Chapter 6
Subcontracting Safety (Cases)

Jean-Christophe Le Coze

Abstract Companies operating high-hazard installations in the process industry call upon consultants to provide safety-related expertise. They do so voluntarily but also in specific regulatory contexts which require operating companies to assess risks and establish a safety case, a structured evidence-based demonstration that the facility will not generate unacceptable risks for society. Consulting companies have different strategies and compete to gain access to contracts, which are selected according to criteria such as costs, technical propositions, trust or reputation. This creates a specific market. National regulators play a key role in setting the level of expectation regarding safety cases, by among other things, requiring the use of a third-party expert. These preliminary outcomes show the importance of situating and understanding the contribution of these private actors in process safety regulation and governance as another facet of subcontracting in relation to safety.

Keywords Contracting · Offshoring · Safety cases · Consulting · Expertise

6.1 Introduction

Most of the chapters in this book address the issue of safety and subcontracting (or outsourcing, offshoring) from a single perspective: some subcontractors, in their daily activities, are exposed to occupational or process safety risks because of the activities that they carry for a company (Quinlan, this volume), and some subcontracting can expose third parties, when for instance contracting work around high-pressure pipelines (McDermott and Hayes 2019). This situation requires therefore a mode of management which, depending on regulations, is adapted to the contractual dimension and supervisory roles to be performed by companies' employees.

They indeed need to make sure that activities reach their target safely (Gotcheva, this volume, Pilbeam, this volume, Pariès, this volume). But companies also

J.-C. Le Coze (✉)
Ineris, France
e-mail: jean-christophe.lecoze@ineris.fr

© The Author(s) 2024

J.-C. Le Coze and B. Journé (eds.), *Safe Performance in a World of Global Networks*,
SpringerBriefs in Safety Management, https://doi.org/10.1007/978-3-031-35163-1_6

contract out work to consultants in many areas including legal, financial, engineering, human resources, environment, strategy and management (Kipping and Clark 2012), Consulting has been a growing market in the past decades as a result of many trends including transformation of work, businesses and states in a context of globalisation in which industry and services strongly interact in what Veltz describes as a hyper-industrial society (and not a post-industrial one): industry has not disappeared, and services, through consulting, are major players of industries' operations (Veltz 2017).

In this chapter, I introduce how safety has become a consulting area covering management, behavioural, engineering and legal domains. Environment, Health and Safety laws contribute to the creation of this consulting market because many companies need external expertise to respond to regulations. One example is 'safety cases' for the process industries (e.g. oil and gas, chemicals manufacturing). Based on ethnographic studies, recent focused interviews and on preliminary research outcomes, four points are sketched in this chapter on 'safety cases' from a consulting angle: the 'safety case' consulting market; the strategies of companies running high-hazard activities; the consulting activity; the role of the law and control authorities.

6.2 Safety Consulting

Safety is one topic for which consulting has also developed considerably in various areas. The author's experience in the chemical and nuclear industry reveals that many consultants bring expertise in this domain, ranging from legal, engineering, behavioural or management dimensions associated with safety. For instance, in one case, following an incident, the top management of a company hired a consultant on 'behaviour-based safety' (BBS) to train people.

The aim was to help reduce 'human error' which was identified as one of the core problems behind the event which caused much trouble for the company. The approach consisted in a series of training sessions. Managers, supervisors and workers of production, logistics, maintenance and health and safety departments of the site on which the event occurred were enrolled in this training. Knowledge derived from a mix of psychology and cognitive science was combined in a two-day session during which several ideas associated with human error, safety, incident analysis and prevention were presented, discussed and translated in operational tools for improving practices in the future.

The same company also contracted legal advice (unrelated to the event mentioned above) to support one member of the safety management team in charge of regulatory compliance. This legal advice was IT based and consisted in updating the health and safety department on work and environmental regulatory evolutions of legal texts. This was associated with compliance to keep up with regulatory changes. These are some examples. They are not commented in terms of their relevance to practices despite conflicting views among people in these two cases. Companies' use

of consultants is not homogeneous, with some making much greater use of consulting experts than others.

6.3 Regulatory Consulting (Safety Cases)

In safety, consulting has also progressively become a part of regulation regimes concerning process safety (Lindøe et al. 2013). As safety in developed economies is strongly regulated, subcontracting comes for companies very often as a need to respond and to comply with these regulations. Companies do not have the internal resources to do so (this point is further developed below). In this sense, consulting can be understood as one of the regulatory (or governance) '*intermediaries'* (Abbott et al. 2017) or '*private facilitators*' (Owen 2021). Safety is indeed regulated through different laws including workplace, environmental or building laws which require different type of risk assessments to be performed to make sure facility design and operational practices incorporate regulatory requirements and targets.

In Europe for instance, environmental law requires hazardous installations to provide what is described in the literature as a 'safety case' (Sujan et al. 2016); workplace law entails (among other) assessment of explosive atmospheres (for which a kind of safety case is also expected) and building laws require a technical fire assessment. At the European level, these laws are framed by directives which are translated at national member-state levels.[1] In France, these directives are translated in French laws in three different legal codes: labour, environment and construction codes. To comply with these regulations, companies need to assess risks related to their processes and must follow a number of technical criteria and steps defined by regulations. Among the three areas indicated here (hazardous processes, explosive atmosphere, building fire), it is the 'safety case' of the environment code ('étude de dangers' in French) which exhibits the highest level of sophistication in both technical criteria and administrative steps to follow. This has to do with the diversity of hazardous processes covered by these regulations but also the level of hazard of some of them.

6.3.1 Hazardous Plants

Chemical plants, agricultural silos, pyrotechnic factories, dams, refineries, oil storage and now hydrogen, carbon capture, lithium batteries and wind turbines (this is not an exhaustive list) fall under the safety case regime. These diverse activities entail different hazards and level of risks. To cover this diversity of cases, the law has been

[1] For example, directive 2012/18/EU for major accident hazards (also known as Seveso III); directive 2014/34/EU for explosive atmosphere (also known as Atex) and directive 93/68/CEE for building fires.

designed to distinguish many different criteria which allow companies to determine their obligations. In this regard, depending on criteria regarding the nature and quantity of substances and products processed, stored or transported, companies must follow increasingly stringent processes as their level of hazard (as defined by the law) goes up.

The highest level of such expectations, for upper-tier Seveso sites, requires several administrative and technical steps that lower-tier sites do not need to follow. Administrative steps include informing and interacting with the Prefect through local authorities (DREAL). The Prefect and DREAL represent the state at the regional level in France and ensure that supervising companies comply with the law. Other administrative steps include local entities representing civil society (public enquiry) or other state and local actors but also associations (Coderst, environmental authority).

Technical steps consist in providing two studies: one on environmental impact (chronic risks) and another on hazards (accidental risks which cover explosion, fire, release of toxic substances in the atmosphere). Both are very often performed by consultants who assist a company in producing these studies and, sometimes, assist in the interaction with the authorities. Technical and administrative steps are intertwined as it is the technical input which feeds the many aspects of the administrative process.

In this chapter, consulting activities associated with the hazard studies (accidental risks) are briefly discussed. This discussion is based on several years of studying high-hazard systems using an ethnographic approach, interacting with a range of actors inside (operators, engineers, environmental and safety professionals, plant managers) and outside companies (regulators, consultants) in a wide range of safety-critical organisations. A recent series of interviews with ten consulting engineers in charge of safety cases provided additional insights.

What comes out of these studies is several aspects worth pondering when studying the subcontracting of 'safety cases' by companies. I introduce and sketch four different points based mostly on qualitative material of observations and interviews. The first one is related to what is a market which is structured by consulting companies' strategies in relation to their domain of expertise, a second is connected to the subcontracting strategies of hazardous companies when it comes to safety cases, a third characterises several aspects of the consulting relationships with hazardous companies (including the commercial dimension of selling services), while the fourth discusses the practices of safety authorities and the evolution of the law in relation to consulting.

6.3.2 A Market Structured by Expertise

As introduced earlier, the European Directive translated in the French law covers a wide range of hazardous processes and substances. They are organised in a document, a nomenclature which contains a great number of prescriptive rules for filtering expectations for the production of 'safety cases'. For instance, for the substance chlorine, above 500 kg in a plant, a company must apply the most stringent level of

safety case. Between 100 and 500 kg, administrative and technical expectations and steps for the safety case are lower and therefore less demanding.

When a level of expectations is determined, a 'safety case' must be prepared. The range of substances and processes included in this nomenclature corresponds first to a vast domain of knowledge and, second, to various degrees of potential complexity of 'safety cases'. If the law contains a prescriptive dimension with the thresholds established by this nomenclature (and sometimes through technical and legal requirements specified for specific processes, such as the storage of chlorine), there is a need for a specific risk analysis which relies on engineering expertise. In this respect, and from interviews with consulting engineers, the market seems to be self-structured around this diversity.

One hypothesis at this stage is that some consulting companies specialise in areas in which standardised responses can be provided but which do not require as much expertise as in other areas in which a higher level of knowledge is demanded. There is indeed a variety of consulting companies from small and local ones to multinationals. Consulting companies with higher expertise do not necessarily target the low expertise domain, for competitive reasons. Their business model is not designed to exploit standardised technology for which costs can be lowered as there is less engineering expertise involved.

6.4 Companies' 'Safety Case' Subcontracting Strategies

From the customers' point of view, hazardous companies also follow different strategies when it comes to subcontracting their safety cases depending, of course, on their resources, but not only. Multinationals with in-house HSE expertise (legal and technical) have three options: outsourcing, internalising or a mix of both. However, the trend observed over the years is, according to an engineer with a long experience with multinationals (and consistently with the evolution of capitalism, see introduction), to favour subcontracting.

One familiar reason is to consider such engineering activity not to be core of the business, but another prevalent reason is the increase in the number of safety cases to be produced which cannot be handled by internal resources only. Another one is the regulator who might prefer external analysis over internal ones, arguing about the need for independent analysis. When this is the case, the competent internal resources of the company can closely supervise studies and make sure that their approach is consistent across consulting companies and sites of the company.

Another option experienced in the industry is multinationals which provide or not their own guidance in terms of methodologies to be used and followed for the production of safety cases. Indeed, despite a form of prescriptive regulatory background with the nomenclature, the law does not specify in detail how a risk analysis in a safety case must be performed. The regulator only provides guidance. Companies can decide to produce their own standards as long as they can justify that they match the expectations of the law. This process is supervised by the authorities,

local inspectors, who follow the administrative and technical steps of the safety case process.

For small or medium-sized (SMEs) hazardous companies, the situation is quite different. They rely on consulting companies to provide the legal, technical but also relational (with authorities) competence that they do not have in-house. Some of them have no previous experience in dealing with such matters. As they change their process, expand their production or because of a change in the nomenclature, they cross a threshold and become affected by the safety case requirement. The situation is very different from multinationals, which have as much expertise as the consulting companies and can supervise, orient and manage the contracts very differently.

The activity of consulting

For consultants, the two situations are very different. Working for a multinational or working for an SME entails different commercial and technical relationships. As one engineer formulated it, about the multinational that she worked for, '*they could produce their safety cases themselves'*, but safety authorities often require an external view. In contrast, an SME needs many explanations concerning the implications of the safety case process. This contractual dimension is obviously one strong dimension of consulting work. Consulting companies compete in this market to secure contracts and bid against each other, creating opportunities for their customers to opt for the one that they prefer according to their preferences.

Technical quality, delivery time and costs feature prominently as key criteria of these competitive situations, but trust established in antecedent contracts or reputation of consulting companies can also determine choices. These criteria might vary depending on contexts which range from the sensitivity of the safety case for the company whether in relation to:

- time (e.g. a safety case is needed quickly to start a new activity);
- a deadline established by the regulator;
- a higher level of scrutiny by the safety authority (e.g. a hazardous process near a city which requires an extensive detailed and robust safety case);
- previous experience (e.g. satisfaction or dissatisfaction in the way a safety case was handled before).

In any case, one important issue for the consultants is to anticipate and to quote for the right amount of time to complete the safety case within budget and according to schedule (pressure to deliver on time can be high for hazardous companies as hinted in the list above). This estimate mainly depends on the size, complexity and sensitivity of the processes involved. Size and complexity mean quite logically more time needed to complete a risk analysis. Sensitivity might also mean more time as the number of scenarios to be modelled (e.g. fire, toxic release, pressure effects) depends on context. One sensitive context is proximity of hazardous processes to public buildings (e.g. school, hospital, housing). In this respect, local authorities can also contribute to the framing of what is expected for a safety case.

6.5 Inspectors and the Law

Although they cannot prescribe a specific consultant, inspectors of hazardous companies can translate their level of expectations, by, for instance, making explicit to a hazardous company that they could ask for what is called a third-party audit of the safety case. A third-party expert is a consulting company which critically reviews a safety case produced for a company, to find potential flaws in reasoning such as missing risks and incomplete accident scenarios. By law, it is possible for inspectors to require a hazardous company to contract with a third-party expert. It is not systematic but can be triggered if the quality of the safety case is considered not be of the expected level, or for other reasons (e.g. sensitivity, uncertainty, new technology). This legal context is therefore one strong defining feature of this consulting activity. On the one hand, it depends on the content of the law which evolves over the years (e.g. one major change followed the 2001 Toulouse accident; other incremental changes concern the content of the nomenclature); one the other hand, it depends on the translation of the law in specific contexts by inspectors of local authorities who can tailor their level of expectations through interactions with hazardous companies (use of third-party audit or not, for instance).

6.6 Conclusion

Hazardous companies in the process industry subcontract expertise in the safety field in behavioural, management, legal or engineering areas. They do so voluntarily but also in specific regulatory contexts which require risk assessments and safety cases. Requirements for safety case vary according to substances, their quantities and the processes involved. To comply with the law, hazardous companies very often subcontract their safety cases to consultants, while only a few multinationals can and chose to internalise this activity. Consulting companies have different strategies and compete to gain access to contracts, which are selected according to criteria such as costs, technical propositions, trust or reputation which in turn depends on contexts of hazardous companies. This creates a specific market. Local control authorities play a key role in setting the level of expectations regarding safety cases, by among other things, requiring the use of a third-party expert. These preliminary outcomes show the importance of situating and understanding the contribution of these private actors in process safety regulation and governance as another facet of subcontracting in relation to safety.

Ethical Statement Informed consent was obtained from all informants interviewed for this work, and their identity has been anonymised. Ethics approval is not required for this type of study in France.

References

K.W. Abbott, D. Levi-Faur, D. Snidal, Theorizing regulatory intermediaries: The RIT model. Ann. Am. Acad. Pol. Soc. Sci. **670**(1), 14–35 (2017)

P.H. Lindøe, M. Baram, O. Renn (eds.), *Risk Governance of Offshore Oil and Gas Operations* (Cambridge University Press, New York, 2013)

V. McDermott, J. Hayes, Risk shifting and disorganization in multi-tier contracting chains: The implications for public safety. Saf. Sci. **106**, 263–272 (2019)

D. Owen, Private facilitators of public regulation: A study of the environmental consulting industry. Regulation Gov. **15**(1), 226–242 (2021)

M.A. Sujan, I. Hablib, T.P. Kelly, C. Johnson, Should healthcare providers do safety cases? Lessons from a cross-industry review of safety case practices. Safety Sci. **84**, 181–189 (2016)

Veltz, La société hyper-industrielle. Le nouveau monde productif (Le Seuil, Paris, 2017)

M. Kipping, T. Clark (eds), The Oxford handbook of management consulting (Oxford University Press, Oxford, 2012)

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.