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Taking public concerns into account as a risk management criterion. A case study.

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On September 26, 2019, a large-scale fire affected the Lubrizol industrial site in Rouen, France. Despite the effectiveness of the emergency response in bringing the blaze under control, the accident gave rise to numerous critical reactions from the public, widely reported in the media. This event is an opportunity to question the consideration of public concerns as a risk management criterion. Reading the collection of various declarations and positions is particularly complex and leaves an impression of unintelligibility. In the context of this accident, this paper presents the interest of setting up a specific reading grid resulting from a methodological framework proposed by Ortwin Renn, to allow an organization of speeches restoring the bases of intelligibility necessary for a work of analysis and comprehension. This reading grid has three levels, and our comprehensive case study tends to validate the hypothesis that links incomprehension and tensions between the stakeholders with a shift in the levels of discourse between the interlocutors.

Keywords: Risk governance, risk communication, industrial risk management

1. Introduction and research question

In Europe, technological risk management policies have been based for several decades on reducing the risk at source, land-use planning, emergency plans, and finally informing the public. The stated objective of these policies is to avoid the occurrence of victims and to lay down rules aimed at preventing major accidents that could be caused by certain industrial activities and at limiting their consequences for human health and the environment. As such, the system operates globally in a very satisfactory manner, through specific regulatory requirements adapted to each of the ten thousand SEVESO companies in Europe, one thousand three hundred in France. The definition of objectives, the implementation of management systems, the deployment of resources is the result of the coordinated work of tens of thousands of people (Industrials, administrations, elected officials, experts, consultants, local authorities, residents,

emergency services, etc.). Although these objectives are achieved, the occurrence of an accident, even when it does not involve victims, is not the occasion for a call to vigilance or an object of study to feed the organizational learning and an opportunity for progress but becomes the site of a total questioning of the system. What emerges are bizarre proposals aimed at jeopardizing an entire organization in the delusional hope of preventing the total occurrence of any accident. The fire at the Lubrizol factory in Rouen in September 2019 is a singular event which has aroused many reactions within French society and is comprehensive of the expression of the public's distrust of industrial risk management. However, from a professional risk management point of view, a huge part of these reactions, beyond the media cacophony, remain difficult to understand. Mistrust is a salient point, but what is its exact nature? Our research approach aims to overcome the resulting

cognitive discomfort that conflicts with canonical frameworks of risk management. Our research question therefore aims to understand the breach between the extremely negative reactions following the accident and the management of the emergency response which met the objectives of the doctrine of industrial risk management defined within the framework of the European Union. Our starting point is empirical and proceeds from the case study. We read more than 300 press articles, watched dozens of television sequences. The various official publications were also collected.

2. What discourses to cope with anxiety?

The fire started on the night of September 26, 2019, in a plant of Lubrizol which synthesizes, and stores phosphorus and organosulfur chemicals. A thick plume of black smoke formed, reaching over 20 km. In total, 276 firefighters engaged 46 firetrucks, deployed 15 km of hoses allowing an extinguishing flow of 2,100 m³/h or approximately 36,000 liters of water per minute. The fire, although of exceptional magnitude, was brought under control in 12 hours. The human losses were zero deaths, zero injuries, and eight people hospitalized under observation for respiratory disorders, quickly returned home. Impacts on the assets were limited to the industrial area. However, one of the specificities of the Lubrizol accident lies in the very significant media enthusiasm and the fact that the state services implemented active communication by deploying substantial resources. Many opinion relays have generated an abundant flow of information both in the traditional media (press & television) and social networks.

2.1. A significant political mobilization

Due to the remarkable feature of the accident, which stimulates almost all aspects of perception: visual by the size of the hearth and its impressive plume of smoke, auditory by the sound of the explosions of the containers and olfactory by the nauseating odors of mercaptans, the prefecture immediately initiated major communication actions. 5 press conferences, 5 press releases and 9 interviews were carried out on 26 September alone. In the 3 weeks following the accident, 27 press releases focused on monitoring the various concerns of the populations. On Friday, September 27, the prefect held a series of meetings to follow up on the accident. A national

dimension was given to the event since many state ministers came to show their support to local authorities and the population. On Tuesday, October 1, the Government is setting up a national support unit around the General Director of Health, to support the prefecture in the implementation of medium and long-term monitoring measures for health and environmental consequences of the accident. The regional health agency is opening a psychological reception unit to support the people of Rouen and respond to their concerns. At the same time, the list of products that burned in the fire is published on the prefecture's website. On October 2nd, set up of a public information and response toll-free number. The prefect welcomes the mayors of neighboring municipalities to inform them about the situation, listen to their requests and inform them about the appropriate support measures. On the 4th, the prefecture made the first results of the agricultural samples available to the public on its website. On the 5th, the prefect announced the establishment of an economic continuity unit to support local businesses affected by the accident in their compensation procedure. On Monday 7, the prefect set up the departmental agricultural crisis unit, then on October 11, a Committee for Transparency and Dialogue was established and finally, the President of the Republic went there on October 30. One year after the fire, the Minister for Ecological Transition and the Home office Minister are going to Rouen on Thursday September 24, 2020, to meet local actors.

2.2. A national coverage combined with an unsuccessful communication effort

The local media paid significant attention to the accident (e.g. more than 350 articles one month after the incident). At the same time, the coverage of the event instantly took on a national dimension, the news television channels covered the event very widely (i.e. around 10% of the airtime). Several thousand print media articles were published in the months following the accident. There are 14,000 internet publications per week linked to the factory fire until the end of October. The management of the proven or potential consequences of the accident therefore mobilized many institutional actors. Several ministries were the source of numerous statements whose uncertain coordination led to fueling feelings of mistrust and suspicion. The

press and the populations perceived dissonances in the communication of the public authorities which fueled the feeling that “things were hidden” and reinforced mistrust.

2.3. A theoretical framework for risk communication

The first step consisted in bringing out intelligibility of the diversity of empirical materials. We have chosen to establish our theoretical starting point on the principles of risk communication and which can be presented as the "5 A's of public risk communication" (Bouder, 2009). These principles are: (1) Assembling the evidence, (2) Acknowledgement of public perspectives, (3) Analysis of options, (4) Authority in charge, (5) Interacting with the Audience. These principles are supposed to be reviewed step by step. In the specific case of Lubrizol incident, we argue that everything looks like as these steps have been considered backwards, starting from the need to interact quickly with the audience and then going back to the evidence linked with the accident. The last one, *interacting with the Audience*, deals with the definition of targeted publics and associated communication means and techniques. Concerning this topic, collected evidence show that significant mobilization and communication efforts are indisputable. Then, regarding *Authority in charge*, the purpose is to ensure that the organization speaks with one voice, major dissonances are easily observable. A detailed analysis of several statements and their inconsistencies was conducted. Going one step backwards, *Analysis of options* is about considering the broad range of options and the associated trade-offs that drive a specific response, including costs and benefits of action as well as inaction. The retrospective analysis of the events shows that most of the costs linked to the accident stem from the compensation of farmers whose marketing of their production was prohibited based on a maximalist interpretation of the precautionary principle. Going through our journey of principles leads to *Acknowledgement of public perspective*, which aim at understanding how members of the public perceive the risk. This specific point is the main topic that is presented within this paper. The data collected show that distrust and incomprehension are an essential part of the study of risk communication related to the

Lubrizol accident. At the origin of the process, the founding principle is *Assembling the evidence* which corresponds to the characterization of risks by taking care to integrate the dimensions of complexity, uncertainty, and ambiguity.

3. Acknowledgement of public perspective: Three levels of debate

Risk communication is not a process in which one seeks to convince a public who would be consumers of risky products who must consent to the choices made in their name, but rather a process of shifting the information required for the construction of relevant representations in accordance with the best available knowledge and their own inclinations (Pidgeon & Gregory, 2004). The objective of risk communication is to enable understanding of risk-based decisions and to reach a balanced judgment that combines factual elements and value systems, it ultimately aims to help stakeholders make informed choices on the issues that concern them. (Morgan et al, 2002). The legitimate intention of the sender to convey a message must be reconciled with the equally legitimate set of concerns and perceptions that each receiver associates with the risks. (Rippe & Schaber, 1999). Technical experts generally have the ambition to communicate the extent of their expertise whereas most observers are not interested in technical details but want information on the likely impacts of risks on their health and well-being. (Schwarz & Thompson, 1990). As part of our research, we mobilized a theoretical model performing a classification into three levels of communication that are addressed during debates on risks (Renn & al. 2002).

3.1. 1st level: What are the risks?

The function of first-level communication is to provide the most accurate picture of factual knowledge. Even if the objective here is to transfer knowledge or create a common understanding of the problem, an attempt at two-way communication is necessary to ensure that the message has been understood and that the technical concerns of the audience have all been considered (Funtowicz & Ravetz, 1985). The fire at the Rouen plant was the source of abundant atmospheric emissions in the form of smoke and extremely malodorous chemical compounds from the mercaptan family. In this context, asking yourself “*Smoke stinks, is it killing us?*” is

therefore legitimate. Exposure to significant olfactory nuisances triggers coherent questioning about the toxicity of the products causing these odors. Providing answers to this type of question calls for first-level communication that requires “expert” knowledge in chemistry and toxicology. The difficulty lies in the need to properly explain the notions of exposure levels, chronic or acute toxicity and the dose-response relationship model. The purpose of the communication will be to popularize these notions and to provide factual elements related to quantified values.



Fig1. Illustration of a 1st level debate claim
“Smoke stinks... Is it killing us?”

Practically, in the case of the Lubrizol accident, the answer to “Smoke stinks, is it killing us?” would simply be “No”. But the very essence of the scientific approach remains marked by methodical doubt on the one hand and empirical uncertainties on the other. Thus, the expert's answer will never be so direct because scientific ethics prohibit ignoring uncertainties, even if they do not really make sense to simply answer the concrete question. In the end, this requirement of rigor, which is an absolutely necessary foundation of the value of science, that the scientist imposes on himself will be likely interpreted as incompetence (i.e. “They are not able to answer with certainty”).

3.2. 2nd level: Who is legitimate to guarantee safety?

The second level of communication does not rely on technical expertise but focuses on the distribution of risks and benefits within society and on the reliability of institutions. It requires evidence that risk managers have fulfilled their formal mandate and that their performance meets public expectations. The theme of trust is a classic topic in the research field of risk (Rempel & Holmes, 1986; Slovic & al., 1991; Peters & al.

1997; Siegrist & al., 2000). A form of consensus states that establishing a climate of trust involves listening to public concerns and engaging in responsive communication. Information alone will never be enough to build trust, without systematic feedback and dialogue there will be no atmosphere in which trust can grow (Morgan & al., 2002). Despite the substantial communication efforts made by the politicians, prefecture and government, trust was notably absent. Conversely, an explicit widespread distrust of the public authorities was expressed in a particularly strong way and was continuously taken up by the local and national media. Reactions to risk depend on the trust that individuals have in the institutions controlling risk (Slovic, 1992).



Fig 2. Illustration of a 2nd level debate claim
“Stop to official lies! #Lubrizol Truth”

The fool's game lies in the fact that the notion of risk implies that accidents or losses are caused by random events and that risk management institutions are always obliged to legitimize their action or inaction. (Cvetkovich, 2013). In the case of accident investigations, a post-accident magnifying effect distorts the framing of the analysis (Dekker, 2015). On one hand, we analyze the story and the decisions of the actors while we know the outcome, on the other hand, we consider that the mission of the public authorities was to avoid this particular accident. However, in Europe, technological risk management policies have been based for several decades on (1) Risk reduction at source, (2) Land-use planning, (3) Emergency plan and (4) Public information. The stated objective is to avoid the occurrence of victims (Foussard & al, in press). As such, the system works overall in a very satisfactory manner. In the post-accident context, the 10,000 SEVESO establishments in Europe (including more than 1,300 in France) are not perceived as places where safety has been ensured for years,

but as potential new threats ready to explode at any moment. While the stochastic nature of risk would require relationships of trust between assessors, managers and risk carriers, each isolated event is perceived as proof of failure, whereas a single event cannot be able to prove or disprove evaluation mistakes or management failures (Luhmann, 1990). It therefore appears that social concerns do not lie in the control and reduction of potential physical damage. If this were true, techno-economic analyzes would be nearly sufficient to ensure risk management and first-level communication would make it possible to reassure a “*misinformed*” public. A detailed analysis of second-level themes was carried out, first regarding to the mechanisms of manipulation of fear (Furedi, 2005) applied to the worries associated with dioxins, and then, through an original discussion around the administrative texts bearing the prescriptions of the state towards industrial facilities and their perception by the public as a misinterpreted promise. Lastly, the distrust catalyzed by a singular event leads to concealing the overall aim of industrial risk management policies and forgetting that 10,000 establishments are concerned and operate daily in safety. Gaining institutional trust requires continuous dialogue between stakeholders, risk managers and public representatives.

3.3. 3rd level: *What society?*

Many authors argue that society is not really concerned with risk minimization (Douglas & Wildavsky, 1982; O'Malley, 2004; Thompson & al., 2018; Siegrist & Arvai 2020). The third level of communication relates to the management of conflicts relating to social values and perspectives linked to lifestyles and their impact on risk management. The debate here is part of a broader perspective that includes choices of society and global political models. The capitalist model, liberal or neo-liberal economic approaches are now pointed out as being at the origin of risks in an almost systematic way. At this level, to address values, it is necessary to establish some form of consensus on the issues that underlie the risk debate, and at this stage, technical expertise and institutional competence are no longer the object of these communication processes. Consequently, information on the risks or participation in a two-way dialogue (Foussard & Specht, 2009) is insufficient to find a solution acceptable to all or

most of the parties. In this context, industry-based risk communication can be interpreted by opponents as part of a strategy to dilute responsibility and promote vested corporate interests. It is therefore common for public authorities to be confronted with major problems if their discourse insists on the fact that the residual risks are tolerable and can thus be imposed even on those who do not share the advantages of the activity concerned (Wellock, 2021). Similarly, labeling residual risks as unavoidable can be the source of major controversies between industrial and environmental groups and other values-oriented groups (Weingart, 2017).



Fig 3. Illustration of a 3rd level debate claim “Lubrizon: 1 billion turnover. Capitalism is killing us”

4. Main findings: A constant shift in levels

In the case of the Lubrizol incident, we observed an almost systematic discrepancy between the levels of debate: risk management organizations generally tend to reframe higher level conflicts into lower-level conflicts. We had witnessed a form of futile confrontation that opposes social choices and lifestyles with technical and scientific expertise. It makes sense that organizations in charge of risk management try to guide discussions on facts, technical arguments, and empirical evidence. On several occasions, we have been able to identify a confusing phenomenon, rather than trying to explicitly reframe the discourse on 2nd and 3rd level concerns, the stakeholders who participate in the discourse inject 1st level arguments to rationalize their value concerns. They want to express concerns related to issues of governance or life choices by linking them artificially to technical elements. It follows that experts point this as the expression of the irrationality of stakeholders. These inefficient interactions are sources of

significant frustration for the different parties (Lundgren, & McMakin, 2018).

So, the unintelligibility of public demands does not arise so much from inappropriate remarks or unreasonable questions, but from the inadequacy of concerns with their place of expression. The 3-level model allows to distinguish discordant levels of values. By associating each piece of discourse with a level of debate, it becomes possible to mobilize adequate analysis tools. We have carried out this approach on numerous examples drawn from the case of the Lubrizol fire. Regarding the first-level debates, we have seen that the identification of shortcomings in conceptual distinctions in the expression of official discourse (hazard vs. risk; chronic exposure vs. acute exposure) are relevant in explaining many public misunderstandings. Regarding the second-level debates, we have seen that several themes (dioxins, lists of chemicals that have burned, etc.) have been used in some context of fear manipulation with the aim of delegitimizing some explicit political postures.

The main contribution of our research confirms that knowing, understanding and identifying the three levels of debate allows to restore intelligibility and can help to better structure the dialogue and avoid disappointments and basic mistakes. The shift mechanisms observed between levels of debate appear promising to us to study. The main limitation stems from the fact that this framework does not provide a simple guide for "Taking public concerns into account as a risk management criterion". If the goal seems to be remote, we consider that the contribution of this theoretical framework is definitely helpful to better formulate the problem. The fundamental issue relates to the very definition of the concept of risk, where an operational definition based on the gravity and probability variables conditioning the implementation of the barrier is opposed to a definition resulting from social perception based on parameters such as anxiety or dissatisfaction. Equity claims stem from a perception of unfairness associated with the distribution of risks and benefits. Finally, the effects of escalations having repercussions on related fields bring us back to several aspects of the theory of social amplification of risks (Kasperson & al., 1988; Pidgeon & al., 2003).

5. Discussion and conclusion. What ways to take public concerns into account?

The multiplicity of levels of debate means that identifying public concerns is no trivial task. The measurement of risk using a two-dimensional metric (probability of occurrence and severity of consequences) has shown its operative virtues. Risk management has indeed experienced considerable operational and conceptual development during the second half of the 20th century. Risk management includes an analysis phase and there is plenty of methods (e.g. more than 800) that can be implemented (Everdij & Blom, 2008; Van Wassenhove & al., 2022). The different methods can be grouped into families according to a typology that depends on the implicit choices used to describe the system that we want to study (Foussard & Denis-Rémis, 2014). Nevertheless, these methods are all based on a similar conceptualization of risk (Renn, 1992). The effectiveness of its approaches has been marked by many successes. The order of magnitude is a risk reduction in many of our common activities of a factor of 100 in less than 50 years. The margin for progress is becoming more and more limited and an asymptote is observed. A resulting paradox is that although the level of risk has decreased considerably in most areas around us, the acceptability of it by society continues to decrease. The safer the world, the more fearful we are. This raises the question of questioning the relevance of including new components (i.e. beyond probability and severity) in risk measurement metrics. How to identify and select these components? Empirical research has shown that people tend to assess risk on a wide range of endpoints (Slovic, 1987), but it has proven difficult to identify those who could claim universal validity (Mayer et al., 2017). Ultimately, the core of the problem is public participation in defining acceptable levels of risk (McComas & al. 2020). It seems legitimate that it should be the right of individuals who would be impacted by the potential damage of risky activities to determine the level of risk they deem acceptable (Webler, 1999). Yet many experts believe that sensational media coverage and intuitive biases can mislead public perceptions. (Roeser, 2017). One of the functions of risk analysis is to establish priorities for risk management and some experts believe that the process is fundamentally degraded by

disturbances resulting from perceptions deemed to be erroneous or arguments steeped in ignorance (Rowe & Frewer, 2005). Resources allocation is crucial, large budgets are spent to reduce minor risks, but which take precedence in the concerns of the public to the detriment of risks which do not attract the attention of the public whereas effective actions could be implemented (Cross, 1998). This brings back to the idea of proportionality, which is the pivot of public industrial risk management policies. The integration of public concerns in the regulatory decision-making process is strongly dependent on the perspective adopted, depending on whether it favors the representation of risk as a social construction or as a mapping of hazard from the real environment into a measuring space (Webler & Tuler, 2021). In any case, the issue of inclusion of public concerns must be considered by any rational approach to risk management. (Lynn, 1990). To conclude, the case study on the fire at the Rouen factory is particularly rich for the study of risk governance processes. We are currently continuing our investigations by focusing on the integration of analytical and deliberative processes before and after the accident by both analyzing the Technological Risk Prevention Plan (PPRT) and the Committee for Transparency and Dialogue.

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