

RESEARCH ARTICLE

Investigation of exceptional events

*Investigación de eventos excepcionales***Alejandro Covello**

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Abstract

This article discusses the impact of accidents, which has grown alongside technological advancements. This has brought about new safety concerns that demand a broader mindset for accident investigation boards to handle unusual events effectively.

Resumen

Este artículo reflexiona sobre las problemáticas en torno a la magnitud de las consecuencias producidas por los accidentes, consecuencias que se ha incrementado en forma paralela con el progreso tecnológico. Esto trae aparejadas nuevas problemáticas en torno a la seguridad operacional, que requieren de una apertura cognitiva que amplíe las competencias de las juntas de investigación de accidentes hacia eventos excepcionales.



On July 10, 1976, the Italian city of Seveso, located 22 km from Milan, was engulfed by a cloud of dioxin due to a major industrial accident. The toxic cloud also spread to neighboring cities such as Cesano Maderno, Desio, and Meda. Months later, newborn babies exhibited deformities, and residents of the city suffered from skin and liver diseases. Additionally, 3,300 animals that had been abandoned were found dead from consuming contaminated plants, while another 80,000 animals were sacrificed to prevent them from contaminating the food chain. The inhabitants of Seveso were forced to leave their homes, and many could not return as their houses were destroyed during the cleanup efforts. The impact of the dioxin toxic emission on the health of the population is still being studied.

The contamination of an entire city and its population was an unprecedented event, only comparable to the use of chemical weapons in World War I. Seveso marked a further escalation in the scale of consequences resulting from major industrial accidents, introducing what we could call *fourth-order victims*

With the advent of the steam engine came industrial accidents in the realm of railway and maritime transport. These accidents resulted in *first-order victims* (workers in the industry where the accident occurred) and *second-order victims* (workers in the supply system and service users, such as passengers on a ship or train). Later, *third-order victims* emerged, those who do not voluntarily participate in the production system, such as the residents of a city. The characteristics of the accident in Seveso inaugurated consequences with *fourth-order victims*, including embryos in gestation at the time of the accident, children born dead or with deformities conceived after the incident, or children of affected

parents who cannot conceive¹. A few days after the Seveso accident and considering the risk of congenital malformations, the Regional Council of Lombardy and the Italian Parliament passed an exceptional abortion law for pregnant women exposed to the toxic cloud. Hundreds of pregnant women were considered at high risk and subjected to abortions

Such accidents have occurred in the subsequent decades, from Bhopal (1984) and Chernobyl (1986) to the Coronavirus pandemic (2019)², among others, and they share a common characteristic: they lead to states of emergency. This means that governments can enact exceptional laws that, in certain circumstances, involve restrictions on freedom of movement, the right to assembly, the circulation of people, isolation, mandatory evacuations, or, as in the case of Seveso, the extraordinary suspension of existing laws (the law penalizing abortion).

Furthermore, due to their magnitude and complexity, when investigated, these events yield new perspectives, models, and explanations that serve as cognitive openings. Politicians, specialists, and investigators in safety and risk management find more effective prevention and mitigation strategies.

Charles Perrow, when analyzing the Three Mile Island nuclear accident (1979), wrote "*Normal Accidents*" in 1984. Later, James Reason, in his book "*Human Error*" (1990), developed the epidemiological analysis of accidents and the concept of latent conditions through the analysis of Three Mile Island and other disasters such as Bhopal, Challenger (1986), and Chernobyl.

1. For fourth-order victims, refer to Perrow, Charles (1984). "*Normal Accidents*."

2. Muro, Marcelo y Covello, Alejandro (2020). Análisis sistémico de la pandemia. Un accidente normal. Available at <https://alejandrocovello.com/2020/08/14/analisis-sistémico-de-la-pandemia-del-coronavirus-un-accidente-normal/>

Diane Vaughan continued with her book "*The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA*" (1996), in which she describes the concept of normalization of deviance in a comprehensive study of the Challenger space shuttle accident. Scott Snook, in his book "*Friendly Fire: The Accidental Shootdown of U.S. Black Hawks over Northern IRAQ*" (2000), somewhat revisits this concept to introduce the concept of practical drift. And so, the last century ended with a scale jump in terms of the number of disasters and fourth-order victims, but at the same time with entirely new theoretical and conceptual frameworks for analyzing accidents that cause "exceptional events."

Sidney Dekker, in his book "*Foundations of Safety Science*" (2019), tells us that these types of accidents constitute a turning point in thinking about explanations for accidents and disasters. In particular, the accident in Seveso was a determining event for the definition of new European regulation on risk management in certain industrial activities. This directive was known as Seveso 1 (1982), and later modified in 1996, Seveso 2, with its most significant additions focusing on the environment.

In 2003, the European Parliament modified Seveso 2 following the events at the AZF chemical factory in Toulouse, France (December 2001). This catastrophe was caused by the explosion of ammonium nitrate and resulted in the death of dozens of people, thousands of injuries, and a significant social and political impact. The new modifications, known as Seveso 3, included the inclusion of processing and storage operations of mineral substances and dangerous substances, to which was added an extension of the obligations of the Seveso directives to subcontracted companies.

Investigation of Exceptional Events

Understanding, providing new explanations for accidents, and developing policies to prevent and mitigate their consequences is the task of the Transport Safety Board (Junta de Seguridad en el Transporte, JST) in Argentina. This organization, starting in 2020, expanded its factual competence to investigate exceptional events. An exceptional event refers to an event of unusual severity whose consequences impact the basic functions of society, such as operational continuity, the provision of essential services, operational and health safety, the environment, and ecosystems, among others. In response to these exceptional events, governments can define states of emergency³.

In the initial context of the global health crisis caused by the coronavirus pandemic, the JST identified the need to expand its field of investigation to exceptional events, in line with the activities carried out by other safety investigation boards around the world, such as the Finnish Safety Investigation Authority (SIAF) in Finland and the Dutch Safety Board (DSB) in the Netherlands. Therefore,

3. Definition adopted by the JST for its first investigation of an exceptional event.

“An exceptional event refers to an occurrence of unusual seriousness, whose consequences impact the basic functions of society, such as operational continuity and the provision of essential services, operational and health safety, the environment, and ecosystems, among others.”



the JST initiated an investigation into an exceptional event impacting the Argentine transport system.

Within this framework, the organization produced its first report⁴ on an event of this nature, which constitutes both a descriptive and analytical approach to the handling of the coronavirus crisis within the Argentine transport system. The work was supported by contributions from a collaborative network

established ad hoc, consisting of national transportation entities, including regulatory and supervisory bodies, operators, transportation chambers and associations, as well as health insurance providers and labor unions representing sector workers.

What is the value of accident investigation, particularly the analysis of exceptional events? Paul Virilio, a French intellectual who wrote about technology and accidents in his book “Original Accident” (2010), states: “Without the freedom to criticize technology, there is no technical progress, only conditioning.” Accident investigation is a critique that arises from an undesirable event. Accident investigation allows us to unveil the specific accidents of new technologies: inventing the ship is inventing the shipwreck; inventing electricity is inventing electrocution; inventing DNA recombination and the gain of function in lethal viruses is inventing an unknown pandemic.

For Virilio: “Every technology carries its own negativity, which emerges simultaneously with progress (...) We do not progress through a technology but by recognizing its specific accident, its specific negativity” (2010). New technologies, climate change, close couplings between different production systems, among other factors, carry a certain type of accident that is no longer local or specific – like the sinking of the Titanic or the derailment of a train – but are general accidents that immediately affect an extensive geographic region or the entire world – like the coronavirus pandemic – and lead to states of exception.

Therefore, working on exceptional events is essential. We are living in the age of the technocene. Flavia

4. Available in: https://www.argentina.gob.ar/sites/default/files/2001/10/resumen_ejecutivo_covid.pdf



Costa defines it in her eponymous book as “the implementation of highly complex and highly risky technologies, leaving traces on the world that expose not only today’s populations but also future generations for thousands of years to come” (2021). That’s why investigation boards in Finland, the Netherlands, and Sweden expanded their scope of competence and gained experience in investigating exceptional events related to the coronavirus pandemic. Furthermore, at the last meeting of the International Transport Safety Association (ITSA) held in Finland, the investigation of exceptional events was added to the agenda⁵.

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5. “Experiences in the investigation of non-transport-related incidents/exceptional events: ‘Some of us have expanded our scope of investigation to so-called incidents and accidents unrelated to transportation. It would be interesting to hear how ‘these branches’ fit into more traditional transportation safety investigations. Additionally, we would like to discuss how you have accommodated your respective legislations and prerogatives to investigate these non-transport-related incidents’ (ITSA, 2022).”

CONCLUSIONS

According to Virilio, “The principle of responsibility towards future generations requires exposing the accident and the frequency of its industrial and post-industrial repetitions now” (2010). International experience and our first investigation into exceptional events highlight the need to expand the competencies of accident investigation organizations to include these types of events. This paves the way for cognitive openness and the generation of new policies for safety and risk management to prevent and mitigate unusually severe accidents.



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