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Hazards and Disasters and Industrial Disaster Risk and Management in Jaipur Municipal Region

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Abstract - Human society, the natural environment, and disasters have been intertwined since the start of civilization. These catastrophes result in significant human and environmental losses, and they pose a severe danger to the environment. Three million people have been murdered, a billion people have been injured, and billions of dollars in material damage has been caused by natural disasters in the last twenty years. Although risk assessment may be performed at any point in the life cycle of an industrial system, it is most useful and fruitful when performed at the outset of the development of the industrial project, new technology, equipment, process, procedure, etc. If we want to stop incidents from happening, we need to investigate them thoroughly. The accurate knowledge of accident kinds and causes, distribution throughout the year, and what may be averted is gained by accident analysis.

Keywords - Environment, Lifecycle, Risk, Industrial, Development, Accident

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1. INTRODUCTION

Human society, the natural environment, and disasters have been intertwined since the start of civilization. These catastrophes result in significant human and environmental losses, and they pose a severe danger to the environment. Three million people have been murdered, a billion people have been injured, and billions of dollars in material damage has been caused by natural disasters in the last twenty years. Disasters, both natural and man-made, affect people all over the world. There has been an upsurge in the physical, social, and economic effects of disasters in recent years, according to statistics. 90% of all natural catastrophes and 95% of all fatalities caused by them occur in developing nations. The resulting loss to global national product (GNP) is projected to be twenty times larger in developing countries than in developed ones. It has been anticipated that up to 60% of the world's population would dwell in developing nations by 2025, and this population will be particularly susceptible to floods, storms and earthquakes. Unchecked urbanization, unchecked population expansion, and high population density are making the globe more susceptible to natural catastrophes. Industrialization with other global phenomena, such as the greenhouse effect, civil unrest, losses to the ozone layer, terrorism, and societal violence, for example. Disasters are more likely to occur as a result of all of these reasons. Disasters, both natural and man-made, are becoming more vulnerable to the whole globe.

2. LITERATURE REVIEW

Keim, Mark. (2011) there has been a rise in public concern about the effect of industrial catastrophes on human health since the Deepwater Horizon oil leak and earthquake/tsunami radiation disaster in Japan. Public health responders face particular difficulties in industrial catastrophes. Hazardous material discharges from industry cause significant gaps in scientific understanding when it comes to the evaluation of and response to public health threats. Additionally, there is a basic lack of awareness with industrial catastrophes within the public health and medical sectors. In the present literature on public health, there are just a few sources that cover these catastrophe phenomena in depth. This article examines the effects of industrial catastrophes on public health and their particular issues.

Philip J. Ward (2022) The bulk of natural-hazard risk research still focuses on single hazards, despite the change in emphasis over the previous several decades from the management of natural hazards to the management of risk. Multi-hazards and multi-risks are being called for increased attention throughout the world. In recent years, the ideas of multi-hazard and multi-risk assessment and management have gained centre stage in the European Union (EU). There have been numerous important advancements in multi-hazard risk research during the last decade, with a special emphasis on the European Union. Several research

initiatives and articles have identified obstacles for multi-(hazard-) risk management. After that, we outline a research plan to solve these issues. As a result, we advocate for a multi-hazard risk management strategy that considers sustainability issues that span industries and geographies. Instead than focusing on a single danger or industry, this strategy examines how several sectors, geographies, and hazards might work together to address a larger sustainability concern. Multi- (hazard-) risk management systems should be co-developed and evaluated in practice, according to our argument. As a final step, we introduce a new pan-European research project that aims to implement our research agenda and enable stakeholders to develop forward-looking disaster risk management pathways that evaluate the trade-offs and synergies of various strategies across sectors, hazards, and spatial scales.

Serkan Girgin & Amos Necci (2019) Natural disasters may have a significant effect on both industrial facilities and vital infrastructure. As a consequence of these incidents, poisonous chemicals, flames, and explosions may be released, posing a risk to human health and the environment, as well as causing financial harm. Natech (Natural Hazards Triggering Technological Disasters) risk is driven by a variety of causes, including technical concerns related to the nature of Natech events as well as risk governance and socioeconomic challenges. Natech risk drivers are discussed in length in this article, as are current mechanisms for managing Natech risk in the EU and internationally. Additionally, a set of fundamental indicators is proposed to quantify a country's degree of reduction in Natech risk. It finishes with specific suggestions on how to bridge the remaining gaps in Natech research and policy.

Staupe-Delgado (2022) Using hunger as a paradigmatic example of a looming catastrophe, we want to show how disasters might manifest over time in a way that makes sense. Catastrophe literature often fails to recognize that disaster repercussions might take a long time to materialize, posing unique issues for policymakers and academics, while disaster onset dynamics are often overlooked. When dealing with creeping catastrophes, it is important to pay attention to four main areas: (1) our knowledge of disaster as a phenomena; (2) measurement and operationalization; (3) early warning and reaction; and (4) disaster management and termination. Famine studies, which are generally ignored from standard disaster research, are integrated into this article's conceptual considerations of catastrophe to give new views on disaster science as well as a variety of implications for disaster risk reduction.

Holla, Katarina (2021) There are roughly 12,000 EU facilities that deal with hazardous chemicals under the SEVESO II and III directives. In most EU countries, the SEVESO III Directive's additional criteria have been incorporated into their legal frameworks. The third version of the CLP regulation, which governs the classification, labeling, and packaging of chemical compounds and mixtures, goes hand in hand with the implementation of the third revision. Risk Management has emerged as one of the most pressing issues in today's workplaces in order to improve safety. As a result of its investigation of industrial accidents, this book chapter identifies the resulting repercussions and affects that may be used for effective prevention. Additionally, this chapter provides a comprehensive overview of the regulatory rules in Slovakia as well as EU-wide data on industrial accidents. It was vital to explain the Slovak Republic's approach to risk assessment since it is one of the most challenging areas of prevention. As a result, we've included an example of how to utilize the programmed ALOHA to mimic a certain outcome at the conclusion of this article. This chapter's major objective is to demonstrate the importance of risk management in hazardous-substances facilities, as well as the strategies that can be used to reduce the risks and the possibilities for modeling its effects.

3. HAZARDS AND DISASTERS

A catastrophe occurs when a danger, either natural or man-made, has a detrimental effect on people and their surroundings. The word's origin

The origin of the word "disaster" in astrology suggests that unfortunate occurrences are more likely when the stars are misaligned.

3.1 From the Greek (dis.) "evil" + (aster), "Star".

An occurrence that causes widespread devastation suddenly is called a catastrophe.

Oftentimes, natural disasters strike without warning and have no preference for who they affect. Extreme occurrences, whether natural or man-made, that surpass the tolerated size within or beyond specific time limitations make adaptation impossible, result in catastrophic losses of property and income, and paralyses daily life. Disasters to human civilization result when these occurrences exacerbate natural environmental processes such rapid tectonic movements causing earthquakes and volcanic eruptions, persistent dry conditions causing extended droughts, floods, atmospheric disturbances, collisions of celestial planets, etc. It is worth noting that human lives are at the center of any discussion on environmental catastrophes. The cost to society is a measure of how devastating an environmental catastrophe has been.

Extreme occurrences usually become catastrophes when they are caused by dangerous environmental processes. Only when they have a negative impact on human civilization can they be considered catastrophes. A powerful tropical cyclone (typhoon, hurricane, or tornado) in the middle of the ocean is only an extraordinary occurrence; nevertheless, when it strikes populated coastal regions, it may cause catastrophic damage and loss of life. The same is true with volcanic eruptions; they are never catastrophic on uninhabited land or water but may

cause widespread destruction in urban areas. Environmental catastrophes are usually caused by the elements, thus we call them "natural disasters."

Put another way, when humans dwell in close proximity to a potential hazard, natural abrupt physical processes and occurrences become catastrophes. If an earthquake measuring more than 10 on the Richter scale hits an uninhabited location, it won't do much damage. However, if an earthquake measuring less than 7 on the Richter scale hits a densely populated area, it will cause widespread destruction. It may be added that the frequency of severe occurrences is not what makes them catastrophic; rather, it is the intensity, size, dimension, and quantity of harm that each event does.

As a measure of a disaster's severity, the amount of money and property destroyed is used. Extreme occurrences are always produced by potentially dangerous environmental processes; however, not all of these events result in calamity. Only when they have a negative impact on human civilization do they have the potential to become catastrophes. It is just an extreme "event" when a very powerful tropical storm (typhoon, hurricane, or tornado) arises and dies in the middle of an ocean, but it is a "disaster" when it causes massive destruction to human property and lives on land. Environmental catastrophes are usually caused by the elements, thus we call them "natural disasters." To rephrase, when people settle in areas that are prone to natural hazards, they increase their risk of being affected by unexpected physical processes and occurrences.

For this reason, it is an unexpected occurrence. This, however, is never quite accurate. There are several examples of individuals refusing to acknowledge a decline. Recent academic research has linked catastrophes to poor risk management. Risks like this emerge when a combination of perils and susceptibility exists. If a hazard hits a low-vulnerability location, it is not called a catastrophe since the area will still have people living there.

3.1.1 Classification

There are a number of methods to categories hazards. Identifying the source of the risk is one approach. The existence of potential energy that, if unleashed, may inflict harm is a critical idea in recognizing a threat. Chemical, mechanical, thermal, radioactive, electrical, etc. are only few of the numerous possible manifestations of the stored energy. There's also the existence of potentially dangerous circumstances, which is not the same thing as the release of stored energy. Spaces with few exits, low oxygen levels, prolonged or uncomfortable postures, the need to reach for items that are out of reach, and so on are all examples of situations that might be dangerous.

Natural, human-caused, and technology hazards all exist. Additionally, they might be categorized as health or safety threats depending on who can be impacted and how seriously they could be harmed.

It's very uncommon for certain targets to feel the full force of a hazard's impact while others feel hardly none at all. In order to locate possible threats, it is necessary to first identify the people or things that may be harmed.

3.2 Definition and Difference Between Hazard and Disaster

There is a world of difference between a danger and a catastrophe, and it's important to pay attention to their individual characteristics. Despite all of humanity's scientific and technological achievements, natural catastrophes continue to leave a path of ruin in the form of human casualties and material losses. However, catastrophes aren't always caused by the elements; sometimes they're triggered by human error. In this post, we will discuss the differences between natural and man-made disasters.

3.2.1 What is a Hazard?

According to the World Health Organization, "a hazard is a source or a situation with the potential for harm in terms of human injury or ill health, damage to property, damage to the environment, or a combination of these."

Anything that poses an unacceptable risk to people or property is considered a hazard. Possible outcomes include human casualties, physical harm, financial losses, service interruptions, societal unrest, and ecological devastation.

Workplace dangers may come in many forms, including but not limited to: loud equipment, a moving forklift, chemicals, electricity, working at heights, a repetitious task, and improper behavior.

There is a danger if there is a potential for harm to human life, ecological balance, or material possessions. Devastating damage is caused by a variety of natural disasters. These include earthquakes, floods, tsunamis, wildfires, landslides, droughts, and volcanic eruptions. These events are caused by the forces of nature and do not choose their targets based on human habitation or infrastructure. Desolate areas are safe for humans and their belongings when any of these dangers occur. Therefore, it is not considered a catastrophe, even though it is the same phenomena that likely would have caused concern if it had occurred in a more densely populated location. Thus, it is evident that a danger is an occurrence with the potential to inflict extensive damage and loss of life and property. However, even if a danger has destructive qualities, it is not considered a catastrophe if it affects a region with no human population.

When there are natural risks, they cannot be avoided. But, we can absolutely learn to live in peace with nature by avoided taking acts that might convert dangers into catastrophic catastrophes. If one takes into consideration the cost that we eventually pay when a catastrophe occurs and the cost of preventing it, we arrive to a conclusion that it is smart to be prepared rather than inviting the wrath of nature on a very big scale.

When it comes to dangers, there are numerous categories of hazards. Radiation, Psychological, Chemical, Biological, and Pestilence and Viruses/Bacteria/Parasites.

The severity of a Hazard is measured by:

In general, the risk becomes more severe as time progresses. If you compare the severity of an earthquake that lasts one minute to one that lasts two seconds, you can see how the former is much more devastating.

The Richter scale or the Volcanic Explosivity Index (VEI) is used to quantify the level of danger posed by an event.

the fact that certain dangers may be anticipated because they leave clues before they strike. Weather stations and predictions allow us to know when a volcano is about to erupt by seeing the telltale signals of smoke that rise from its crater.

Frequency: When a threat occurs often, individuals may anticipate its coming and take precautions to reduce the likelihood of suffering losses.

As a result of their frequency, certain dangers put more people in harm's way and make life more challenging.

The rapidity with which a threat is introduced might make it catastrophic since no one will have time to prepare for it.

Extent in space: if the danger is not confined and aid is not provided, it will quickly become a tragedy.

However, disasters pose the kind of dangers that expose humanity and the natural world to a wide variety of tragedies that may ultimately wipe out both. What similarities exist between dangers and disasters? Both natural and man-made hazards pose a danger, although a hazard often comes before a tragedy. Both disasters and dangers are connected to one other. It may be said that a danger is a calamity waiting to happen.

Geophysical hazards include things like earthquakes, volcanoes, cyclones, storms, floods, and droughts. All potentially cataclysmic.

Threats may also come in the form of living organisms, such as sickness and insects. Contagious diseases have the potential to trigger widespread suffering and catastrophe.

The degree to which a hazard poses a threat varies from context to context. They might endanger people's lives, as well as their health, their possessions, and the environment.

Natural disasters are only declared when they pose a direct danger to human life.

If people can learn to coexist with their natural surroundings, they can stop a potential threat from developing into a full-blown catastrophe. In many cases, the only thing that's required to stop a threat from becoming a catastrophe is for people to be aware of it and take the necessary precautions. On the other hand, catastrophe is inevitable if a threat causes widespread disruption. Shakespear was the one who upped the ante on a perilous lifestyle.

To paraphrase, "I have staked my whole existence on a caste, and I am prepared to live with the consequences of the dice." The word "hazard" comes from the French word "Hazard," a game of chance in which players toss dice to choose a victor. William Shakespeare understood the concept of taking a chance, even if it meant death.

3.2.2 What is a Disaster?

When something happens to radically change the way a community operates, we call it a catastrophe. The community suffers irreparable harm on many fronts, including human lives, money, and the environment. The word "disaster" is used to describe the widespread destruction caused by natural phenomena including earthquakes, floods, tsunamis, wildfires, landslides, droughts, and volcanic eruptions in densely populated regions. While tornadoes and typhoons are common occurrences in many regions of the globe, they are only considered catastrophes when they strike an area with a constructed environment and a human population.

Man-made variables may exacerbate an already dangerous situation. Rapid deforestation in many regions has led to more frequent floods, which in turn have caused more extensive harm. Although it is impossible to stop earthquakes from happening in areas prone to them, human population density and the construction of buildings that are not earthquake-resistant may greatly increase the likelihood of catastrophic events and the loss of precious lives.

Fires, transportation mishaps, radioactive radiation, explosions, etc., are all instances of manufactured catastrophes.

These weak points in society are a recipe for catastrophe when combined with weather-related events, geological hazards, armed conflict, earthquakes, and economic collapse. As the English expression "a formula for catastrophe" puts it, this is

a certain way to fail. The ripples from a disaster may be felt for quite some time.

Personal injury, property loss, physical damage, economic damage, interruptions to everyday life, and health risks are only some of the stresses that might result from a catastrophe.

The WHO is always quick to intervene in situations when help and rescue are needed. According to the World Health Organization, human lives are the most important thing, and disasters cannot occur if people are absent. When you include in all the participants and members of our ecosystem, I think you'll agree that's a debatable argument. All aspects of an ecosystem, not just humans, may be harmed by a national catastrophe.

4. INDUSTRIAL DISASTER RISK AND MANAGEMENT IN JAIPUR MUNICIPAL REGION

Sitapura, Jaipur (North), Jaipur (Rural), and Jaipur-II are the four primary sections into which Jaipur's industrial districts are broken up. EPIP has a total land size of 425.31 hectares, whereas Sitapura I phase and Sitapura II phase encompass a combined 360.83 hectares. The first unit, Sitapura, is an industrial area with 9 subunits. Land area for Sitapura phase III was 92.21 hectares, while the area for Sitapura phase IV was 138.82 hectares. Institutional area in Sitapura was the smallest of the five regions at about 21.50 ha. Land area covered 488.09 ha in SEZ Sitapura I ph., 89.39 ha in Ramchandrapura, and 269.33 ha in SEZ Sitapura II ph.

The second section, known as Jaipur-II, was split into 11 smaller sections that included many significant areas of Jaipur including Bassi, Hirawala, Malviya, Bagrana, Kilkipura, Bagru Chhtroli, Mansarovar, Apparel Park, and Gem Park. Bagru Chhtroli had the largest industrial area at 284.62 hectares, while Bagrana (UD) had the smallest at 22.91 hectares. Vishwakarma, Manda, Jetpura, Renwal, kaladera, Jhotwara, and Akera Dungar are only a few of the important industrial regions that make up Jaipur's third unit, Jaipur (North). Vishwakarma got the greatest industrial area, measuring in at 1399.34 hectares, while Akera Dungar obtained the smallest, measuring in at 63.75 hectares. The Jaipur (Rural) region was the last division, and it was further subdivided into 16 smaller regions: Phulera, kanakpura, Bagru, Shahpura, Dudu, Bindayaka, Kartarpura, Sudarshanpura, Bais Godam, Manpur Manchedi, Kukas & Ext., and Kant Kalwar (Ext.). Manpur Manchedi obtained 490.10 hectares of industrial land, but Dudu acquired just 14.71 hectares of industrial land.

Table 4.1: Industrial Scenario of Jaipur Industry at a Glance

S. No.	Head	Unit	Particulars
1.	Registered Industrial Unit	No.	37756
2.	Total Industrial Unit	No.	37785
3.	Nos. of medium & large unit	No.	29
4.	Employment Generated in MSMEs	No.	239240
5.	Employment in Large and Medium Industries	No.	11101
6.	No. of Industrial Area	No.	48
7.	Investment Of MSMEs	In Lacs	361190.61

Source: - RIICO, Jaipur

Based on the data shown in the table above, it can be concluded that out of a total of 37785 industries operating in Jaipur, only 37756 are officially recognized as such. There are 29 major employers that provide 11,101 people with jobs. About 239,240 people are employed by Jaipur's industries, which span 48 different neighborhoods. A total of Rs. 36,1190.61 was invested by micro, little, and medium-sized enterprises (MSMEs) in Jaipur.

Table 4.2: Year Wise Trend of Units Registered

Year	Number of Registered Units	Employment	Investment (Lakh Rs.)
2000-01	1057	4172	3764.70
2001-02	1180	5233	4802.48
2002-03	1074	4245	3042.33
2003-04	1156	4727	2514.68
2004-05	1213	5280	3360.78
2005-06	1364	7664	7749.79
2006-07	1455	18375	32345.61
2007-08	1933	19312	22544.49
2008-09	1954	17627	25171.41
2009-10	1580	14112	19784.84
2010-11	1914	18657	33141.64
2011-12	1874	17647	32142.64
2012-13	3188	26328	44965.76
2013-14	5009	29340	45322.81
2014-15	9051	37307	62622.07
2015-16	2754	9212	17914.57
TOTAL	**37756**	**239240**	**361190.61**

Source: - DIC Jaipur

From 2000 to 2016, the number of Industries in the table above rose annually. The number of registered units climbed from 1057 in 2000-01 to 1180 in 2001-02 to 1074 in 2002-03, with an overall rise in investment of 3764.70 rupees and a corresponding increase in employment of 4172.

Investment increased annually from 2004-05 to 2008-09, from a high of 3360.78 lakh rupees in 1213 industrial units providing 5,280 jobs. In 2008-09, Jaipur was home to 1950 manufacturing facilities that together invested 25171.41 crore rupees and employed 17627 people. In 2009-10, there were only 1580 manufacturing facilities, resulting in the loss of 14112 jobs and an investment of Rs. 19784.84 million. In 2011–12, there were 1874 businesses; in

2012–13, there were 3188; and by 2014–15, there were 9051; they provided 37307 jobs and attracted an investment of 62622.07 lakh rupees. There were 2754 manufacturing establishments in Jaipur that year, investing a total of 17914.57 million rupees and providing jobs for 9212 people.

Main Industrial Areas of Jaipur are: -

- Jhotwara Industrial Area
- Viswakarma Industrial Area
- Bindayaka Industrial Area
- Bais Godam Industrial Area
- Malviya Nagar Industrial Area
- Sanganer Industrial Area
- Sitapura Industrial Area
- Kukas Industrial Area

Sitapura Industrial Area, VKI Industrial Area, and Kukas Industrial Area are the three primary Jaipur industrial zones chosen for this study. Below, we'll take a closer look at each of these:

5. CONCLUSION

Although risk assessment may be performed at any point in the life cycle of an industrial system, it is most useful and fruitful when performed at the outset of the development of the industrial project, new technology, equipment, process, procedure, etc. If we want to stop incidents from happening, we need to investigate them thoroughly. The accurate knowledge of accident kinds and causes, distribution throughout the year, and what may be averted is gained by accident analysis. By using the insights gleaned from accident reviews to the development of effective technical, behavioral, and enforcement methods, safety standards may be improved. Behavioral therapies have an emphasis on training, skill upgrading, incentive, and punishment, whereas engineering solutions focus on reducing risk with improved technology, obstacles, and protective gear. According to the data, falls from great heights account for the lion's share of fatalities, followed by being struck by an item, being involved in a car crash, suffering from burns or electrical shock, and being caught on a conveyor belt. There is a 4.58 percent chance of chemical harm or explosion in an accident. Steel companies suffer more accidents than their counterparts in the manufacturing and chemical sectors. Since dangerous chemicals are often stored and handled in large quantities, accidents in the chemical industry have the potential to result in widespread casualties. Workplace accidents may be impacted by severe weather; for example, the unpleasant, burning heat of summer increases the likelihood of an accident occurring. According to the data, the summer months (April, May, June, and July) had the highest death toll. Winter (December–February–March) had the lowest death toll. May, the warmest month of the year, had the highest monthly death rate (10.6%), while December had the lowest monthly fatality rate (6.5%). The months of April, May, June, July, and October tend to be more dangerous than the months of November, December, January, February, and March. Injuries and illnesses sustained on the job may have far-reaching consequences for employees and their families. In industries where risky behavior or conduct is prohibited, harmful circumstances are corrected, and timely interventions are implemented, accidents may be avoided. Key elements for eliminating incidents at work place include adherence to "standard operating procedures" (SOP), proper maintenance of plant and equipment, monitoring of the work environment, use of safety gear, health check-ups and screening, periodic training, empowerment of employees, and participation of people.

REFERENCES

1. Sheek-Hussein, M., Abu-Zidan, F.M. & Stip, E. Disaster management of the psychological impact of the COVID-19 pandemic. Int J Emerg Med 14, 19 (2021). https://doi.org/10.1186/s12245-021-00342-z
2. Michal Titko (2020),” Disaster Preparedness And Sustainable Disaster Risk Management In A Changing Environment,” Wit Transactions On Ecology And The Environment, Vol 241, © 2020 Wit Press
3. Panes, Russell & Panes, Ilyn & Ventayen, Randy Joy & Pereyras, Jeff & Orlanda-Ventayen, Caren. (2019). Disaster Preparedness and Readiness of an Institution in one ASEAN Country. SSRN Electronic Journal. 10.2139/ssrn.3517336.
4. Titko, Michal & Moricová, Valéria & Sedliaková, Mariana. (2020). Disaster preparedness and sustainable disaster risk management in a changing environment. WIT Transactions on Ecology and the Environment. 241. 10.2495/SDP200361.
5. Rose, april & patalinghug, b & amamag, gertrudes & endie, maria & suico, a & niña, maria & aying, a & montebon, stacy & crusat, marivic & dolfo, leizel & patalinghug, april & linox, dale. (2022). Disaster risk reduction preparedness in the elementary school during pandemic. 1. 93-101. 10.5281/zenodo.6612717.
6. Holla, Katarina, Sventekova, Eva. "Risk Management in the Area of Major Industrial Accident Prevention in the EU and Slovak Republic". Risk Management, edited by Muddassar Sarfraz, Larisa Ivascu, IntechOpen, 2021. 10.5772/intechopen.98406.
7. Staupe-Delgado, R., Rubin, O. Challenges Associated with Creeping Disasters in

Disaster Risk Science and Practice: Considering Disaster Onset Dynamics. Int J Disaster Risk Sci 13, 1–11 (2022). https://doi.org/10.1007/s13753-022-00391-9

8. SerkanGirginAmosNecci (2019)," Natural hazard impacts on industry and critical infrastructure: Natech risk drivers and risk management performance indicators," International Journal of Disaster Risk Reduction Volume 0, November 2019, 101163
9. Philip J. Ward (2022)," Invited perspectives: A research agenda towards disaster risk management pathways in multi-(hazard-) risk assessment," P. J. Ward et al.: A research agenda towards disaster risk management pathways
10. Keim, Mark. (2011). The public health impact of industrial disasters. American journal of disaster medicine. 6. 265-72. 10.5055/ajdm.2011.0065.

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