about the delivery of advisory statements (to whom and when) and what questions these statements should answer.

8. The safety regions of Zuid-Holland Zuid and Midden- and West Brabant did not provide adequate interpretation of the information that had been gathered about the spread of hazardous materials. Both regions released the information without explaining to the public how this affected them. The effect was that other experts provided their interpretations in the media, thus the government lost its control over the communications.
9. There was a lack of direction with respect to crisis communications concerning the fire in Moerdijk. This was partly due to omissions in the Safety Regions Act. There are no clear stipulations for the following elements in this Act for situations that do not involve a national disaster or crisis:
 - Action plan and authoritative coordination in the event of incidents that extend beyond a single region
 - Duties and authoritative powers of the ministries
 - Operations management of the national advisory bodies and measurement services

The Board notes the following with respect to the content of crisis communications:

10. Even though the information released by the government was generally correct, the message did not match what the public was experiencing at that time. The communications did not do justice to the seriousness of the fire as perceived by the public. Messages about the nature, control and consequences of the fire were perceived as unclear or even as unreliable. This made room for interpretations made by the public and the media. This created an image of a failing government that was withholding information.

Conclusions with respect to the media

The media landscape has changed drastically over the past few years. New technologies have created a communications infrastructure in which each form of information from any location can be distributed at any time. Citizens are not only news consumers, they have also become news producers thanks to the technologies available to them today, such as mobile telephones with camera, YouTube and Twitter. The government has no influence over this development.

11. Incorrect messages in the media were not corrected by the government nor by the media.
12. The regional broadcasting station has a specific responsibility as an emergency broadcasting station during a large-scale incident, disaster or crisis, which is to act as the voice of the government. At the same time, the regional station keeps its role as an independent news broadcaster. It was not clear which role Omroep Brabant was playing when informing the public about the fire in Moerdijk. The public cannot be expected to differentiate between the two roles of the regional broadcasting station.

RECOMMENDATIONS

INDUSTRY

Recommendation to VNO-NCW, the Association for the Dutch Chemical Industry (VNCI) and the Association of Distributors of Chemical Products (VHCP), the Association of the Netherlands Petroleum Industry (VNPI) and the Association of Independent Tank Storage Companies (VOTOB):

1. a. Ensure that the ten points plan that was published in September 2011 is actually implemented, that the companies strive towards continuous improvement, but that also the “weak brothers” (members and non-members) are approached by the sector itself.
- b. Encourage suppliers and customers to set safety requirements of the high-risk companies with whom they do business.

The Board has also determined that the Netherlands is mostly unaware of the important lessons learned in the United Kingdom regarding the vulnerability of IBC’s in the event of a fire.

2. Recommendation to VNO-NCW, the Association of the Netherlands Chemical Industry (VNCI) and the Association of Distributors of Chemical Products (VHCP), the Association of the Netherlands Petroleum Industry (VNPI) and the Association of Independent Tank Storage Companies (VOTOB):

Alert the industry to the vulnerability of IBC’s (so-called IBC s) in the event of fire.

PERMITS, SUPERVISION AND ENFORCEMENT

The fire in Moerdijk has already had a positive effect by creating a sense of urgency to actually monitor and enforce the laws in this sector. The Board emphasizes that in particular in the area of safety in an environment that is strongly influenced by political and economic forces, the people involved in safety monitoring must possess sufficient expertise and independence to do so. Professional, honest and technically sound assessments are required, especially when it comes to enforcing the laws. This is not only important for the government, but also for these companies. They must be able to count on expert and authoritative monitoring services.

Recommendations for the state secretary of Infrastructure and the Environment:

3. Specify in the short term how the national government inspections will be associated with the upcoming regional BRZO services. Ensure that all necessary expertise is placed under an authoritative, single area of responsibility.
4. Specify which criteria the announced assessment of this reorganisation will have to fulfil so that it is completely clear beforehand what the requirements are: What do the regional enforcement services / BRZO have to accomplish to be considered successful?
5. Ensure, together with the industry, that an annual report is generated of the “Safety status of high-risk companies”.

Safety Regions Act

Recommendation for the Minister of Security and Justice:

6. Have the Safety Regions Act assessed by an independent party as soon as possible. Include in the assessment how the authoritative power of the mayor and the chairman of the safety region relates to the following, based on the Safety Regions Act:
 - a. How incidents are handled that spread beyond the borders of a single safety region but that do not have the characteristics of a national crisis or disaster. Take the optimum size of the safety regions into consideration.
 - b. The duties and authoritative powers of the ministries that are involved in the incident.
 - c. Operations management by the national advisory bodies and measurement services like the BOT-mi and the Environmental Incident Service.

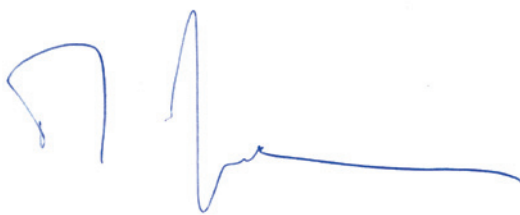
Crisis communications

Recommendation to the Minister of Security and Justice and the Council of Public Safety Regions:

7. Come up with a centralised service so that expertise in crisis communications can be made available immediately to municipalities and safety regions that are confronted with a disaster or crisis. Include the role of the National Crisis Centre and the National Information Centre.

Recommendations for the Council of Public Safety Regions:

8. Ensure that communications regarding a disaster or crisis fulfil the information needs of the public and emergency services personnel. Take into consideration that the public always perceives a chemical fire as a dangerous event.
9. Organise a completely new approach to how and what the government should communicate in the event of a disaster or crisis in this quickly changing media landscape. Include the dual role of regional broadcast stations (independent news station and emergency broadcast station), social media and the methods used by the public to search for information.



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