RBSO
Revista Brasileira de Saúde Ocupacional
ISSN: 2317-6369 (online)

Interview

Sandra Lorena Beltran Hurtado[a]
https://orcid.org/0000-0003-4059-2365

Raoni Rocha Simões[b]
https://orcid.org/0000-0003-1181-0132

Ildeberto Muniz de Almeida[c]
https://orcid.org/0000-0002-8475-3805

Rodolfo Andrade de Gouveia Vilela[a]
https://orcid.org/0000-0002-8556-2189

Jean-Christophe Le Coze[d]
https://orcid.org/0000-0001-8164-5641

[a] Universidade de São Paulo, Faculdade de Saúde Pública, Departamento de Saúde Ambiental. São Paulo, SP, Brazil.
[b] Universidade Federal de Ouro Preto, Departamento de Engenharia de Produção, Administração e Economia. Ouro Preto, MG, Brazil.
[c] Universidade Estadual Paulista, Faculdade de Medicina de Botucatu, Departamento de Saúde Coletiva. Botucatu, SP, Brazil.
[d] Institut National de l'Environnement Industriel et des Risques. Verneuil-en-Halatte, France.

Contact:
Sandra Lorena Beltran Hurtado
E-mail:
sandrabeltran@usp.br

Hot to Cite (Vancouver):
Hurtado SLB, Simões RR, Almeida IM, Vilela RAG, Le Coze JC. Jean-Christophe Le Coze and the study of socio technological risk. Rev Bras Saude Ocup [Internet]. 2025;50:e7. Available from: https://doi.org/10.1590/2317-6369/08424en2025v50e7

Jean-Christophe Le Coze and the study of socio technological risks

Jean-Christophe Le Coze e o estudo dos riscos sociotecnológicos

Abstract

Jean-Christophe Le Coze has been working for the INERIS National Institute for Industrial Environment and Risks in France for more than 20 years now. He started his career as a safety engineer, but very quickly moved into the human and social sciences. From the beginning of his career, he was brought in with the idea that engineers could incorporate Human Factors in their visions and practices of safety. He then spent almost a year at the Technical University of Delft in the Safety Science Group. After that there was an accident in a French pyrotechnic plant in 2003, and Jean-Christophe Le Coze, in charge of the investigation, wrote a report showing the importance of the Human and Organisational Factors behind this event. It was a moment in France during which high-hazardous plants were questioned and were at the heart of the political agenda in terms of developing adequate regulation. Since then, he has contributed significantly to the advancement of knowledge in the safety area. One of his publications "Thirty years of accidents: the new face of socio-technological risks" was translated into Portuguese and published in 2023. This interview highlights the main concepts of the book and current challenges for accident prevention.

Keywords: Safety; Socio Technological Risks; Accident Prevention; Occupational Health.

Resumo

Jean-Christophe Le Coze trabalha no Instituto Nacional de Ambiente Industrial e Riscos (Ineris) na França há mais de 20 anos. Começou sua carreira como engenheiro de segurança do trabalho, mas rapidamente migrou para as ciências humanas e sociais. Desde o início de sua carreira, foi introduzido à ideia de que os engenheiros poderiam incorporar os Fatores Humanos em suas visões e práticas de segurança. Ele passou quase um ano na Universidade Técnica de Delft, no Grupo de Ciências de Segurança. Após isso, ocorreu um acidente em uma fábrica de pirotecnia na França em 2003 e Jean-Christophe Le Coze, como encarregado da investigação, escreveu um relatório mostrando a importância dos Fatores Humanos e Organizacionais por trás desse evento. Foi um momento na França em que as plantas industriais de alto risco foram questionadas e estavam no centro da agenda política em termos de desenvolvimento de regulamentação adequada também. Desde então, ele contribuiu significativamente para o avanço do conhecimento na área de segurança. Uma de suas publicações, "Trinta anos de acidentes: a nova face dos riscos sociotecnológicos", foi traduzida para o português e publicada em 2023. Esta entrevista destaca os principais conceitos do livro e os desafios atuais para a prevenção de acidentes.

Palavras-chave: Segurança do Trabalho; Riscos Sociotecnológicos; Prevenção de Acidentes: Saúde do Trabalhador.

Figure 1 Author Jean-Christophe Le Coze

B What are the main concepts or key ideas that your book "30 years of accidents" brings to the readers?

Jean-Christophe Le Coze (**Figure 1**) It is very much an academic book (**Figure 2**) with practical application and with the intention to create an autonomous way, academically or intellectually, of dealing with safety that would be multi-dimensional and interdisciplinary. My idea was that we needed to find ways to combine disciplines for this purpose, just like ergonomics did in the past but with a wider scope. Safety should be a field for which we find ways of combining different disciplines, ergonomics, sociology, political science, and engineering , and then build an object that we would understand from those integrated perspectives. That idea was of course not new, and was already discussed by Barry Turner[1] and Jens Rasmussen[2], for instance. So one big aspect of this book, which is almost an epistemological aspect, is about how we construct, scientifically, objects.

Another aspect of the book is that complexity provides a core notion that has been around for quite some time. Several authors used complexity as a core notion but in different ways. They applied it to technology, to cognition, to organisation, or to society. My use of the notion of complexity adds another layer of understanding through a philosophical perspective developed by Edgar Morin, an influential luminary of France. I use this notion to help me frame several problems associated with safety.

Another important idea and practice is ethnography, which is not a new idea of course, but that has a strong meaning when it comes to understanding the realities of work that cannot be grasped through auditing and that we need to position ourselves in a different approach to understand what's going on a daily basis in companies.

A last commented concept among many developed in the book is the notion of visualisations. Safety is supported by many visuals, drawings, and pictures. These visuals help us communicate, but they also help conceptualise objects. I followed the influence of the Swiss cheese model, for instance, as an illustration of the power of visuals, which I connect to the work of Bruno Latour on the concept of inscription[3].

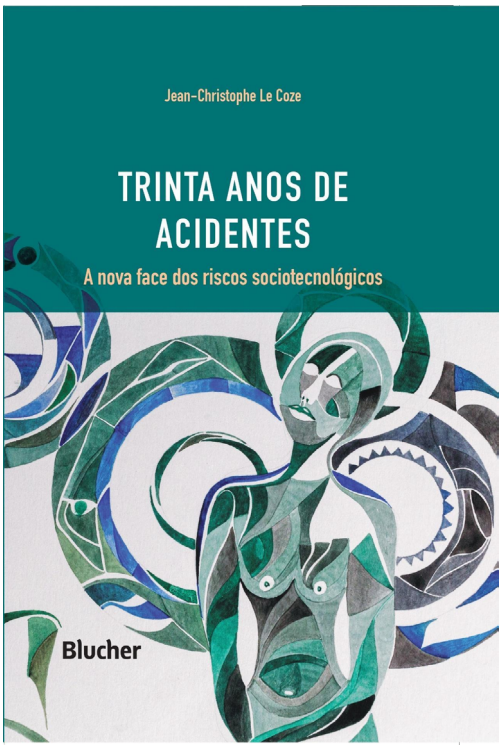

Figure 2 Book cover - Portuguese edition

A This strategy of ethnography will allow us to see organisational aspects that are not shown .

Le Coze Absolutely, and ethnography, to put it briefly , is about paying attention to the way people relate to their work experience in the context of studying organisations. It's a methodological background that is absolutely central to the development of the book, especially the new models that I suggest using. Ethnography has also been developed in French ergonomics in the 1960s, and there is a strong tradition in France in sociology too, in a sense of a qualitative approach to the understanding of organisations. And I tried to make a strong case for the importance of applying this methodology in safety research, not only from the perspective of studying shop floor workers, but also other types of actors, including engineers and managers who are also experiencing complexities that we need to grasp, understand, and pay attention to.

Another very important idea is the socio-technical approach. There is this great sentence from Latour which is "*to socialise is to materialise, to materialise is to socialise*"[4]. It means that if you want to understand society in general and organisations and work, you have to find a way to bring materiality to the understanding of what we would think of as social patterns. Now that there has been a bit of time passing between the publication of this book, in 2016, and this interview, in 2023, I've published other books in the meantime and I added the eco socio-technical aspect, which was there with the idea of complexity as a reflection about the limits of the dualism between nature and culture in the anthropocene era.

A When we try to go deep in the investigation, we discuss decision making, but in your experience, is it possible to go far?

Le Coze Yes, it is possible. But how far do we go? Does ethnography imply that we have to increase the scale of the observation that we need to have different types of factors? In my view, it has to be and that's a key question because when you have a small company, you can study work and very quickly discuss with the top managers. But when we are dealing with multinationals, very big companies, this challenge is huge, because we're talking about thousands of people and there is a need to be very careful about how we conduct such fieldwork and how we are able to establish causation. So we need to be ethnographic in the sense that we need to produce

the data and to understand how different decisions create specific cases for either safety or accidents, it is a tough question.

A That's the idea of Accimaps.

Le Coze Yes. So another concept is a systemic approach and how visualisations help us look at causation in a sort of sociological way. But we should be very careful and that could be discussed also regarding the use of Accimap. To have enough data to conduct such causal analysis well is challenging. Although I'm sensitive to the notion of hindsight bias, we need to establish causation and to understand phenomena while making sure that the links that we establish in these Accimaps are well thought out and based on data rather than on conjectures or hypotheses. But the strength and the power of a visualisation like Accimap, that's why I used this, is to show explicitly that causation must be thoroughly systemic. If something happens somewhere in an organisation, it is because the organisation has been designed a certain way, and the design and the dynamic of this organisation unfolded in certain ways. Is the product of a number of people doing and deciding at different levels of hierarchies. That is imperative in terms of research relevance, and yet it can be extremely challenging to establish a good description of the different dimensions of decision making across sometimes very complex organisations.

So there are challenges, but the Accimap is great in terms of its visual power. Accimap tells us what to look for visually . A sociologist who regularly used Accimaps is Andrew Hopkins. That's the great value and heuristic power of visuals and drawings in general.

B We have to be very careful about establishing the causalities with group decisions and risky decisions making.

Le Coze Yes. We have to be careful with the notion of causation and causes. I frame them as sociological causation. We need to think sociologically about this, which is new for safety because we've got research available and yet we have not put the words on what it is that we need to look into, whereas we know so much. We need to push companies to say, well, How are your sociological realities of your everyday practices introduced in the search for causation? How are they introduced in the search for what makes your system safe?

B In the book, you develop the idea of the Systemic and Dynamic Safety Construction Model. Could you explain to us how this differs from other models?

Le Coze It had the specific intention to be helpful for assessing the situation from a sociological angle. At the time of doing this research, I realised that there were interesting works in sociology, and I thought that it was important to use this in a practical way for practical purposes. The first chapter of the book is on an accident that I've been involved in investigating. We had collectively a good understanding of what the background condition was for these accidents in terms of the organisational dynamic, the change of strategies, the change of regulation and the technical changes a few days before the event. It seemed like we could read through the interviews what happened in the past quite well. But the big question was: can we do this before rather than after? This is a very simple question. And to answer it, I had to think about the insights of sociology, and I realised that none of the researchers were doing this. They were not bringing the ideas developed by sociology to actually try to implement them for the purpose of assessing situations in critical safety systems. So the difference in terms of what it adds is this attempt to translate what we know from sociology for this purpose.

We're looking in systems and we need to understand the patterns of interactions between people. That's the basic sociological statement from the sociology of organisation in France back in the 1970s with Michel Cozier. This dynamic is a great challenge because patterns are not static. Patterns are moving sometimes pretty fast. Situations might develop in ways that are toward improvements or degradation, perhaps also maintenance.

I constructively criticise some influential models in the field, the Swiss cheese model and the migration model. These models are great, but they were based on the insights of cognitive engineering, psychology, ergonomics and system thinking. We need to perhaps bring in the picture the insights from other disciplines, including sociology and political sciences, which means that we do not get rid of psychology or ergonomics. We need to combine

them, and that goes back to interdisciplinarity. So, the model introduced in the book is a translation of the insight of sociology in graphical ways to include the systemic, constructed and dynamic view. The previous models introduced this, but not explicitly enough.

B We can discuss the need for interdisciplinarity in industrial safety and how the adventure of crossing boundaries entering the territory of other researchers can be aided by graphical interpretations. Can you explain how these objects can contribute to the interactions between the intermediary objectives?

Le Coze That goes back to the notion of "inscription", a notion introduced by Bruno Latour in Science and Technology Studies (STS)[3]. It's something that I've been studying a bit more later in another collective book that came out of a workshop based on the topic of visualising safety. We wanted to pay more attention to the visual properties of such objects and their power in terms of how they can help us think and work together. Because when you coordinate people with the help of what we call "boundary objects" (a notion also developed in the STS field), then you give the opportunity for people with different backgrounds and different experiences to somehow connect their reflection and investigation. We often say that visuals and drawings are worth 1,000 words, because they've got this ability that texts don't have to represent in non-linear ways several aspects together in a broad perspective. A graphical representation gives you the opportunity to put together, like we discussed with the case of Accimaps, several things that would take chapters to describe.

Therefore, you have this ability to be around a drawing and for people to discuss in ways that would be impossible or very different without them. And you observe that countless times when you're in a brainstorming situation, in a design situation, in an investigation situation. You have people very often taking a pen, going on the board, trying to express their ideas through drawings so that people can see aspects that the one who started the drawing didn't see. The power of drawing has something to do with our body. The way we think through our body using hands, using things to think (the body is also a great provider of metaphors). The fact that we draw using our body and our hands is absolutely fascinating as a topic.

There's this notion as well that was developed in the STS about this "interpretive flexibility". The fact that you see different things in the same drawing and this type of differences between the way people interpret drawings is extremely useful to debates, conversations, because it triggers a lot of interesting conversations.

B Our research group truly believes in the power of those intermediary objects, graphical representations that help understand the complexity of work, even if they represent only a part of reality.

Le Coze Yes. And they're really something we need to insist on because sometimes that's the way people think about drawings and their value. They're not only communication objects. They're proper, conceptualised, thinking objects. They're in the externalisation of our thoughts. It's not just communicating, it is about using pens, whatever you use to draw, and our bodies to think.

B Yes, we stimulate workers to do that. Well, you described in the book how safety is also built at the managerial decision-making level, in interactions between market, media, regulatory bodies and so on. Could you explain in more detail the proposal and the concrete methodological tools that allow the integration of those descriptive levels of analysis and the relationship with the macroscope transformation?

Le Coze We could talk about the micro, meso, macro and mega levels of analysis. Ethnography is about understanding what goes on in social contexts such as companies and building an understanding of the connections between different types of work from managerial work to operational work practices. But you must build an understanding not only based on interviews but also on the notion of activity, through observations, and the contribution of ergonomics is very important in this respect. So you need to observe work, then talk to people about their work, to understand the patterns that are created by people interacting with each other in the material environment. And obviously, the notion of bureaucracy is very important here too. The societies that we live in are extremely bureaucratic and therefore you need to understand it because this is the core stuff that allows us to think about the different connections.

But now there is the notion of trends that I have introduced and related to the mega level of globalisation. And that is something that came out after studying many cases of organisations and realising that I could observe similar trends, such as the importance of auditing and standards, of digitalisation and automation, of the notion of self-regulation for companies but also of the rise of financial capitalism. And I started to study the work of people addressing the issue of globalisation.

Globalisation is an old story, but it has intensified over the past four decades and the possibilities of the transport revolution and the information revolution, and the possibility of investing because of the economic policies of opening borders to capital investments. The transformation from the 1980s up to now has been massive on our economies, on our societies, to the point that we start to realise that we have to include work in economic and political terms, with sociology and anthropology to understand these global transformations in our lives.

The world is a very different place than it was 40 years ago, and there is no reason that safety should not be part of such transformations. So, there is indeed somehow a link between safety in these global forces. I saw it through my case studies of multinationals, of the evolution of several patterns. The causal relation between bureaucratization and safety has to do with globalisation. It was not very explicit in safety research and that's why I tried to bring that up because it is an interesting case of mega-causation.

B Operating in a network requires greater flexibility and innovation from companies, and as you point out, more autonomy and initiative are needed at the local decision-making level. At the same time outsourcing and externalisation themselves have significantly increased the standardisation of work as well as a reduction in costs and deadlines. How do you assess these problems in the context of safety?

Le Coze Well, it's an interesting case of contradiction. A French political scientist, Isabelle Hibou, called this the paradox of neoliberalism. On the one hand, this ideology values flexibility and autonomy to create market value because you are unrestrained in your ability to innovate. For companies operating across the world, it is important to have the flexibility for business, to develop the markets locally, adapted to the consumers of their services or products. And the paradox is that bureaucratization goes against that ideal. In safety, it 's been addressed by a number of people. Sidney Dekker, for instance, published The Safety Anarchist[5] about this idea of the problem of over-bureaucratized realities. At the time, in my view, he was not connecting this, well enough, with the origin of this bureaucratization, which was the product of globalisation (and to the academic work on bureaucracy more generally). So I'm not the only one pointing out this idea in terms of safety .

Therefore, it is a very interesting way of addressing a number of topics associated with safety critical systems. I was involved in several studies in the nuclear industry and from reading the stuff in all the domains such as the space industry or subnuclear industry that bureaucracies are paramount to create the conditions for safety. In these industries you have standards, you need expert, competent, trained people able to apply the standards in engineering, in operations and if you don't have that, of course, you are potentially exposing yourself to bad surprises.

How far can we push the kind of bureaucratic way of framing the system beyond a certain threshold in such ultra safe systems? (an argument developed by René Amalberti) They became ultra safe because of bureaucracy, because of standards and making sure that the standards could be applied and that they were good for that purpose (in design, maintenance, operations). If we've got airplanes flying the way they fly, as with the level of safety, it's because of those standards and the resources associated to implement them, obviously requires skills, expertise, people.

The problem comes when such standards in other contexts are no longer valuable because they address risks that are not worth this level of standardisation, but because there is a bit of a frenzy about trying to control everything, then the level of bureaucratization has become crazy with no sense. It's fine when you've got a rocket that you sent to space that the level of standards has to be very high. But when it comes to hurting yourself because you cut your finger with a paper? Not sure. How do you balance the value of bureaucracy in relation to the level of risk you're dealing with?

R Is it Max Weber's sense of finding the balance between bureaucracy?

Le Coze Yes, bureaucracy is a good thing when you can standardise processes and make sure that it is a repeated type of activity. Weber introduced this description also to refer to the ethic of bureaux, as explained by Paul du Gay. When you innovate, it might be a bit more controversial. Can you innovate in bureaucracies? I am not sure. But safety is not necessarily about innovating. It's about making sure that you do things a certain way, considering that the system has been designed that way to make it safe. So there is of course the issue of how you innovate without taking risks, which is impossible. So innovating always implies a certain level of risk, but you can build margins, engineering margins to innovate by making sure that you've got enough safety in your innovation. This question opened the box for very interesting and important discussions, and I published an article on this topic[6]. But we cannot just go back to the idea that bureaucracies are only hindrances and problems. They are also there to make sure that we are happy to take the plane and make sure that we go from A to B safely.

R Is it yours this concept of mega and the idea to incorporate it in the globalisation analysis?

Le Coze The first time I saw it formulated was in a book by Edgar Morin[7] I think, it is what my memory tells me... He introduced the idea of mega. The macro, meso or micro is the classic sociological way of framing the problem of individuals in society. The idea that societies could be understood through the prism of national borders is challenged by the power of globalisation. Our society is shaped in ways that cannot be understood only through the national perspective. So the mega is a way of saying that something is situated beyond the national (macro) level, elsewhere in the combination of the way nations are shaped by wider trends. This concept came up because there is a need to explain micro, meso, and macro . Now it has a different meaning than when it was perhaps developed 20-40 years ago because of that layer of analysis.

R And is it related to the concept of post-normal accident you developed in your second book?

Le Coze That's right. I insist more than I did in the previous book about this. And I create this, explicit drawing, again, visual. The digitalisation, the high level of standardisation, the financialized approach of companies' strategies or administrations, the externalisation of what used to be internal activities and the self-regulatory processes: these are forces created by globalisation that are currently shaping a lot of different industries. And it is only by understanding where it comes from that you can causally relate to your micro-observations. I show this empirically in an article published recently[8].

B Let's talk about the complex causality of the events and the attempt to anticipate them. Will it make sense to invest more in the analysis of network system interactions including, as you mentioned, cognition, socialisation and so forth than putting the analysis of the accidents?

Le Coze Complex causalities are the reason why we should be very careful and very modest but try to be helpful in the way we address this idea in organisations. It is very much about focusing on the interactions between the different categories of people, from managers to workers, engineers, and understanding the patterns of interactions there and to take this as a kind of unit of analysis. It's a key move intellectually, practically, and methodologically in my view. Trying to understand the relationship between specific kinds of interactions between people and their outcome in terms of events, whether they're quality events or safety events. When you do this, you start addressing the complexity of the patterns of interactions observed in practice. You can start connecting them to the probability, the frequency of events, and kind of combining the two. And when you do this, you start to move into the position of being more precise about how safety is produced daily.

You need to connect this with events. There are always events in companies. These events should be taken seriously and understood as the results of not paying enough attention to a number of problems. So it could be the customers not being happy about the quality of products, which means that things slip through the system. Or it could be related to safety with events that almost created an accident, for instance. And therefore you need to be able to connect the dynamic using the notion of dynamic construction of the systems and events.

B What is your approach to the relationship between power and safety in organisation?

Le Coze It pervades organisation, and it must be included somehow because otherwise you miss the important realities of companies. Managers are empowered by bureaucracies. But a manager can lose some of her or his power if it has not sufficient credibility, for instance, and if the expertise is available elsewhere in the organisation to solve problems. So the notion of power is relative to specific situations and that you need to uncover through ethnographic work for instance. Power is not a static thing. It is something that is created by the patterns of interactions between different categories of actors. Unions, for instance, can have great power in companies because of their abilities to stop work collectively if they decide to do so . And therefore this collective dimension of unions and workers can create specific patterns of interactions. I have many cases in which the power issue is at the heart of understanding a specific situation.

So, you need to locate power through empirical work, it cannot be inferred without close connection to data. Power is a relational property that you need to discover and that you need to make good use of in order to understand what goes on in a company. So it's a relational thing and it is situated at different levels. There is power in the environment of companies, with the States for instance, but there are other sources in the environment too, like professions. It is an analytical tool that is absolutely critical to our understanding of safety.

There are important notions such as culture too, but I often start with social interactions so that I don't focus on culture with the idea of finding an invisible influence on people that dictates their ways of thinking, of doing, of interacting. I'm more interested, at least initially, in how patterns are created by people interacting when solving their problems of cooperation to succeed in what they do, and how power plays a specific role in that. The notion of organisational structure is also an important dimension of culture, as argued by Hopkins with the question of centralisation of safety departments for instance[9]. Of course, culture matters but tends sometimes to be essentialized to represent invisible forces imposing themselves on individuals, which also tends to make us think that certain ways are fixed because that's the culture, whereas there is a lot of change too.

A Some aspects of accident investigation are more a power question than a technical question.

Le Coze Yeah, this is a political, social reality. They are both important, hence the notion of sociotechnical.

A In your experience, what is being done to face this? In Brazil, it is crucial. We had two terrible damn ruptures and despite a large quantity of studies from different groups, we did not have any change in the structure about how to investigate and how to prevent them.

Le Coze You have to situate this at the level of society. There's not enough social interest, not enough political agenda created to push for more regulation, for more power in terms of the institution in charge of regulating, controlling the system. So the momentum does not exist socially because as a movement, as a political agenda, it has not been sufficiently developed. Therefore you, as academics or universities, are powerless because the population – civil society, through associations for instance – has not created a movement for this to be addressed at the highest level of your institutions in parliament, to require a change in the law that would empower regulators, inspectors or experts to require companies to answer their questions.

In the nuclear industry it's different because the civil society organised scrutiny. People like Paul Schulmann of the High Reliability Organization (HRO) school , talk about "public dread". The public fear for certain activities is translated into the highest requirement through the law going through parliaments, through our democratic processes, to empower the state to require a closer scrutiny of the nuclear sector. It happens in aviation too, and more so after a crash. That's why you've got presidential and parliamentary commissions, as was the case for the Boeing 737 Max, with our political institutions empowered to require companies to release information. It is a question of power.

In fact, it's really sad to think that an unsafe infrastructure is still there, probably threatening again, perhaps not as much as before because companies realise that they need to do more (see for instance the personal experience of Hopkins in this mining sector)[10].

The law changed in France after we had a highly visible event in 2019, near Rouen, and there was a lot of media attention and a lot of public protests. There are now requests for more transparency about the outcome of the inspections by the state agencies about chemical plants. Now you go on the website of the ministry of ecological transition and you find out about the plants not complying with the law. So now it's more transparent. Higher level of scrutiny following an event, increasing "public dread", translated into higher requirements by the state in relation to the industry. That's one step beyond. They also created an independent investigation board for the chemical industry too, which did not exist before.

A I agree with this lack of social movement and this something unhappy. In the case of Brumadinho, it was possible to show the relationship between companies and governmental agencies that regulate the mining activity. The control is in the hands of the company. In some moments there was visibility, but it was not sufficient.

R We have politics financed by mining companies too and, after being elected, the politicians tend to protect their interests.

Le Coze It's lobbying of known multinationals and the power to do more than they would be able to do if the law was more constraining and this must be integral to an analysis of safety. Safety is a power issue, which requires the State to be very demanding about what it is that companies do, a message that Charles Perrow emphasised in his studies.

If that was not the case with flying, we wouldn't have the level of safety that we have. It's impossible to imagine that we take a plane with a crash every 10 flights. So there are of course companies that do a lot of effort to maintain that safety level through engineering, design and organisation but the State is there to remind companies of their duty to incorporate safety at the highest levels of expectations. The Boeing 737 Max story is a good reminder of these imperatives. The Federal Aviation Administration (FAA) was weakened, was kind of co-opted by Boeing (following public policy changes in FAA strategies), and they modified the way they were controlling and required Boeing to do the safety engineering design. It's a political and a socially structural problem.

B In the book "Thirty years of accidents" there are important critiques of Perrow's theory and also of others' models. Could you first tell us why these criticisms are necessary and how they contribute to safety?

Le Coze At the end of the book Human Error, James Reason[11] says that the next step is for sociologists to be involved because we need to know more about the complex relationships and interactions within the systems. We need to go more into that to understand the production of safety and the production of accidents. I never separate both. You can either study events from the past or events in daily operations. You need to combine the study of accidents and safety together. Something that needs to be embraced, let's take most of the two postures.

Why is it important to move on to complexity? Because we accumulate data, we can develop better theories. We know far more now than we knew 40 years ago. Imagine the number of studies available in safety research. It's tremendous. How much we know from the investigation of the Challenger[12], from the work of HRO with the contribution of Karlene Roberts and others, from the cases of BP, Boeing and the multiple cases available. We know so much. Is this translated into practice? Not as much as we could probably, even if there are improvements and that it is not an easy task in itself, an example of which is the success of Human and Organisational Performance (HOP), inspired by different works, from James Reason to Erik Hollnagel in ergonomics and cognitive engineering. I also see my role as a researcher to be using such ideas for practical purposes, either for looking back into the causes of accidents, or improving daily operations.

So I'm trying to push the boundaries here of what it is that we could do, we should do perhaps to understand more on a daily basis what it is that makes us safe and what it is that makes us unsafe by bringing the knowledge of different disciplines. And in particular a mix of ergonomics, sociology, and political science, combined in ways of thinking about safety. That's what I do and that's the challenge. That's my journey, and that is very exciting as well as frustrating at times.

A Finally, we would like to ask if you would like to suggest what we should read.

Le Coze I published new books that expand the programmatic ideas established in the book translated in Brazil. I have nuanced and deepened several ideas initially framed in this book in other books that are now available. So I can encourage you to see the broader picture of my work through what has been written afterwards.

I'm really pleased to see this book translated into Portuguese as one step in a broader journey. I've been writing about this topic regularly and consistently over the past decade. And I can encourage you to keep on reading what I've been writing. But of course that's a very self-centred way of presenting what should be read because it's only about my work. So read many other authors of course too, some are mentioned in this interview.

References

1. Turner BA. Man-made disasters. London: Wykeham; 1978.
2. Rasmussen J. Risk management in a dynamic society: a modelling problem. Safety Science. 1997 Nov-Dec;27(2-3):183-213. https://doi.org/10.1016/S0925-7535(97)00052-0
3. Latour B. Visualization and cognition: thinking with eyes and hands. In: Long E, Kuklick H, editors. Knowledge and society: studies in the sociology of culture past and present. Stanford: Jai Press; 1986. p. 1-40.
4. Latour B. Cogitamus. Six lettres sur les humanités scientifiques. Paris: La Découverte; 2010.
5. Dekker S. The safety anarchist. Relying on human expertise and innovation, reducing bureaucracy and compliance. London: Routledge; 2018.
6. Le Coze J-C. NASA, SpaceX, safety and (post) bureaucracy: reinterrogating the past, challenging the present with H. McCurdy. Safety Science. 2024 Sep;177:106599. https://doi.org/10.1016/j.ssci.2024.106599
7. Morin E. Les idées, leur habitat, leur vie, leurs mœurs, leur organisation. Paris: Le Seuil; 1991. v. 4, La méthode.
8. Le Coze JC, Dupré M. Safety as a network, digital and global reality. Safety Science. 2022 Dec;156:105896. https://doi.org/10.1016/j.ssci.2022.105896
9. Hopkins A. Organising for safety: how structure creates culture. Sydney: CCH Press; 2019.
10. Hopkins A, Kemp D. Credibility crisis. Sydney: CCH Press; 2021.
11. Reason J. Human error. Cambridge: Cambridge University Press; 1990.
12. Vaughan D. The Challenger launch decision: risky technology, culture, and deviance at NASA. Chicago: University of Chicago Press; 1996.

Other publications by Jean-Christophe Le Coze

Le Coze JC. 30 anos de acidentes: a nova face dos riscos sociotecnológicos. São Paulo: ASAS-Blucher; 2023. https://doi.org/10.5151/9788521221197

Le Coze JC, Journé B, editors. The regulator–regulatee relationship in high-hazard industry sectors new actors and new viewpoints in a conservative landscape. Springer: Cham; 2024. https://doi.org/10.1007/978-3-031-49570-0

Le Coze JC, Journé B, editors. Compliance and initiative in the production of safety a systems perspective on managing tensions and building complementarity. Springer: Cham; 2024. https://doi.org/10.1007/978-3-031-45055-6

Le Coze JC, Reiman T, editors. Visualising safety, an exploration. drawings, pictures, images, videos and movies. Springer: Cham; 2023. https://doi.org/10.1007/978-3-031-33786-4

Le Coze JC, Journé B, editors. Safe performance in a world of global networks: case studies, collaborative practices and governance principles. Springer: Cham; 2023. https://doi.org/10.1007/978-3-031-35163-1

Le Coze JC, Antonsen S, editors. Safety in the digital age: old or new problem. SpringerBriefs in applied sciences and technology. Springer: Cham; 2023. https://doi.org/10.1007/978-3-031-32633-2

Dupré M, Le Coze JC. Des usines, des matières et des hommes: de la sécurité industrielle dans la chimie. Paris: Presses des Mines; 2021.

Le Coze JC. Post normal accident: revisiting perrow's classic. Boca Raton: CRC - Taylor and Francis; 2020.

Le Coze JC, editor. Safety science research: evolution, challenges and new directions. Boca Raton: CRC - Taylor and Francis; 2019.

Acknowledgments: The authors thank the *Associação de Saúde Ambiental e Sustentabilidade* (ASAS) and the *Fórum Acidentes de Trabalho* (Fórum AT) for publishing and launching the book "30 Years of Accidents" in its portuguese version in Brazil.

Authors' Contributions: Hurtado SLB, Simões RR, Almeida IM, Vilela RAG contributed to the conception of the interview and development of the script. Hurtado SLB, Simões RR, Almeida IM contributed to the interview application. Hurtado SLB contributed to the transcription of the recording, data curation, and preparation of the preliminary versions of the manuscript. Le Coze JC contributed to the script revision, participation in the interview, and data curation. The authors have approved the final version and assume full responsibility for all aspects of the work.

Data availability: The complete data set supporting the results of this study is available upon request to the corresponding author.

Funding: The authors declare that this study was funded by the São Paulo State Research Support Foundation (*Fundação de Amparo à Pesquisa do Estado de São Paulo* – Fapesp) processes nº 2019/13525-0 and nº 2020/08413-6 and by the Public Ministry of Labor (*Ministério Público do Trabalho* – MPT), Public Civil Action nº 0010983-31.2018.5.15.0084.

Competing interests: The authors have no conflicts of interest to declare.

Presentation at a scientific event: The authors inform that this study has not been presented at any scientific event.

Received: May 15, 2024
Revised: July 03, 2024
Approved: July 15, 2024

Editor-in-chief:
Leila Posenato Garcia

Sandra Lorena Beltran Hurtado, Raoni Rocha Simões,
Ildeberto Muniz de Almeida,
Rodolfo Andrade de Gouveia Vilela, Jean-Christophe Le Coze

Jean-Christophe Le Coze e o estudo dos riscos sociotecnológicos
Jean-Christophe Le Coze and the study of socio technological risks

Revista Brasileira de Saúde Ocupacional
vol. 50, e7, 2025
Fundação Jorge Duprat Figueiredo de Segurança e Medicina do Trabalho - Fundacentro,
ISSN: 0303-7657
ISSN-E: 2317-6369

DOI: https://doi.org/10.1590/2317-6369/08424pt2025v50e7