



## Formal and legal requirements for operators of establishments in the prevention of major industrial accidents

### Formálne a právne požiadavky na operátorov prevádzok pri prevencii závažných priemyselných havárií

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#### Abstract:

*The article presents issues concerning selected elements of major-accident prevention concerning formal and legal requirements for operators of establishments, their location in legal norms in the aspect of the tasks performed in relation to the needs of the society. In this context a review was made of legal acts related to the functioning of the system of preventing major industrial accidents, concerning the requirements for operators of establishments to a high risk of a major industrial accident.*

*Moreover, provisions included in legal regulations were analysed and their meaning in the area of preparing and implementing documentation by an establishment manager concerning preventing the possibility of a major industrial accident, i.e. reducing the risk as much as possible, were explained, referring to the accident prevention programme and the safety management system.*

*The subject was based on new legal regulations on environmental protection law and the requirements to be met by emergency plans in Poland.*

**Key words:** upper-tier establishment, major-accident prevention, emergency plan.



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## Abstrakt:

*Článok prezentuje problematiku vybraných prvkov prevencie závažných havárií týkajúcich sa formálnych a právnych požiadaviek prevádzkovateľov na prevádzkach, ich umiestnenie v právnych normách z hľadiska plnenia úloh vo vzťahu k potrebám spoločnosti. V tejto súvislosti prebehla revízia právnych aktov súvisiacich s fungovaním systému prevencie závažných priemyselných havárií, týkajúca sa požiadaviek prevádzkovateľov daných prevádzok s vysokým rizikom vzniku závažných priemyselných havárií.*

*Ďalej boli analyzované ustanovenia obsiahnuté v právnych predpisoch, čím bol vysvetlený ich význam v oblasti prípravy a vykonávania dokumentácie vedúcim prevádzky týkajúcej sa predchádzania možnosti vzniku závažnej priemyselnej havárie, t. j. čo najväčšieho znížovania rizika s odvolaním sa na haváriu, preventívny program a systém riadenia bezpečnosti.*

*Predmet vychádzal z nových právnych predpisov o práve ochrany životného prostredia a požiadaviek, ktoré musia splňať havarijné plány v Poľsku.*

**Kľúčové slová:** *nadriadený podnik, prevencia veľkých havárií, havarijný plán.*

## Introduction

Recent events in the neighbourhood of our country and incidents in Poland highlight the importance of the subject related to the system of preventing major industrial accidents. Emerging incidents meeting the criteria of the Regulation of the Minister of the Environment on major accidents required to be reported to the Chief Inspector of Environmental Protection of 30 December 2002 (Journal of Laws 2003 No. 5, item 58) highlight the essence of striving to properly prepare to combat the occurring threats, continuously improving the skills of their risk assessment and developing fast and efficiently communicated information on the fact of an industrial disaster.

This was confirmed by incidents, among others, in the Lower Silesian Voivodeship in a plant producing disinfectant liquid, where on 12.04.2021 a fire broke out in the production and storage halls. The incident resulted in the emission of 13 Mg of perhydrol 40%, 30 Mg of isobutyl alcohol, 1 Mg of sulphuric acid (VI) 98%, 3 Mg of peracetic acid 80% and 0.59 Mg of ammonia water 24%.

Another incident can be traced to the Małopolskie Voivodeship on 07.01.2021, where an explosion and fire broke out in the thermal afterburner at a plant producing synthetic rubbers, styrene plastics, plant protection agents and dispersions and latexes. The result was the emission of combustion products into the air. Material losses at the plant amounted to PLN 13.5 million.

Another incident occurred in Śląskie Voivodeship in the town of Bieruń on 14.01.2021, at a plant engaged in the production, disposal and storage of explosives, during a routine waste disposal procedure, there was an explosion of the material being transported. As a result of the incident, two people were injured including one person who died as a result of the burns suffered.

A dangerous incident occurred on 26.07.2021 in the Silesian Voivodeship. During the transport of cylinders with acetylene, there was an explosion in an unspecified quantity of acetylene transported in a cylinder containing a total of 8 kg of gas in liquefied form.

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As a result of the incident, 2 people suffered burns and died. Damage to property was estimated at approximately PLN 350,000. Approximately 67 people were evacuated for 24 hours<sup>1</sup>. Examples of the above incidents highlight the need for continuous improvement of the system for preventing major industrial accidents, adapting protection systems to the current legal conditions.

The basic legal document regulating the system of preventing serious industrial accidents in Poland is the Act of 27 April 2001. Environmental Protection Law (POŚ)<sup>2</sup>. Directive 96/82/EC, the so-called Seveso II, and then Directive 2012/18/EU, the so-called Seveso III, were implemented into Polish law through the implementation of the aforementioned act, in order to raise the level of safety in establishments using dangerous substances. The main objective of the article is to indicate selected formal and legal elements of the major-accident prevention system, which have an impact on preventing the possibility of a major accident, reducing the risk of a major accident by implementing the accident prevention programme and the safety management system.

The research problem is the performance of tasks by establishments of high risk, functioning within the major-accident prevention system, which implies the need to determine whether the formal and legal requirements indicate practical actions to be taken by establishment teams in case of an accident in the danger zone. The indicated mechanisms should minimise the effects of a major accident on people, the environment, property by preparing forces and means, activities, proper response in an emergency situation<sup>3</sup>.

For the purpose of this paper, theoretical research was carried out. The article was prepared using the analysis of legal acts and the analysis of literature on the subject in terms of specifying practical elements as requirements for operators of establishments, which should be implemented to improve the system of preventing major accidents.

The analysis of the research was based on publications on law and regulations concerning prevention of serious industrial accidents.

### **1. Safety mechanisms for the prevention of major industrial accidents**

In accordance with the requirements of the EU Directive, national legislation has introduced two categories of establishments. Pursuant to Article 248(1) of the Environmental Protection Act, an establishment posing a risk of a major industrial accident, depending on the type, category and quantity of the dangerous substance present in the establishment, is deemed to be an establishment with a higher risk of accident or an establishment with a high risk of accident.

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<sup>1</sup> <https://www.gov.pl/web/gios/rok-2023>, Serious Industrial Accident Register 2021 [accessed: 09.11.2023].

<sup>2</sup> Act of 27 April 2001. Environmental Protection Law (i.e. Journal of Laws of 2002, item 2556)

<sup>3</sup> J.S.Michalik, Prevention of serious industrial accidents, CIOP PIB, Warsaw 2005, p. 5.

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The Ordinance of the Minister of Development of 29 January 2016 on the types and quantities of hazardous substances present at an establishment determining its classification as an establishment at increased or high risk of a major industrial accident, issued pursuant to article 248(3) of the Environmental Law, specifies the types and quantities of hazardous substances whose presence at an establishment determines its classification as an establishment at increased risk or an establishment at high risk<sup>4</sup>.

Pursuant to Art. 244 of the Environmental Protection Act, each entity operating a facility whose activities could cause an accident, as well as the entity transporting hazardous substances and the authorities, are obliged to protect the environment against accidents. In this respect, the basic obligation is to notice the occurrence of an accident and immediately notify the people in the danger zone, as well as the State Fire Service, the Police or the mayor of a town and municipality.

Pursuant to art. 249 of the Environmental Protection Act, anyone intending to operate or operating an establishment of increased risk or high risk is obliged to ensure that the establishment is designed, constructed, operated and decommissioned so as to prevent industrial accidents and limit their effects on people and the environment.

In this regard, the operator of an upper-tier or high-risk establishment is obliged to notify the establishment to the competent authority of the State Fire Service at least 30 days before the day on which a new establishment or part thereof is put into operation or within 3 months from the day on which an existing establishment is classified as an upper-tier or high-risk establishment. The scope of the notification is indicated in art. 250 of the Environmental Law Act and includes, inter alia:

- the nature of the conducted or planned activity of the establishment or installation;
- type of installation and existing safety systems;
- the type and quantity of the hazardous substance, including the stored hazardous substance, taken into account when classifying the establishment as a lower-tier establishment or an upper-tier establishment, as well as the physical, chemical, fire and toxic characteristics of those substances;
- the characteristics of the terrain in the immediate vicinity of the establishment, with particular reference to factors which may increase the risk of an industrial accident or aggravate the consequences thereof, including, where available, information on neighbouring establishments and sites which are not lower-tier establishments or upper-tier establishments, and on areas and developments which could be a source of or increase the risk of, or aggravate the consequences of, an industrial accident or aggravate the domino effect.

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<sup>4</sup> Regulation of the Minister of Development of 29 January 2016 on the types and quantities of hazardous substances present at an establishment, determining the classification of an establishment as an establishment with an increased or high risk of a major industrial accident (Journal of Laws 2016, item 138)

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Notification to the competent authority of the State Fire Service is also subject to any significant change in the quantity or type of dangerous substance or its physico-chemical, fire and toxic characteristics, a change in technology or production profile and a change which could have serious consequences related to the risk of an accident, in relation to the data contained in the notification referred to in paragraph 1. Such notification should be made within 30 days prior to the date of introduction of a significant change (Article 250 (5) Environmental Law).

It should be emphasised that a significant change in the type of substance or its physicochemical, fire and toxic characteristics refers to a change that involves inclusion in a different category of hazardous substances in relation to the data presented in the notification.

Pursuant to article 251 of the act, the operator of an upper-tier or upper-tier establishment is obliged to draw up a major industrial accident prevention programme and to implement the accident prevention programme by means of a safety management system guaranteeing a level of protection for people and the environment appropriate to the hazards. The programme should include in particular:

- 1) the general objectives and operating principles of the operator;
- 2) an indication of the tasks and responsibilities of the operator's management regarding the control of the risks of industrial accidents and ensuring a level of protection of persons and the environment appropriate to the risks;
- 3) determination of the probability of an industrial accident hazard;
- 4) principles for preventing an industrial accident in order to improve safety;
- 5) principles for combating the effects of an industrial accident;
- 6) determination of ways to limit the effects of an industrial accident on people and the environment in case of its occurrence;
- 7) determination of the frequency of the analysis of the accident prevention programme in order to assess its timeliness and effectiveness.

The operator of an establishment shall submit the major-accident prevention programme to the competent authority of the State Fire Service and the provincial inspector for environmental protection at least 30 days before the date of starting up a new establishment or a part thereof, or one year from the date of classifying another establishment as an establishment of increased risk or an establishment of high risk. Changes in the establishment which are justified on the grounds of safety resulting from a change in the state of the facts, scientific and technical progress or the analysis of industrial accidents which have occurred are an important element with regard to the programme. The accident prevention programme shall be subject to review and justified amendment at least every 5 years.

Pursuant to article 252.(1) of the act, the operator of an upper-tier establishment or an upper-tier establishment is obliged to develop and implement a safety management system guaranteeing a level of protection for people and the environment appropriate to the hazards, as part of the overall management system of the establishment. The safety management system should take into account the hazards of industrial accidents and the complexity of organisation in the establishment and be

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based on a risk assessment. In addition, the Safety Management System should include the organisational structure, responsibilities, procedures, processes and resources necessary to define and implement the accident prevention programme. The safety management system should include:

1) defining, at all levels of the organisation, the responsibilities of the employees in charge of industrial accident response, as well as the measures taken to raise awareness of the need for continuous improvement;

2) the definition of a training programme and the provision of training for employees and for others working in the establishment, including subcontractors;

3) The functioning of mechanisms for the systematic analysis of the risks of an industrial accident and the likelihood of its occurrence;

4) instructions for the safe operation of the installation where the dangerous substance is present, provided for the normal operation of the installation, as well as for maintenance and temporary stoppages;

5) instructions on how to proceed in the event of necessary changes in the industrial process;

6. a systematic analysis of foreseeable situations which could lead to industrial accidents;

7) the performance, taking into account best available practices, of monitoring of the operation of the installation where the dangerous substance is present in order to allow corrective action to be taken in the event of phenomena which deviate from the normal operation of the installation, including those associated with wear and tear of the installation and corrosion of its components;

(8) a systematic assessment of the accident prevention programme and safety management system from the point of view of their validity and effectiveness, indicating how it is documented and approved;

9) an analysis of the internal emergency plan - in the case of an upper-tier establishment.

Pursuant to Article 253 of the Act, the operator of a high-risk establishment is required to prepare a safety report which should demonstrate that:

1) the operator of a high-risk establishment is prepared to apply the accident prevention programme and to combat industrial accidents;

2) the establishment meets the conditions for implementing the safety system;

3) the possibility of an industrial accident has been analysed and the necessary measures have been taken to prevent it;

4) the principles of safety and of the correct design, construction and maintenance of installations, including storage facilities, equipment, excluding means of transport, and infrastructure, connected with the activity which could cause the risk of an accident have been observed

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5) an internal emergency plan has been drawn up and information has been provided to the regional commander of the State Fire Service for the preparation of an external emergency plan;

6) the necessary information for planning and zoning purposes has been included.

Issues concerning safety reports are regulated by the Ordinance of the Minister of Development of 23 February 2016 on the safety report of a high-risk establishment, (Journal of Laws 2016, item 287)<sup>5</sup>.

The prepared safety report should be submitted to the regional commander of the State Fire Service and the regional environmental protection inspector at least 30 days before the day on which the new plant or its part is opened and 2 years from the day on which the other plant was classified as a high-risk plant.

The maintenance of appropriate safety mechanisms in the establishment is influenced by Article 256 of the above-mentioned Act, which obliges the operator of a high-risk establishment, at least once every 5 years, to analyse the safety report and make reasonable changes to it.

In this case, the operator of a high-risk establishment shall amend the safety report if the need for the amendment is justified by safety considerations resulting from a change in the facts, scientific and technical progress or an analysis of industrial accidents which have occurred, taking into account industrial accidents which have occurred at the establishment in question and, if justified, events which could lead to an industrial accident or if it results from an analysis of the implementation or rehearsal of the internal or external emergency plan.

An important element of this task is that the operator of an upper-tier establishment, before making changes to an establishment, an installation, including a storage facility, an industrial process or changes to the type, properties or quantities of dangerous substances present in the establishment that could affect the occurrence of an industrial accident hazard or the classification of the establishment as an upper-tier establishment, is obliged to analyse the notification, the accident prevention programme, the safety management system, the safety report and the internal emergency plan and amend them, if necessary. The aforementioned documents should be submitted to the authorities of the State Fire Service and the provincial environmental inspector before changes are made to the establishment.

## **2. The domino effect and obligations to the Works Group**

The act imposes an obligation, under article 259, on operators of upper-tier establishments, upper-tier establishments and establishments not at upper-tier or upper-tier level, which are neighbouring establishments, to cooperate with each other with

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<sup>5</sup> Ordinance of the Minister of Development of 23 February 2016 on the safety report of a high-risk establishment, (Journal of Laws 2016, item 287).

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regard to informing each other of factors which could increase the risk of an industrial accident or aggravate its effects, or cause a domino effect.

The domino effect is said to occur if the proximity of establishments containing dangerous substances increases the likelihood of a major industrial accident.

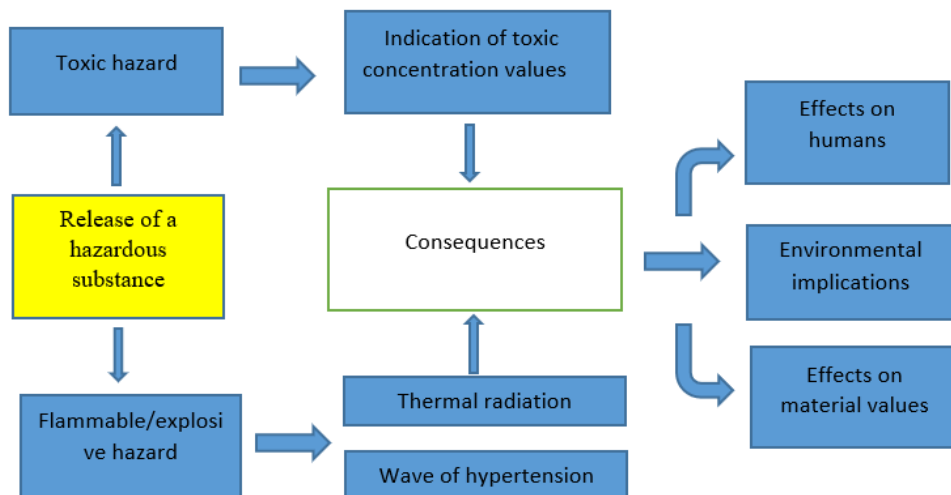
The domino effect phenomenon is closely linked to land-use planning.

Already at the stage of notifying an establishment of a high or increased risk of an industrial accident, the Environmental Protection Act imposes an obligation on its management to perform a thorough analysis of the area in the direct vicinity of the establishment from the point of view of the presence of factors increasing the risk of an industrial accident or likely to aggravate its effects.

Factors which could increase the risk of an accident should include the occurrence of so-called domino effects, i.e. the possibility of interaction between establishments containing dangerous substances and the possibility of interaction of individual installations within the establishment.

Factors which may increase the consequences of an accident include: the close proximity of the site to residential areas, housing estates, public buildings such as schools, hospitals, etc., transport routes, rivers, reservoirs and water intakes, as well as objects of particular cultural and material value. However, it should be noted that safety distances for land-use planning purposes are defined on the basis of risk to people, whereas in most cases the escalation and severity of the consequences of major accidents involving neighbouring establishments will depend primarily on the vulnerability of the establishment concerned to the effects associated with fires and explosions.

Diagram 1. Types of effects of accidents



Source: own elaboration



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An example of an accident could be the loss of containment of apparatus containing substances of specified hazard. The loss of containment causes the substance to escape and result in a specific type of effect (Figure 1). In the event of a release of a hazardous substance, the toxic or flammable effect will determine the toxic dose or flammability/explosivity parameters, which involves thermal radiation, explosion pressure, fragmentation with consequences for people, property and the environment.

As in the effects-based terrain analysis method used to define protection zones for land-use planning, it is necessary to adopt effects-related limits for thermal radiation and blast overpressure when analysing the potential for domino effects.

The calculation of hazard zone ranges for scenarios is most often assumed for four threshold values of thermal radiation flux density: 4 kW/m<sup>2</sup>; 7 kW/m<sup>2</sup>; 12.5 kW/m<sup>2</sup>; 37.5 kW/m<sup>2</sup>. The effects of thermal radiation on people and installations for threshold values of thermal radiation flux density are shown in Table 1.

*Table 1. Effects of thermal radiation on people and installations*

Radiant heat flux density [kW/m <sup>2</sup> ]	Effects of thermal radiation on equipment and surroundings	Effects of thermal radiation on humans
37,5	Damage to equipment forming part of process (process) installations. Components ignite within 1 min.	100% fatalities after 1 min exposure, 1% fatalities after 10 sec. exposure. Significant probability of fatalities for immediately exposed groups. High probability of fatalities for prolonged exposure.
12,5	Melting of plastic pipes. Minimum energy for wood ignition. Thin steel, insulated on the side away from the heat source, can reach thermal stress levels high enough to cause structural failure. Damage to non-pressure apparatus.	1% fatalities after 1 min exposure, 1st degree burns after 10 sec exposure. Potential for fatalities during prolonged exposure. High probability of injury.
7	Paint damage, destructive stresses in thin steel.	Causes pain with exposure longer than 20 sec. Potential for injury in case of exposure exceeding 30 sec.
4,0	---	Causes pain on exposure longer than 20 sec.

Source: own elaboration

The following overpressure wave threshold values are assumed for the calculation of the extent of the hazardous areas: 3 kPa, 5 kPa, 8 kPa, 15kPa, 45 kPa.

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The effects of the threshold values of the overpressure wave on people and installations are shown in Table 2.

*Table 2. effects of overpressure wave thresholds on people and installations*

Overpressure value [kPa]	Significance for the environment	Relevance to people
< 3	--	Minor injuries from glass fragments
3	Permissible magnitude of shock wave overpressure for facilities such as, but not limited to: compact development area, motorway and heavy traffic road	Minor injuries from glass fragments
5	Damage to glazing at 5 kPa limited minor damage, limit safe value for building. 5 kPa - permissible magnitude of shock wave overpressure for objects such as, but not limited to: dispersed development area and others that are not in a compact or dispersed building area, motorway and road with heavy traffic	Injuries from glass fragments

Overpressure value [kPa]	Significance for the environment	Relevance to people
8	Light limit for damage to buildings	Injuries to persons caused by falling building components
15	Damage to buildings suitable for renovation, damage to facades of residential buildings. Unsealing of pipe connections. Destruction of the joint between steel or aluminium plates.	1% damage to eardrums 1% severe shrapnel injuries
45	Area of total damage, 1% of deaths due to damaged lungs, deaths in all typical buildings	1% fatalities due to lung damage >50% of ear drum injuries >50% of severe shrapnel injuries

Source: own elaboration

The correct identification of zones where the effects of an accident exceed the assumed value, indicating the possibility of domino effects, requires the establishment to identify the hazards and to define and analyse the possible accident scenarios. If the operator has not assessed the consequences for all identified scenarios, he should declare in writing (for upper-tier establishments in the accident prevention programme and for upper-tier establishments in the safety report) that the range of consequences considered is fully representative and sufficient.

On the basis of the results of that analysis, the areas likely to be affected by a domino effect are identified and the establishments which fall within that area are grouped together in groups of establishments whose location in relation to each other is likely to have a domino effect. A group of establishments may comprise upper-tier

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establishments, upper-tier establishments and establishments that are not upper-tier establishments or upper-tier establishments.

Determination of a group of establishments of increased or high risk, the location of which in close proximity to each other may increase the probability of the occurrence of an industrial accident or aggravate its effects, is made by the Regional Commander of the State Fire Service in an administrative decision. In such a decision, the public administration body may oblige the establishments' operators to cooperate by exchanging information allowing them to take into account the increased probability of an industrial accident or increase of its effects in the accident prevention programme, safety reports and internal operational and rescue plans. In addition, it may oblige to provide the information necessary to draw up external emergency plans and to develop information on hazards and anticipated safety measures. It may also impose an obligation to cooperate in informing the public and neighbouring establishments of the danger involved.

### **3. Informing the public on major industrial accidents**

Another obligation of the operator of an upper-tier establishment, pursuant to article 261, is to provide information, at least once every 5 years, on safety measures and on the way to behave in the event of an industrial accident to the organisational units of the educational and social welfare system, to medical entities and to the facilities specified on the list included in the internal emergency plan of the establishment, and to other entities and institutions serving the public which may be affected by such accidents, and to make that information available to the public and to neighbouring establishments. In addition, the operator should review that information at least every 3 years and, where necessary, update it, in particular where changes have been made to the establishment, installation, including storage, industrial process or changes in the nature, characteristics or quantities of the dangerous substances present which could have an impact on the occurrence of an industrial accident hazard or on the classification of the establishment as an upper-tier establishment.

The above information should be implemented by:

- 1) making available on the establishment's website;
- 2) advertising on the premises of the establishment;
- 3) forwarding to the head of the village, the mayor or the president of the city having jurisdiction over the location of the establishment;
- 4) communicating in writing or electronically to the educational and social welfare authorities, treatment establishments and facilities specified in the list contained in the establishment's internal emergency plan, and other entities and institutions serving the public about the provision, announcement and communication of information in the manner referred to in points 1 to 3 above.

The head, mayor or town mayor, having obtained the information in question, should make it available to the public in the manner customary in the area concerned.

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Pursuant to article 261a of the act, the operator of an establishment with increased risk or an establishment with high risk is obliged to make public:

1) the designation of the operator of the establishment;

2) confirmation that the establishment is subject to regulations for preventing industrial accidents and that the operator has notified the competent authorities and submitted an accident prevention programme to them;

3) a description of the activity of the establishment;

4) the characteristics of the dangerous substances stored which determine the classification of the establishment as a lower-tier establishment or upper-tier establishment, including their names or categories and the hazards they present;

5) information on the means of alerting and dealing with the public in the event of an industrial accident, as agreed with the competent authorities of the State Fire Service.

In addition, the operator of a high-risk establishment shall also make public:

1) information on the preparation and submission to the competent authorities of a safety report;

2) information on the main industrial accident scenarios and the safety measures to be taken in the event of an accident<sup>6</sup>.

### **4. The operator's responsibilities under the internal emergency plan**

Operators of a high-risk establishment under Article 260 of the Act are required to draw up internal emergency plans to prevent, combat and limit the effects of an industrial accident. The emergency plans should include in particular:

1) assumed actions to limit the effects of the industrial accident on people and the environment;

2) proposals for methods and means to protect people and the environment from the effects of the industrial accident;

3) information about the existing hazards, the preventive measures taken and the actions which will be taken in case of an industrial accident, presented to the public and to the competent authorities of the State Fire Service, the voivode, the provincial environmental protection inspector, the regional director for environmental protection, the starost, the head of the commune, the mayor or the president of the city;

4) indication of the ways of removing the effects of the industrial accident and restoring the environment to its previous state, and if this is not possible, the ways of removing the threat to human health and the state of the environment;

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<sup>6</sup> Article 264 of the Act of 27 April 2001. Environmental Protection Law (i.e. Journal of Laws of 2022, item 2556, as amended).

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5) indication of ways to prevent the transboundary effects of the industrial accident.

The requirements to be met by internal emergency plans are set out in the Regulation of the Minister of Internal Affairs and Administration of 8 June 2016 on the requirements to be met by emergency plans .

In this regard, the operator of a high-risk establishment is obliged to:

1) develop an internal emergency plan and, in the event of a threat of an industrial accident or its occurrence, to proceed immediately to its implementation;

2) provide the Regional Commander of the State Fire Service with the information necessary to develop an external emergency plan, taking into account the cross-border effects of industrial accidents;

3) cover the costs of developing and amending the external emergency plan.

Table 3 Requirements of security systems

Major-accident prevention system Formal and legal requirements for high risk establishments to implement the internal emergency plan	National Rescue and Firefighting System Formal and legal requirements for the PSP to implement the external emergency plan
Procedure to be followed by employees of an establishment in the event of a major industrial accident alert	Organisation of communications
How to organise and conduct the evacuation of people and property	Principles and means of informing and warning the public about hazards and dealing with emergencies
Tasks of the organisational units of the establishment, the plant services and the employees of the establishment for the limitation and elimination of the consequences of a major industrial accident resulting from the analysis of the scenarios contained in the internal plan, taking into account:	Means of notifying the competent authorities, the public and neighbouring establishments or sites, other than upper-tier establishments, including railway infrastructure managers, road operators and airport managers, of a major industrial accident with possible off-site effects
1) <u>actions to limit</u> the consequences of a major industrial accident 2) <u>rescue operations</u> , including first aid prior to the arrival of the first fire protection unit or medical emergency team,	Characteristics of the scenarios included in the external plan, which include the relevant parameters defining the effects on people, the environment and property and the extent of their impact
2) the use of process safety equipment and installations,	Measures to deal with the anticipated transboundary effects of a major industrial accident
3) the safe stopping of installations presenting a major industrial accident hazard.	The manner in which the environment is restored, including the manner in which the facility's resources are used

Source: own elaboration

Bearing in mind the safety of workers in particular, the legislator, in article 262, obliged the operator of an upper-tier establishment to ensure that the employees of the establishment, in particular those who are directly exposed to the effects of an industrial accident and who act as social labour inspectors or trade union representatives responsible for health and safety at work, and, if necessary, also

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external entities performing work on the site of the establishment, can participate in the proceedings for drawing up the internal emergency plan.

The tasks of the systems and their convergence in certain elements indicate the need for synergy in undertaking the activities contained in the internal emergency plan and the external emergency plan.

At the executive level included in the internal emergency plan and the rescue plan, we see synergy, convergence and the need for interaction from reconnaissance to containment.

The synergy of the two systems is found in the provisions of the internal emergency plan and the rescue plan.

The common tasks are highlighted in Table 4.

Table 4. Synergy of actions to be taken, requiring synergy

Major-accident prevention system Internal emergency plan - Operational Chart Part B	Krajowy system ratowniczo-gaśniczy Plan ratowniczy
Recognition of risk	Recognition and identification of risk
Announcing an alarm in the plant, alerting external services	
Designation and marking of the danger zone	<ol style="list-style-type: none"> <li>1) demarcation and marking of the danger zone</li> <li>2) elimination, reduction or enlargement of the danger zone</li> </ol>
Provision of pre-medical first aid to victims	<ol style="list-style-type: none"> <li>(a) the arrival and execution of access to or evacuation from the danger zone of endangered or affected persons, including the execution of medical rescue operations</li> <li>(b) the preparation of escape routes for endangered or affected persons and for rescuers</li> <li>(c) ensuring the safety of endangered or affected persons and rescuers</li> </ol>
Evacuation of persons (including casualties) and vehicles (including tanker trucks with hazardous substances) from the risk area	Evacuation and rescue of persons and then animals, and rescue of the environment and property from the effects of immediate hazards posed by hazardous substances
Restricting the range by making baffles, cutting off the point of failure with valves	Adaptation of rescue equipment and techniques to the site and type of hazardous substance in order to reduce the effects of leakage, evaporation or emission of the hazardous substance

Source: own elaboration

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According to the decree of the Ministry of the Interior and Administration in § 12. par. 1, the operational card in part B contains, among other things, the definition of the tasks to be performed by company services during rescue operations.

The surveyed internal emergency plan operational cards in part B indicate convergence in some areas and the necessity of cooperation in undertaking activities, as well as the requirement for company groups to implement and apply the provisions.

### Conclusion

The development of civilisation and the economy makes high-risk establishments and establishments at increased risk of a major industrial accident an indispensable part of our reality. The presence of particularly hazardous substances in significant quantities in these entities is a matter of course. The hazardous materials collected, processed and produced are the primary factors causing the hazard. The potential consequences of the development of a negative scenario threaten not only the facilities of the plant but also other operators and transport routes. The specific nature of the plant's hazards means that the final success of rescue operations will probably be determined by the first few minutes of the action. Only by eliminating the danger at the source of the accident will the rescuers have a chance to implement their action plan, otherwise it is highly likely that the situation will get out of hand. The worst and most difficult scenarios will then unfold. Therefore, establishments with a high risk of a major industrial accident are a major challenge for both plant teams and firefighter-rescuers from the State Fire Service units closest to them.

Practical exercises have an important role to play in this respect, which show that in view of such a high risk, the frequent presence of firefighting teams on the site is mandatory.

The conclusions of the exercises make it clear that it is becoming necessary to check the adopted operational procedures concerning the cooperation of company teams, services and rescue entities and local government bodies. Checking the procedures within the framework of the exercises taking place also means improving the work of the teams as well as the functioning of the headquarters during a fire, accident and hazardous substance emission, as well as the activities themselves in terms of removing their effects. This relates to meeting the requirements of the Regulation of the Minister of Internal Affairs and Administration of 8 June 2016 on the requirements to be met by operational and rescue plans.

In this respect, it should be noted that the tasks are defined in the organisational part, not only for the plant services, but also for the organisational units of the plant and the plant employees<sup>7</sup>. The scope includes the limitation and elimination of the effects of a major industrial accident resulting from the analysis of the scenarios included in the Internal emergency plan, taking into account rescue activities,

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<sup>7</sup> § 6 item 5b Regulation of the Minister of Internal Affairs and Administration of 8 June 2016 on the requirements to be met by operational and rescue plans, (Journal of Laws 2016 item 821).

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including first aid before the arrival of the first fire protection unit or medical rescue team.

It can be concluded that the major industrial accident prevention system recognises the need, among other things, to reduce the time it takes to identify the site of emission of a hazardous substance

by adding a trained plant employee to the source identification team at the installation in order to reduce the time taken to identify the site of an emission of a chemical substance and not to increase the risk.

These formal and legal requirements for operators are intended as a starting point for understanding the issues involved and for creating a more effective mechanism for plant teams to plan, organise and carry out the preventive and rescue work necessary to reduce or eliminate the immediate risks posed by hazardous materials in upper-tier and upper-tier establishments.

### References

[1] Konieczny J., Management in crisis situations, accidents and disasters, GOW, Poznań-Warsaw 2001.

[2] Obolewicz-Pietrusiak A., Wojnarowski A., Podstawy ratownictwa chemicznego, Firex, Warszawa 2001.

[3] Announcement of the Marshal of the Sejm of the Republic of Poland of 22 July 2022 on the announcement of the consolidated text of the Act on chemical substances and their mixtures ( t.j .Dz. U. 2022 poz. 1816).

[4] Kożuchowski K. (ed.): Meteorology and climatology. Warsaw, Wydawnictwo Naukowe PWN, 2009.

[5]<https://ios.edu.pl/wp-content/uploads/2018/02/stop-smog.pdf> (accessed 10.10.2023).

[6] Act of 27 April 2001. Environmental Protection Law, ( t.j. .OJ. 2022 pos. 2556 as amended).

[7] KG PSP website, <https://www.gov.pl/web/kgpsp/interwencje-psp> (accessed: 05.10.2023).

[8] Regulation of the Minister of Internal Affairs and Administration of 17 September 2021 on the detailed organisation of the national rescue and firefighting system (Journal of Laws 2021, item 1737).

[9] Regulation of the Minister of the Interior and Administration of 8 June 2016 on the requirements to be met by operational and rescue plans, (Dz. U. 2016 item 821).



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[10] Steumpfle A.K., Howells D.J., S.J. Armour and C.A. Boulet, Final Report of ITF-25 Hazard from Industrial Chemicals, US/UK/CA, Memorandum of Understanding on Chemical and Biological Defense, 18 March 1996.

[11] GIOŚ website. <https://www.gov.pl/web/gios/di-wystepowanie-zdarzen-owni-serious-awaria>, [accessed 20.11.2023].

[12] Website; <https://www.gov.pl/web/kwpsp-krakow/instrukcje-postepowania-mieszkancow-na-wypadek-wystapienia-awarii>, [accessed; 20.11.2023].

[13] Principles of organization of chemical and ecological rescue in the national rescue system Rescue and Firefighting, KG PSP Warsaw, 2021; available at: <https://www.gov.pl/web/kgpsp/dokumenty-rchem> (accessed; 12.11.2023).

[14] Government statement of 13 March 2023 on the entry into force of the amendments to Annexes A and B to the Agreement concerning the international carriage of dangerous goods by road of Dangerous Goods by Road (ADR), done at Geneva on 30 September 1957, (Journal of Laws 2023, item 891).

[15] Government statement of 13 March 2023 on the entry into force of the amendments to the Regulations concerning the International Carriage of Dangerous Goods by Rail (RID), constituting Appendix C to the Convention concerning International Carriage by Rail (COTIF), done at Berne on 9 May 1980 (OJ 2023, item 789).

[16] Government declaration of 31 May 2023 on the entry into force of the amendments to the provisions annexed to the European Agreement concerning the international carriage of dangerous goods by inland waterways (ADN), concluded at Geneva on 26 May 2000, effective from 1 January 2023 (OJ. 2023 item 1167).

[17] Kopczewski R., Nowacki G., Analysis of the security of road transport of hazardous goods of hazardous goods in Poland and the EU, Institute of Scientific and Publishing "Spatium", 2018.

[18] Kołcz B., Formal and legal requirements for rescue entities concerning the recognition of chemical threats in Poland, J. Tuliszkowski Scientific and Research Centre for Fire Protection, National Research Institute, 2023, SFT VOL. 61 ISSUE 1, 2023.

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