



Safety management at the frontier: Cooperation with contractors in oil and gas companies



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ABSTRACT

International reviews show the deepening of outsourcing (shifting from secondary to core processes) and, despite the legal hurdles implemented in developed and developing countries to control abuses, its strong connection to incremented job precarity and to the tendency to delegate the riskiest activities to sub-contractors. Through a mixed quanti-qualitative design, but essentially based in qualitative evidence, this paper compares the changes in the relationships with contractors that took place in 2012 in two oil and gas Patagonian subsidiaries when safety management systems were implemented. The comparison of these case studies highlights emerging hybrid forms of subcontracting conducive to more constructive and even cooperative ties between contracting and sub-contracted parties.

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1. Introduction

In the early 1980s Alain Wisner coined – along with his team of the Conservatoire National des Arts et Métiers in France – the

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¹ This analysis about the role of large multinational and local corporations in the technology transfer was inspired by the call for papers for a special issue published in June 2012 by the journal *Laboreal* (<http://laboreal.up.pt/>) about the state of the art in anthropotechnology, as a tribute to Alain Wisner. A first draft of this paper was presented at a conference to which we were invited by the *Association Internationale des Sociologues de Langue Française* (AISLF) during its 19th Congress, held in the city of Rabbat, Morocco, in July that same year.

² Alain Wisner presents anthropotechnological islands in the following way: “The great discovery of the Philips Company (and other Companies) is that to obtain the same products, it is not enough to have the same machines. It is also necessary to have people in the same physical and mental state, and organized in the same way. (...) The creation of anthropotechnological islands is only indispensable in the case of advanced technology. For instance, the Unilever factory in Bombay is managed, from the point of view of safety and hygiene, in a remarkable way, with a very low labor accident rate. The same goes for the Volkswagen factory in Sao Paulo. In Minas Gerais, Brazil, I had the opportunity to visit the steel mill of Joao Monlevade (Pont-à-Mousson). There, again, we couldn't find any of the terrible difficulties experienced by Brazilian workers: good housing, a health center, schools, all financed by the company, and the impression of being constantly on company grounds. In other words, the character and the degree of ‘the isolate’ are the result of a decision, of a policy implemented by large corporations. In fact, such islands shouldn't surprise us; they correspond to what was created in France at the end of the reign of Louis XVI for the Salines d'Arc-et-Senans and in the 19th century for iron and steel works, coal and railways. At Noisiel, in the Parisian suburbs, it is possible to visit the village-isolate around the Menier chocolate factory” (Wisner, 1985).

concept of *anthropotechnological islands* to refer to the way to manage safety in the branches of multinational companies located in developing countries (Wisner, 1984, 1985).¹ According to this author, the method consisted of isolating industrial plants from the contexts in which they were located: within them, workers had organizational conditions similar to those in the country of origin of the company, thus obtaining productive performances comparable in terms of safety to those of the headquarters.² Wisner wondered about the local companies “...why in the same country, in the same town, can workers belonging to the same population give very acceptable results in an ‘anthropotechnological island’ and unsatisfactory ones³ in a national company?” To what he responded: “The usual reply is of a socio-cultural nature. It neglects what may be called the incomplete transfer and leaves little room for ergonomics, especially the most up-to-date ergonomics, that of cognitive activities and communications” (Wisner, 1983: 30–31).

During the thirty years after these publications, downsizing processes took place in organizations through the outsourcing of initially peripheral activities (such as cleaning, gardening, or the

³ For example, “...a higher rate of work accidents, a greater frequency and more numerous categories of occupational illnesses, a specific development pathology (increase in parasitosis as a result of the spreading of stagnant irrigation water, psycho-pathology of shantytowns, etc...) justifying a development hygiene.” (Wisner, 1983: 30).

buffet) and later of core activities, with a direct impact on safety, like the daily maintenance of high-risk installations, jointly contributing to the development of subcontracting networks. Did the up-to-date technology transfer that characterized the anthropotechnological islands extend in the new scenario to local contractors?

Unfortunately, it didn't. At least, that's the result shown by the literature about subcontracting processes worldwide. The priority in these processes was the reduction of costs. As a result, instead of the transference of risk management technologies, what took place was the transference of riskier activities to contractors. That happened to such a point that once the negative impacts on safety and health of the workers became evident governments – first in developed and then in developing countries – were forced to take action through legislation and government enforcement bodies. Simultaneously, advances were made in the self-regulation of sectors and companies that performed high risk activities, reflected during the last decade in a peak in certification of safety management systems in the branches of local and multinational companies. Did this last fact encourage the spreading of new safety management technologies to the contracted SMEs?

This article presents the result of research performed in 2012, through which we investigated the functioning of the recently certified safety management systems by means of perception surveys⁴ involving the staff of the contractors in the branches of two oil and gas Patagonian subsidiaries: one of a local, state owned company and one of a multinational company.

Regarding similarities between the two cases, the first and more evident one resides in the implementation and certification of a safety management system and the interest in reducing the gap between practices and norms showed by the results of our perception study. The second one is related to the resort to hybrid coordination forms with the contractors. The characteristics, reasons, consequences and future perspectives of such hybrid forms raised some questions: were these forms coherent and stable or were they conflictive and transitional? In other words, were we witnessing an innovative form of coordination between the company and its contractors, or a variant of the more traditional mechanisms of coordination between both?

We found that, in addition to specific features which are described for each particular case, there are emerging hybrid forms of firm coordination that are being overlooked by current scholarship. In the first case, the hybrid nature of the job is a response to the bureaucratic, vertically-integrated and closed organizational structure of the firm, and its difficulties to adapt to the requirements of a new generation of Safety Management Systems. In the second case, the hybrid form of "organic contractors" reflects instead a fundamental change in the relation with contractors within an organization which depends on local contractors for its safety operations.

1.1. Methodology & materials

We will keep the companies anonymous by using fantasy names. GEAR in the case of the branch of the multinational company and GENECH in the case of the branch of the national, state-owned company. Both were located in countries in the southern cone of Latin America and specialized in oil & gas extraction. The survey from where we extracted the data for this paper

was conducted after the implementation of a Safety Management System (SMS) according to international standards (OSHAS 18001) in the case of GENECH and according to company headquarters standards in the case of GEAR.⁵ Both surveys were conducted by request of both organizations.

The diagnostic was carried out in two consecutive phases, based respectively in qualitative and quantitative techniques. In the initial phase, a questionnaire with 100 questions was answered by 90% of the workers of GEAR and GENECH, including contracted workers (permanent and temporary), and the workers of the contractors that were working for both companies at the time. The management in both companies (directors, managers and supervisors) responded the survey in 100% of the cases. At the GEAR branch 1836 people responded while 1270 did so in GENECH.⁶

The questions were grouped for their analysis according to a set of parameters referring to individual and group behavior, the organization of work and board and management practices. After the statistical analysis, the interpretation of the results was discussed in individual and group interviews (focus groups) carried out in the workplace (corporate offices and oil and gas camps) with the participation of staff from different hierarchical levels, sectors, specializations, seniority, and contract types. The aim of the meetings was to collect contextualized interpretations and explanations for the quantitative results and additional information and proposals for the solution of identified problems. At GENECH we recorded the discussions held in 16 focus groups organized in 3 different locations, with a total of 72 interviewees. At GEAR we called 37 focus groups in 5 different locations, with 143 interviewees. The present paper will work on the qualitative data through a systematic treatment of the testimonies recorded in the interviews.⁷ As opposed to the majority of case studies in the literature, which is generally focused on the analysis of incidents or accidents, this research presents and compares two case studies that highlight practical lessons learned from positive, proactive problem solving experiences. As will be further developed in the sections below, attention to proactive cases can help develop benchmarks useful for strategic decision making within (and beyond) specific organizations.

The survey was not conducted by sampling. All the employees present in the companies at the time of conducting the survey responded the questionnaire – regardless if they were company or subcontractor employees, so that it could accomplish the double role of instrument for an employee collective involvement and diagnose study. At the multinational company, the employees hired by contractors stood for 71% of the responding employees. At the national company, that percentage was 53%. These proportions are common to oil and gas companies, which constantly undertake site works for which they resort to subcontracting.

⁵ The design of the survey was done with the collaboration of Marcel Simard in the framework of a cooperation agreement between the *Centro de Investigaciones por una Cultura de Seguridad* at the Universidad de San Andrés in Argentina (<http://www.udesa.edu.ar/Unidades-Academicas/Centros/Investigaciones-por-una-Cultura-de-Seguridad/El-centro>) and the *Institut pour une Culture de Sécurité* in Toulouse, France (<http://www.icsi-eu.org/fr/>).

⁶ The methodological strategy of the research, which is based in the survey of every person (not only permanent staff) performing duties, allowed measuring the reach of outsourcing, identifying different forms of interrelation and, more importantly, involving the staff working for contractors in a reflection about the survey's results in the qualitative phase of the investigation. It was the richness of the testimonies in this phase combined with the virtual lack of research integrating contractors, qualitative and quantitative methods, in the diagnose process, that motivated this article.

⁷ The collection of testimonies was done by dactylographic notes during the meetings. For its analysis, we assessed the possibility to resort to software specialized in the analysis of quantitative data, but we opted for manual index cards and post-codification. The volume and the nature of the material collected didn't justify adopting a software.

⁴ With the goal of investigate about "The shared perceptions of organizational members about their work environment and, more precisely, about their organizational safety policies" (Cabrera et al., 1997; cit. by Guldenmund, 2000: 219).

2. Old and new forms of outsourcing

The trend in management literature in the early 90 s of the last century promoted the virtues of outsourcing as a factor for competitiveness since it allowed simultaneously to reduce costs and to allocate the savings made to the development of core competencies of the firms (Pralhad and Hamel, 1990).

2.1. Old forms: the precarization of jobs

Reviews on outsourcing processes showed that, due to the emphasis on cost reduction, such processes brought about the disorganization of labor, the precarization of jobs and a double, legal and union defenselessness (Quinlan et al., 2001; Rousseau and Libuser, 1997), with the subsequent increase in accidents and their impact on health (Mayhew et al., 1997; Nenonen, 2011).

The phenomenon had global reach, involving both developed and developing countries. The latter suffered most due to the structural weakness of its labor markets: “there is good evidence that precarious employment is expanding in the third world ... where the informal sector typically accounts for over the half the workforce” (Quinlan et al., 2001). In Latin America, outsourcing was the main underlying factor for labor flexibilization, that is to say, in the “flexible adjustment of the amount of labor according to the needs of the market and the production” (de la Garza and Arteaga, 1998: 203). According to literature reviewed by Lais Abramo for the American continent and by Marcia Leite for the Brazilian case, the situation of labor in the productive chains was defined in the late 90 s by the precarization of labor “...as a consequence of the intensive use of poorly paid labor, the use of obsolete equipment, the informality or absence of contracts, the low qualification levels and the despotic or paternalistic management methods” (Abramo and Abreu, 1998: 47), and for the “...keeping of repetitive and unqualified jobs, the increase of rhythms, the intensification of control, the loss of benefits, the decrease of wages, the precarization of employment and the rise in the incidence of professional illnesses” (Leite, 2003: 208). In a latter review it was however verified that “...the situation is not homogeneous. There are different factors that can have crucial importance on the working conditions of contracted firms such as the position of the company within the subcontracting chain, the sector and the corporate strategies deployed facing the crisis” (Iranzo and Leite, 2006: 277).

2.2. Outsourcing of risks and the control of abuses

Latin American literature, in fact, has not taken into account the risk level of the activities undertaken by companies, a key factor for our research. In the companies that perform high risk activities it was verified a tendency to outsource the riskiest activities, which made legislative action and the implementation of state abuse control systems necessary, though not always effective (Johnstone et al., 2005; Johnstone, 2005; Nossar et al., 2003). The text by Johnstone and others reaches indeed a conclusion on a pessimistic note about the regulatory changes: “What is particularly disturbing is the recognition that even in the one area where efforts to combat adverse effects have been carried out for some period of time, namely in relation to subcontracting, the results of regulatory intervention are, at best, very limited” (Johnstone et al., 2005: 393).

The propensity to assign the riskier tasks to employees of contractors is confirmed by a review of French ergonomic literature (Tazi, 2010), in which a 2003 report is quoted, published by the French Maintenance Engineers Association, according to which the staff of contractors experienced in that country more accidents than full-time employees of the hiring companies. The author of such review undertook a case study in a petrochemical

plant where the subcontractor employee accident rate doubled that of the full-time staff. She also commented on a survey made in French nuclear energy companies, which verified that the maintenance contractors were exposed to 80% of the radiation risks (Thebaud Mony, 2001; quoted by Tazi, 2010) and mentions, lastly, the conclusions of a case study conducted in Australia according to which “...contractors were involved in that country in twice as many accidents or incidents than the company’s full-time employees, which was explained by the specific risks they were facing and therefore the exposure to risks, both increased due to the intensification of work” (Mayhew et al., 1997).

2.3. The deepening of outsourcing

One of the most relevant conclusions of Tazi’s paper in connection to our research does not refer, however, to the outsourcing of risks but to the deepening of outsourcing with regards to risk management: “...subcontracting has evolved considerably during the last two decades, expanding from activities with no added value for clients, such as catering, transport or gardening to the subcontracting of direct support for the business, such as the maintenance of the production units”.⁸

2.4. New forms: cooperation with contractors and a surprising phenomenon

Tazi’s pessimism on to the risks of outsourcing is not endorsed by the case studies carried out by Javier Cantero in France in the same sector for his Phd thesis on subcontracting modalities in four petrochemical platforms⁹ in the region of Rhône-Alpes, located respectively in Rousillon, Jarrie, Pont de Claix and St. Fons (Cantero, 2008). Even though Cantero agrees on the fact that contracted companies had higher frequency accident rates, the newest and most important was – and he supports it with statistical data – “the distance reduction in frequency rates of contracting and contracted companies in the chemical sector in general and in the four analyzed enterprises in particular”. In the Rousillon platform there were records of an uninterrupted reduction of frequency rates since 2000 and, even more interestingly, in the Jarrie platform “...since 2003 a surprising phenomenon was taking place: the safety indicators of outsourced companies were better than those of the contracting enterprise not only regarding frequency rates but also the accidents’ seriousness level”. What had led to success in this and other platforms? In the first place, the thesis observes, as do other aforementioned texts, an evolution in private and public regulation,¹⁰ which triggered the evolution of regulations on safety management devices in connection to contractors’ work.¹¹

⁸ At the petrochemical plant studies by Tazi “subcontracting of maintenance stood for 50% of the hours worked at the plant, equivalent to around 2.5 million hours of work per year”. As for the reasons to subcontracting maintenance, he mentions the following: “...a strategy consisting in focusing in the ‘core business’; the need for competent and specialized personnel in all maintenance activities; the reduction of personnel costs, especially in those activities with lower added value; the need for flexibility and rationality with the personnel present in the facilities”. (Tazi, 2010: 2).

⁹ “Platform” refers to a site where different companies with the same specialty or with connected specialties are settled.

¹⁰ Cantero refers to Decree 92–158 from February, 20th 1992 on works carried out on a site by an external firm and Norm DT 78 dictated in concomitance by the Union of French Chemical Industries (UIC) implementing a system authorizing exterior companies. Ten years later Law N° 2003-699 was established concerning natural and technological risk prevention and damage repair.

¹¹ In the cases analyzed in this article both circumstances arise. In one of them the SMS implementation occurred after a national regulation change that established solidary co-responsibility of the contracting party in accidents occurring in contracted companies and in the second one it was caused by the implementation in the subsidiary of some regulations conceived in the headquarters of the multinational company.

2.5. The new forms of coordination

According to Cantero, a 1992 French executive order¹² "... installed a coordination mechanism between the contracted and the contracting enterprises establishing that, represented by their managers, the enterprises had from then onwards to interact in order to implement prevention measures (a Prevention Plan) and guarantee communication regarding the characteristics the intervening employees had to have, including employees from companies that were contracted by the contractors. This communication nexus had to be maintained before, during and after the work, mainly through periodical inspections and meetings". At the same time the regulation DT 78 implemented an external enterprises qualification system "that aimed at training employees both from external and own enterprises so that they could have their own risk management system. Since this regulation was established the hiring enterprise had to select contracted enterprises following not only technical and economic criteria but also health, hygiene and environmental ones".

A decade later, Law 2003-699 «aimed at strengthening the cooperation between managers particularly regarding risks resulting from co-activity. This law conferred the main executive of the contracting enterprise the "comprehensive management of industrial risk". This ruling distributed responsibility in a more balanced way than 1992's decree according to which the main executive of the outsourced enterprise was the sole responsible. Another regulation derived from the Law that strengthened co-responsibility between the contracting and the contracted enterprises was the expansion of Hygiene and Safety Committees integrating representatives from the outsourced enterprises in them" (Cantero, 2008: 266).

In addition to the mechanisms and restrictions established by legislation (limiting subcontracting cascade, establishing prevention plans, Committees for Hygiene, Safety and Working Conditions "...and other regulations tending to co-responsibility"), "proximity networks"¹³ with the contractors were created in the platforms together with a contractor's specializing process and the creation of formal and informal inter-enterprise onsite coordination and control mechanisms (Cantero, 2008: 266).

Just like Dounia Tazi's "pessimism" coincided with negative tendencies observed in Latin America that, as we will see, persisted in one of our case studies; Javier Cantero's "optimism" is linked with subcontracting ways we can observe in the second enterprise we will now present.

From Cantero's thesis we are interested in highlighting the following conclusion referred especially to industries including high risk activities: "It is through a new structural configuration of the platforms with numerous interlocutors (*partenaires*) that organizations face the system's complexity. A complex system must resort to complex dispositives or, using our terminology, complex modalities of inter-enterprise governance. In other words, if the enterprises disintegration (*éclatement*) had not taken place, a vertically integrated enterprise couldn't have been able to face the growing complexity of the system. It is due to the disintegration and therefore the specialized enterprises including outsourced companies that the new structural configurations (platforms,

industrial complexes) become a suitable and unavoidable answer to the system's complexity" (Cantero, 2008: 262).

2.5.1. Summary

Latin-American literature brought to light the main and darkest features of outsourcing linked to labor precarization, in order to reduce costs, affecting the workers' health through disorganization and work intensification, and the deterioration of work environment and conditions. Such literature doesn't focus however on the situation of industries carrying out high risk activities like the ones examined in the present research. In this type of organizations the tendency was not, however, different in any way. In any case, high or low risk industries, it was the abuses of subcontracting that caused a legal intervention, often accompanied by the entrepreneurs' own initiative alone or through their associations. Another important fact observed was the deepening of outsourcing that moved forward from peripheral processes (such as cleaning or gardening) to central processes (such as high risk facilities' maintenance), that didn't escape the tendency of getting rid of the riskier activities. Nevertheless in pioneer sectors and cases as the French petrochemical plants studied by Cantero the tendency toward risks' outsourcing was replaced by contractors' co-responsibility, establishing collaboration links with contracted enterprises and the development of proximity networks; reverting this way the tendencies in the field of safety results.

In the cases of the Latin-American southern cone subsidiaries carrying out high risk activities we will now examine, there are still important and possibly persisting traces of initial forms of outsourcing marked by an emphasis in the costs, labor precarization and the transfer of risks to contractors (particularly in the case of the local, state owned company), but there is also consistent progress (as we will see in the case of the subsidiary of the multinational company), toward improving safety conditions in the work of employees from contracted enterprises and the joint management of safety by contracting and contracted enterprises. Taking up the tradition of the studies conducted by Wisner and his team at CNAM in France, we will try in this way to contribute to the conceptualization of subcontracting networks as vehicles for the transfer of technologies to SMEs in less developed contexts.

3. The cases

The first case (GENECH, a large state-own company) shows on the one hand highly negative consequences derived, in order to reduce costs, from having temporary contracts for high risk positions in the company; and on the other hand an important – but contradictory with the latter – improvement in the relations with contractors regarding safety as a result of the implementation and certification of a safety management system according to OHSAS 18.001 international standard.

The recent implementation of SMS took place short time after a new legislation was enacted in the country where the company was settled. This law, passed in the second half of 2000s established the joint responsibility for contracting enterprises regarding accidents taking place in the contracted enterprises.

The second case (GEAR, a subsidiary of a multinational enterprise), had also implemented an SMS but framed it in an implementation plan that included every subsidiary in the group at an international level. Unlike the first case, this company did not resort to temporary workers for high risk jobs. Simultaneously, outsourcing was in this case stronger because it involved key positions and activities related to safety management.¹⁴ In fact it is in

¹² Mentioned in the previous footnote.

¹³ "The proximity reaches very high levels there are even contractors settled in the platforms (...) In general what we have mentioned is caused by the subcontracting companies deciding to concentrate contractors in a very small group of companies that usually belong to large industrial groups that have developed specialized industrial maintenance lines and other activities that have been traditionally object of subcontracting. Sharing the same space helps knowing the site's specificities besides contributing to a long-term commitment of the external companies to the site's safety" (Cantero, 2008: 266).

¹⁴ In fact, one of the two HSE Managers at GEAR was an organic subcontractor" (this category is explained in the footnote after the next chart).

Table 1
Amount of persons carrying out activities at GENECH and GEAR when the Survey took place (2011) according to different types of contractual relation. Source: Safety Culture Survey.

GENECH			GEAR		
	V.A.	%		V.A.	%
GENECH permanent staff ^a	598	47	GEAR permanent staff	529	28.8
Hired temporarily by GENECH ^a	259	20.4	Organic contractors ^b	581	31.6
Contractors staff	413	32.5	Contractors staff	726	39.5
Total	1270	100	Total	1836	100

^a *Hired temporarily by GENECH*: personnel hired directly by GENECH for six months who could not be re-hired by the company immediately after that period.

^b *Organic Contractors*: personnel from contracted companies who work permanently for GEAR and in many cases occupy hierarchical positions in its organizational chart (which is the reason they are called organic). They supervise safety in tasks performed by other contracted companies and receive to that effect the same safety management training provided to GEAR's permanent safety employees.

^c The average age of the permanent staff at GENECH was 56 years old, which was a sign of the company not recruiting staff directly. In the future, when the permanent staff retires there will probably be a reduction of the permanent workforce and an increase of the hired one.

this second case where the new forms of subcontracting we refer to at the end of the literature review emerged.

As we can see in Table 1, the proportion of contracted workers exceeded 50% in the vertically integrated state company, and over 70% in the private multinational company which had a high degree of outsourcing since it was established in the country in the early 1980s. Unlike GENECH that carried out those activities with their own staff or hiring new one; GEAR didn't hire the staff directly but resorted to contracted companies for drilling new wells, maintaining facilities and managing safety.

It is also worth mentioning that both companies underwent a profitability crisis related to the maturity of the deposits exploited in this region. The second company was making an effort to counterbalance the crisis through large investments meant to extend the extraction scope.¹⁵

3.1. The GENECH case

We will first refer to the context in which GENECH implemented the SMS and then we will give some results of our evaluation concerning the changes they made.

In mid-2000, a law was adopted in the home country of the state-owned company establishing mandatory joint responsibility for contracting enterprises regarding accidents taking place at contracted companies. One year after the adoption the state company implemented a safety management system according to the OHSAS 18001 international standards.

3.1.1. Contracting to reduce costs in high risk positions

Our survey showed that in high risk extracting jobs – also known as “wellhead” positions – the traditional practice of assigning experienced workers had changed in order to reduce costs in favor of workers who were contracted for 6 months and that according to the national labor regulations could not be contracted again. The experience these workers could gain was always insufficient, the need of strict supervision became constant and it wasn't a coincidence that the most serious accidents in the last years had always taken place in those positions.¹⁶ Here are some selected testimonies from individual interviews with supervisors and focus groups with workers:

“Previously, in order to work with autonomy in these positions they asked for at least three years of experience” (Old maintenance worker);

¹⁵ This gives the idea of bigger restrictions faced by the first company which could explain its hiring behavior.

¹⁶ Taking the 59 accidents in the Extraction Sector –that concentrated high risk positions - in 6 years (2006–2011), only 4 of them had involved permanent staff and 55 (93%) transitory staff (data taken from the annual report carried out by the safety area of the company). The temporary staff hired by GENECH represented however only 26% of the total staff (permanent + transitory).

“We have to be all the time on top of the temporary employees to prevent them from doing what they don't know how to and having an accident” (Extraction supervisor);

“They usually have accidents the week before their contract's expiration. They are unfocused, usually worried about finishing the contract and not being able to be re-hired by the company.¹⁷ If they are lucky they will end up working at a supermarket and many of them have families they need to support” (Extraction supervisor);

“When we start to learn the contract is over” (temporary worker).

In sum, even if adopting special measures aimed at solving that problem was clearly advisable after implementing the SMS, the cost-reduction criterion related to contracted workers in high risk positions was not modified.

3.1.2. Work permits and its positive effect on contracted companies' staff

Some of the implemented safety management tools were aimed at the work of employees from the contracted companies carrying out tasks at and for the company, for example:

- Morning meetings with GENECH supervisors in order to organize the tasks that had to be performed by the contractors during the day.
- Risk analysis and procedure development for risky tasks.
- Preparing work permits to supervise the fulfillment of those tasks.

As it usually happens when this sort of tools are implemented in companies with a long tradition of safety management based on worker's experience (Simard, 1996), the first reaction is a strong resistance to formalizing and following procedure protocols, starting with the supervisors. It is in this context that the enterprise requested in 2010 a diagnosis part of which was focused on the relation with contracted workers and the contracting companies.

The results of the survey and the focus groups with GENECH supervisors and workers, and management from contracted enterprises shed interesting light on the efficacy of the new management tools.

In the first place, GENECH's supervisors acknowledged they had first experienced as a heavy burden the mandatory daily morning meetings, analyzing the risks related to the tasks of the day and filling in the work permits to later supervise the contracted companies' workers in the field. But after one year of implementing the SMS the task is not a burden any more – most of the risk analysis are already done and filling in the forms doesn't require the same

¹⁷ If the explanation given by this interviewee is accurate, the triggers of this accident are not only the insufficient training but also a psycho-social risk deriving from job instability.

amount of effort. In other words, the new way of work had become a habit not only for them but also to the executive directors and the workers from contracted companies.

The most interesting effects derived from this change in safety practices was not any of the aforementioned but the new perception from both the hierarchy and the workers from contracted companies about the positive consequences the implementation of the new tools had had in their work. Here are some of the testimonies from two focus groups:

“GENECH was used to tell us: ‘send us 10 persons’, without specifying the tasks the persons had to perform. Now we are informed of the tasks they will carry out and the required conditions to perform them” (Manager from a contracted company);

“With the new system we work less, we work better and we do it in a safer way” (Worker from a contracted company)

3.1.3. Coordination of safety policies

At a meeting attended by managers from companies contracted by GENECH a clear distinction was made between small and medium-sized local companies in charge of the tasks carried out by persons whose testimonies we have already reported; and the contracted companies which were subsidiaries of big multinational enterprises and that had their own safety management systems. The manager of a local subsidiary of a multinational company providing catering services that was in charge of the restaurants in GENECH's camps made the following comment in one of the focus groups:

- *“We implemented an SMS supported by our headquarters a long time before GENECH did”;*
- *“This is the first time we are convened by GENECH in order to state our point of view in safety matters”;*
- *“If an event took place in the camp we don't have a shared course of action to face it in coordination with all the present organizations.”*

3.1.4. Cost reduction vs. safety: normative contradictions

In order to deepen our contractors-related enquiries we organized a focus group with staff from GENECH's Purchase team. The team members informed us that “unfortunately” – that was the term they used – the company was still basing the contracting in the sole criterion of the best price “...even if we have statistics on the performance of our contractors in safety matters”.

3.1.5. Summary

The state-owned enterprise GENECH implemented a safety management system when facing a national legislation change that made it responsible of the accidents occurred in contracting enterprises.

The survey revealed major progress acknowledged by managers and workers from local contracted companies as a consequence of successful systematic implementation – finally accepted by everyone – of key-tools to prepare and supervise tasks carried out by workers from contracted companies, such as work permits and risk assessments. However, it also brought to light normative inconsistencies resulting from keeping in other areas of the organization (such as the Purchase team or the HRM area) criteria that was incompatible with the new system's goals. In fact, once the new safety management system was already implemented the enterprise kept previous recruiting policies including not experienced workers with short term contracts for high risk positions,¹⁸ and a

¹⁸ In order to compensate this there was a close permanent supervision (which main task consisted in preventing the hired staff from undertaking risky duties, that's to say, risks they were not sufficiently trained to face). Obsolete equipment and tools whose operation depended exclusively from the worker's strength and physical skills caused the high level of risk associated to these positions.

purchase policy exclusively based on price of goods or services provided by contractors. Those normative inconsistencies contradicted in practice the slogan in the posters “safety is the companies' top priority”.

These sort of incoherencies are common in large organizations and have been described by Henry Mintzberg as *dysfunctional hybrids*, produced by the “combination of hybrid forces that are dysfunctional either because they are arbitrary or because they reflect the lack of a clear executive decision” (Mintzberg, 1985: 318). Having said that, this clear decision was hard to make due to opposite demands the organization was facing simultaneously.¹⁹

Lastly the survey also revealed a coordination deficiency with contracted companies. The managers claimed for the need to streamline their safety policies with GENECH's camp safety policies.

3.2. The GEAR case

We carried out a survey at GEAR in 2011 after they had implemented their own safety management system in every subsidiary across the world. Unlike the precedent case, the system implementation was not motivated by local legislation but developed in-house by HQ, subject to a stricter regulatory framework.²⁰

It must be taken into account as a starting point of this analysis that in the periodical audits of the management system carried out in every GEAR subsidiary by an external consultant, the local subsidiary was part of a very small group of outstanding performance.

As we have mentioned above GEAR wasn't working like GENECH with temporary staff. Regarding the contracted companies we were surprised by a special staff category in GEAR: “organic contractors” that lead us to find out more about it.

3.2.1. Staff seniority

Besides receiving the same safety management training as the permanent staff we were surprised to find out that the organic contractors had a very similar “seniority”²¹ distribution (see Fig. 1).

As we can see something similar happened with the contractor's staff: in the category 4–10 seniority years, both the organic contractors (48%) and the contractor's staff (46%) were more numerous than GEAR's permanent staff (42,2%). A manager at GEAR provided the following explanation: “Even if the contractor changes, most of the staff is still the same. There is a minimum of fifty and fifty percent so that the trained fifty percent can translate the knowledge to the new fifty percent”.

This data confirms that the subcontracting problems GEAR was facing had different scope and features than the ones observed at GENECH. At GENECH there was a clear link between subcontracting, precarization and risk outsourcing in extractive tasks. Moreover and according to the testimonies before the recently implemented SMS, GENECH requested staff to the contractors without specifying the tasks they would have to perform

¹⁹ On the one hand the demands of the new labor safety law regarding contractors; and on the other hand, the need of reducing costs caused by the permanent staff's aging (that meant a “heavy burden” concerning direct and indirect benefits in salaries, derived from their condition of public servants) and the maturity and high production costs of the old extraction sites of the company.

²⁰ When GEAR implemented the safety management system there was no regulation about the co-responsibility of the contractor in the country it was located.

²¹ We stress “seniority” because it refers to the amount of time workers had served without any interruption at GEAR even if during that period their hiring company had changed.

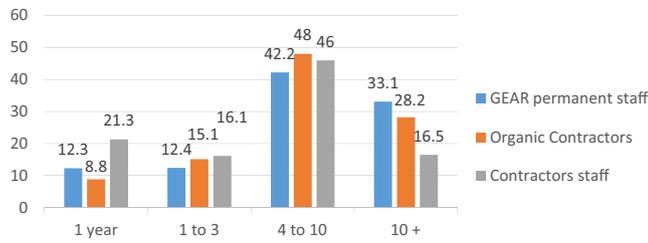


Fig. 1. Seniority of the Staff, per contractual relation (in percentages). Source: Table A1 (Appendix A).

nor the risk level while GEAR tried to keep the best workers from the contractors even if the contractors had been replaced. Lastly, in GENECH there were no hybrid categories such as the organic contractors and key activities – such as maintenance or drilling – had not been outsourced.

3.2.2. Organic contractors and supervision

The organic contractors performed key safety activities such as facility maintenance under the Maintenance Management Department and the work supervision under the Project Management Department.

According to the testimony of a Director working at the Project Management Department, the supervision of the construction works had, compared to maintenance or production, the characteristic of not including routine tasks: “The situation at the Project Management Department is very different than the one at Operations: maintenance and production are routine jobs while our work is not because we construct” (Director MRI, 6 years²²). MRI is the company that provided the organic contractors working at GEAR’s Project Management Department. In fact, a big part of the supervisors at the Maintenance Management Department (23/51: 45%) and most of the workers in that area (129/178: 72%) were MRI employees. In this sense MRI worked in this area as a conventional contractor under the control of a vast majority of directors and supervisors (48/71: 67%) who worked permanently for GEAR (cf. Table A2 in the Appendix A).

On the other hand MRI was in charge of most of the supervisor positions at the Project Management Department (51 supervisors were organic contractors of MRI, against 30 permanent supervisors) and in that department most of the workers belonged to contractors (141/200: 70.5%). It is precisely the role of MRI as a controller of the contractors’ workers that we are interested in studying within the wider safety management policies that distinguished the Project Management Department in GEAR.

3.2.3. GEAR project management

In the analysis of secondary information provided by the company before we carried out the survey, we found out that over 12 control indicators taken into account by the annual external audit of the safety management system, the best qualified item in the whole subsidiary was the one referred to providers and contractors’ performance.

The risk perception section of the survey taken by staff with different types of contracts revealed that GEAR permanent staff had a more negative perception (perceiving usually the same risks at a higher level) while the organic contractors had systematically a more positive perception.

The subsidiary’s good performance regarding the relation with contractors could not only be verified by an internal comparison with other aspects of the safety management (such as respecting the rules, managers’ responsibility, staff’s training and competences, environmental care, preparedness for emergency situations, and accidents’ analysis) but also and especially when comparing performance in the same aspects with other important companies from the same sector.

Across organizational levels, and the type of contracts, the perception of the workers who had experience in other companies was always that safety management at GEAR, and in relation to the contractors, was above the rest of the large local and international companies in that field in the country.²³ The traditional management model was based on respecting orders and a strict supervision rather than on the intelligence and commitment of the worker; however, according to a worker testimony, they had evolved in that direction.

3.2.4. GEAR risk management

Let’s now observe GEAR’s Project Management policy regarding contractors’ staff working on construction for the company.

According to the testimony of the GEAR’s Construction Director,²⁴ the company’s Project Management Department used rigorously a contractors’ conventional control tool, such as work permits, but they also expected the contractors to be in charge – that means with their own staff – of managing safety in the construction sites they had (as acknowledged by a worker from company C. whose testimony is reported in Table A3 of the Appendix A). In return, the supervisors – permanent GEAR staff and organic contractors – made daily rounds and the Project Management Department offered support to the contractors training their supervisors and workers and encouraging contractors’ staff to report anomalies. These policies and specifically trusting – supporting them in order to develop necessary capacities – the contractors’ professionalization was, however, a distinctive safety policy of the Project Management Department.

3.2.5. The role of organic contractors

Which were the links between organic contractors with GEAR’s permanent bosses and supervisors and the contractors’ workers and supervisors that could explain the good internal evaluation of the Project Management Department’s performance (carried out by the consultant in charge of auditing the management system every year) and GEAR’s external reputation as a “safety school” among the contractors in the field?

MRI organic contractors, starting by the supervisor appointed as general group coordinator, considered that the key of the Project Management Department’s good performance – against other sectors in GEAR – was the fact that they were object of strict, external daily controls of the adherence to regulations,²⁵ which were reflected in a multi-level signature procedure to approve work permits.²⁶

²³ Refer to Table A3 of the Appendix A, where we have summed up testimonies from directors’ interviews and focus groups with supervisors, inspectors and workers both permanents and organic contractors and, especially, staff hired in different ranks working for one of the contractors (Company C.) carrying out construction works for GEAR.

²⁴ Table A4 of the Appendix A presents quotes from an interview with GEAR’s Construction Director (17 years in the company), who had been in charge of the Project Management Department since it was created and had succeeded in giving it his personal style of leadership.

²⁵ In a focus group with the organic contractors’ supervisors from MRI we gathered a series of testimonies, which is summed up in the Table A5 of the Appendix A.

²⁶ This kind of authorizations are used for example in airplanes maintenance workshops, where each repairing has to be signed by the worker/technician in charge of the duty and authorized by a supervisor from the company and an inspector from the national regulatory authority present in the plant.

²² Six years refers to the time the person working for the contracted company MRI (is a fake name) has been working for GEAR.

A Safety Inspector from MRI pointed out that the key, the “charm”²⁷ that guaranteed safety was team work including supervisors MRI (and GEAR) and the contractors’ supervisors so to assure permanent onsite presence of one or the other.

Strict procedures and redundant supervision (team work) were combined with the “participative approach” of GEAR’s construction manager that consisted in delegating construction supervision to the contractors’ supervisors and making their workers accountable offering them the necessary training.

3.2.6. Advantages and issues associated with organic contractors

The staff from MRI organic contractors has hierarchical positions in the organization where they work (that’s why they are called “organic”) which is not the same organization that pays their salaries (that’s why they are called “contractors”) and they represent GEAR before the contractors in charge of construction sites. That integration in GEAR’s organizational chart implies benefits, especially when applied to training, but also problems.²⁸ In the first place regarding the different demand-level comparatively applied to them and to permanent GEAR personnel (“they are controlling themselves”, “they have more considerations internally”), and in the second place, not only identity problems (“we should have MRI’s clothes”) but also in terms of career opportunities and representation in case problems arise (“we have no one to go to”), which was perceived as an strategy to reduce their negotiating capacity (“it’s a move”) limiting the reaction of the organic contractors to an individual level (“if something happens, you’re out”). These and other testimonies are listed in [Table A6, Appendix A](#).

Finally we will now go over the main characteristics of MRI, the company providing the organic contractors for the Project Management Department.

3.2.7. MRI: a local engineering and construction services company

MRI is a state-owned company providing engineering and construction services mainly aimed – according to the company’s website – at working in chemical plants, elaborating and commercializing chemical products. Second line goals include research applied to technological developments, designing basic and detailed engineering, building, assembling, starting-up and maintaining industrial facilities and also providing industry-related services both on their own and by making associations – like in GEAR – with third parties.²⁹ In addition they claim to have a comprehensive management system according to regulations ISO 9001 and 14.001, and OHSAS 18001.

3.2.8. Summary

Let’s now go over some of the global figures again. In the whole organization there were more organic contractors (31.6%) than GEAR’s permanent staff (28.8%). At the Project Management Department, and more specifically when referring to supervisors

and Chiefs, 52% of them were GEAR’s permanent staff and 48% were MRI employees.³⁰

From a conceptual point of view we can describe the organic contractors category as a *plural form* (Bradach and Eccles, 1989). Plural forms are hybrid categories that result of the combination of three basic coordination forms: market, hierarchy and network. In this case it is a network (a company and a contractor whose staff is) embedded in GEAR’s hierarchy.

Hence, having the status of organic contractor consisted in being quasi-integrated to the organization’s hierarchy. It’s thanks to the higher demand level they had – compared to the permanent staff – that GEAR obtained very good safety results especially in the Project Area. This point, made by MRI employees, justified GEAR’s management maintaining the hybrid category in this and other sectors of the organization even though the seniority of some of the persons in the category was similar or higher to the one the company’s “permanent staff” had.

The good results in safety that distinguished the Project Area – in a subsidiary that ranked globally in safety matters – were reflected in the audits made to the management system and the testimonies of the executive directors and employees from contractors carrying out construction jobs for GEAR. This achievement was due to a combination of strict supervision of the organic contractors and their collaboration – “team work” – with the contractors’ supervisors (who were held accountable for the safety in the construction) in addition to a “participative approach” in the workers’ training.

Lastly we have to mention that even the organic contractors didn’t ask to be incorporated as GEAR’s permanent staff (on the contrary, they wished they could wear MRI’s distinctive clothes) the fact of being under higher demand and less achievement acknowledgement (“we have no one to go to”, “we have no progress perspectives”) provoked in them deep dissatisfaction.³¹

4. Conclusion

What have we learned about safety technology transfer to contractors? Literature reviews showed negative tendencies in subcontracting that grew stronger from the 80s onwards. The first of such trends is the link between subcontracting procedures and labor precarization, which was extensively reviewed by Latin American scholarship. The second trend is the outsourcing of risks through subcontracting for risky activities. The third and last one, often combined with the latter, was a deepened subcontracting that first involved secondary processes but then included core activities involving safety management in high-risk facilities.

The literature also confirmed that given the negative consequences on workers’ health and safety, in the late 1990s there was a regulatory reaction that established, first in developed countries and then in developing ones too, the co-responsibility of contracting companies in accidents suffered by the contracted companies’ staff. Case studies carried out during the second part of the last decade in several petrochemical French platforms stressed that after a series of progressive changes in public legislation and private standards and due to onsite networking among large and small companies, some of them had achieved major, long-lasting improvements in the safety results of contractors that

²⁷ A certainly curious term implying magic attributes, used to refer to a management tool. Which is the magic that allows establishing cooperation between contracting and contractors’ supervisors?

²⁸ In a focus group with 10 inspectors (safety, quality, electricity, piping, etc.) from MRI, the participants made a series of comments summarized in [Table A6 of the Appendix A](#) regarding the pros and cons of the particular contractual relation they had with GEAR (it’s worth mentioning that salaries – in an absolute level or compared with GEAR staff – were never mentioned by the interviewees as a problem and we didn’t receive any claim regarding the incorporation of the organic contractors staff with seniority to GEAR’s permanent staff).

²⁹ In the list of “provided and ongoing services” MRI has in its website, GEAR is presented as one of the most important clients.

³⁰ In lesser proportions something similar happened in the sectors in charge of Extraction (61%/39%) and Logistics (59%/41%).

³¹ The combination of high demand and little acknowledgement that creates the basis for work-related stress (Karasek, 2011) was reflected in a very high anxiety level and the generalized claim for psychological assistance.

evened and sometimes surpassed the performance of the contracting companies.

Public and private regulatory changes also applied in the companies studied in this research. The state-owned local company GENECH implemented a safety management system following OHSAS 18.001 as a direct consequence of changes made to the subcontracting legislation in its country. Multinational private company GEAR implemented in the local subsidiary a management system developed in the European headquarters in the framework of a technology transfer policy that included all the subsidiaries around the world.

Both organizations also differed in forms and reach of subcontracting. The multinational subsidiary GEAR resorted to more subcontracting. Unlike state-owned GENECH that preserved a high degree of vertical integration, GEAR appointed its own hierarchical positions to contractor's staff (with the professional category of organic contractors). That staff was in charge of supervising safety management in construction sites ran by other local contractors. GENECH had precarized labor in high-risk positions –with the highest accident-rate in the company – by assigning staff with short-term contracts.

In the case of the state-owned company (GENECH) we established that the form of relating to contractors was highly unstable because the priority the managers had given to safety after the SMS certification coexisted with old purchase and hiring policies based solely in cost reduction. The consistency problems between bounded rationalities (March and Simon, 1958) in different areas are not new in large organizations. However the harmonization of the policies was very hard to achieve because the company had, in fact, to reduce costs due to the maturity crisis of the sites and the overall aging of the staff added to public service.

The hybrid form adopted by the subsidiary of the multinational company (GEAR) – the integration of contractor' staff in hierarchical positions – could paradoxically be described as a stable form. With their positive and negative features,³² hybrid forms of coordination are here to stay. From a conceptual point of view, the organic contractors category is in fact a variation of the *plural forms* (Bradach and Eccles, 1989) consisting in the combination of hierarchy, network and market forms of coordination. In this particular case it referred to a contractor (network) *embedded* in the hierarchical structure of the contracting enterprise.

What are the consequences for safety performance of these hybrid forms? In the case of the state company: marked improvement in safety for contracted companies, due to the successful implementation of work permits under the new SMS, as well as an increased accident rate for the riskiest jobs in the company taken by workers with short-term contracts. In the subsidiary of the multinational Company: outstanding safety records for works conducted by contracted firms under the supervision of “organic contractors” in the Projects Area.

This said, how to explain good results achieved by organic contractors when they claim to be mostly unsatisfied with their personal situation? The first reason points at the very nature of hybrids: when introducing a structure within another the effect is supervision on the supervision, that's to say, a reinforcement of the hierarchical principle. The second and opposite reason, given by the area director, a permanent employee of the multinational,

resided in his personal style of leadership that had in time achieved a specially effective bond with contractors. The basic features of that exemplary and innovative practice are: demanding the contractors to develop their own safety area, delegating control to the area supervisors at the construction sites, dedicating its own supervising capacity (basically made up of organic contractors) to training the contractors' supervisors and workers, limiting own supervisions to daily rounds and, as a corollary and support of all the rest, trusting the professionalism of the safety staff from the contracted companies.

Regarding specifically MRI and its employees, the organic contractors, the existence of a hybrid category remits to the role local engineering and construction companies can have as interface – that's to say key roles in the technology transfer – between the multinational company and the contractors' network.³³

We conclude, finally, that in both organizations a major change took place. The implementation of an SMS meant in both cases a turning point with positive, direct and indirect consequences on the ways of relating to contractors in safety matters. The survey was carried out to assess whether the new rules were put into practice and contributed to this situation. This was possible thanks to the fact that the companies accepted including the contractors in the assessment. In the first case, contractors expressed their satisfaction with the improvements resulting from the successful implementation of work permits and in the second case praised company policies for their outstanding results. Furthermore, the focus groups we organized including the contractors' hierarchy, supervisors and workers, were in fact the first opportunity they had to express their opinion about problems and possible improvements to the management system's functioning. It was in that context that, for example, a manager from an international subcontractor suggested articulating the safety policies of the companies working on GENECH's camps.

In light of the results of the present study, we consider it relevant to reactivate the debate proposed by Alain Wisner and his team regarding the transfer of safety management technologies, which was also what motivated the present study. To achieve this goal it is necessary to widen the scope of observation to subcontracting networks carrying out high-risk activities for large companies. Unlike the anthropotechnological islands, which sought to protect themselves from hostile contexts, subcontracting networks allow to break insular forms of technology transfer when, as in the case of GEAR, the company relies on the professionalism of local engineering and construction contractors and contributes to its development. The state company GENECH has not yet benefited from the latest subcontracting networks development strategies, and it has made slow progress toward better cooperation with its contractors. But changes in national legislation and improvements in the relationship with the contractors through SMS implementation, as well as the survey on safety culture, indicate that it has already entered the same path.

Appendix A

See Tables A1–A6.

³² The fact that the job category “organic contractor” was stable in the company (just like the persons in those positions) didn't mean, however, that their personal situation was satisfactory. We reviewed specifically this issue in a paper on psychosocial risks associated with long shifts in remote oil camps (Walter, 2015).

³³ In a previous research about technology transfer (for the construction of onshore treatment facilities corresponding to offshore platforms that GEAR built in the late 1980 s) we examined a similar kind of relation established with another local engineering and construction company in terms of “learning by cooperation” (Walter, 2000).

Table A1
“Seniority” of the staff working at GEAR according to their contractual relation (absolute values). Source: Safety Culture Survey.

Seniority/type of contract	1 year		1–3 years		4–10 years		+10 years		Total
	N°	%	N°	%	N°	%	N°	%	
GEAR permanents	65	12.3	66	12.4	223	42.2	175	33.1	529
Organic contractors	51	8.8	88	15.1	278	48	164	28.2	581
Contractors staff	155	21.3	117	16.1	334	46	120	16.5	726
Total	271	15	271	15	835	45.5	459	25	1836

Table A2
Types of contract according to the hierarchy and the area at GEAR (absolute values). Source: Safety Culture Survey.

	Production	Maintenance	Projects	Extraction	Logistics	HSE	Other	Totals	%
PERMANENTS	58	58	71	42	22	27	250	528	28.2
Employees	7	10	15	7	3	1	81	124	6.8
Supervisors	38	28	30	21	10	20	92	239	13
Chiefs	13	19	25	12	8	5	70	152	8.3
Managers		1	1	2	1	1	7	13	0.7
ORGANIC CONTRACTORS	105	152	95	54	56	32	87	581	31.6
Employees	91	129	44	33	43	25	70	435	23.7
Supervisors	13	23	51	20	13	6	17	143	7.8
Chiefs	1			1				2	0
Managers						1		1	0
CONTRACTORS' STAFF	24	45	181	124	80	17	256	727	39.6
Employees	14	39	141	103	64	13	227	601	32.7
Supervisors	9	6	37	21	15	4	28	120	6.5
Chiefs	1		2		1			5	0
Managers			1					1	0
Totals	187	255	347	220	158	76	593	1836	100

Table A3
Testimonies from interviews and focus groups on GEAR's safety performance compared to similar companies in the same field. Source: Safety Culture Survey (interviews with managers; focus groups at MRI and Contractor C.).

GEAR Permanent Staff	Manager, 14 years in other companies in the same field, last 4 years for GEAR	“I have worked for other companies and I think that GEAR is the most committed, the one investing more money in safety. It's very superior in that aspect”
	Team Leader, 9 years working for GEAR	“I can compare because I have information about the way things work in other companies and it's day and night. The thing is that GEAR demands and the contractors respond”
Organic Contractors (MRI)	Inspector, 10 years at GEAR	“most of us know other companies. The safety level at GEAR is really high”
	Inspector, 6 years at GEAR	“Outside here we are considered a successful group”
Staff from the construction's contractor (Contractor C.)	Construction Chief, 17 years working for Contractor C., last 6 years working for GEAR	“For the one doing the job, GEAR feels like a safety extremist. But GEAR sees it that way and you have to get used to it. Sometimes they exaggerate. Some things are excessive. They are looking for any mistake. As a safety extreme it's good but excessive”
		“Our company accepts GEAR's conditions such as anomaly reports and work permits at the supervisors' level. The field supervisor accepts GEAR's conditions, assesses them and performs the tasks. We are always with GEAR's staff when performing the tasks”
		“GEAR is a lot more demanding than other companies. That demand has been kept and tends to grow. During the years I have spent here demand was never reduced, it always grew”
	Supervisor, 10 years working for GEAR	“safety measures grow. They change all the time, they bring new stuff”
	Supervisor, 6 years working for GEAR	“GEAR is a lot more demanding. I have worked for 'X' in 1999 and for 'Y' in 2003 (two other big companies in the same field). I don't know if they changed after that”
	Worker, 6 years working for GEAR	“Safety changed over the years. Before there was a safety watcher from GEAR who imposed. The old imposing changed. Nowadays they are more like friends rather than safety managers. They know how to reach you, they can have a chat. You base your experience in theirs in order to find a common ground. There are very good things such as training, PPE, that gives you the tools but it's on you knowing how to use them. We all have moments of weakness where we feel confident and go up without using the harness, or we force ... we have to be aware”

Table A4
GEAR's Project Management department's safety policy toward contractors. Source: Safety Culture Survey (interview GEAR's Construction Director).

Element	Testimony
Work permits	“We are very rigorous about the work permits”
Anomaly report	“We encourage the contractors to report anomalies; we give them the company's <i>merchandising</i> as a prize”
Contractor's specialized staff	“We demand the contractors to have safety staff” “We can't justify having two supervisions: ours and the contractor's. I had to convince GEAR's safety managers: 'how can we let the wolf watch over the sheep?' they would say. That's not how it is –I answered – they are safety professionals, not the wolf”
Supervision carried out by the contractor	“My supervisors make a round every day and, with less frequency, so do I” “The contractor's safety staff makes rounds permanently”
Contractor's supervision and workers' training	“We implemented contractor's supervision workshops and after the Workshops the supervisors started working with the grassroots, the workers” “I am not concerned by the fact that they are contractors because we are very trained in training them, and it's not about being overconfident: we know how to reach people” “We expect the contractors to identify the problems alone. Being participative is more efficient than lecturing”

Table A5

The “rabbit’s foot” of safety management in constructions sites in charge of contractor companies. *Source:* Safety Culture Survey (focus group with organic contractors from MRI).

Factor	Reasons explaining the Project Management Department’s good performance
MRI supervisors under daily GEAR supervision	When they sign a permit – GEAR permanent supervisors – they are controlling themselves” (Coordinator MRI, 6 years)
	“The requirements on the work permits are always higher for us than for GEAR. They have more considerations internally” (Supervisor MRI, 10 years)
	“As contractors we are expected to comply with all the regulations, even the drafts or ones to be applied soon, or as decided by whoever is in charge. I hope they continue like this” (MRI Coordinator, 6 years)
	“In addition to our own controls the people from the place control us thoroughly” (Coordinator MRI, 6 years)
Multiple-level signatures	“In order to read a permit we need a box file with a lay-out, procedures, plus one inspector of our own and one from GEAR, etc. The control measures are more aggressive” (Coordinator MRI, 6 years)
	“We have to respect lots of rules and specifications. We take minimum risk” We have a permit with four signatures: our own, the safety coordinator one, the safety management and finally the signature of the person in charge of safety for the whole site” (Coordinator MRI, 10 years)
Team work including MRI and contractors’ supervisors (onsite presence)	“The key is our presence or a contractor’s safety inspector. It is the rabbit’s foot . This is what should change in the safety culture in other sectors. Team-working with contractors. The supervisor is the key” (Safety Inspector MRI, 10 years)

Table A6

Positive and problematic aspects of the organic contractors status. *Source:* focus group of organic contractors working at the Project Management Department, interviews with managers. Safety Culture Survey.

Positive aspects	Problematic aspects
“The organic contractors receive the same training as GEAR’s permanent staff” (GEAR Manager)	“GEAR gives you the clothes but we should have MRI’s” (inspector MRI, 10 years)
“We are MRI employees but we are in GEAR’s structure” (Chief MRI, 6 years)	“We have no one to go to. MRI washes it hands clean and so does GEAR” (Supervisor MRI, 10 years)
“We represent GEAR to the contractors” (Supervisor MRI, 10 years)	“We have no progress perspectives we are always in the same position” (inspector MRI, 6 years). “It’s a move, they outsource with that purpose” (supervisor MRI, 10 years)
“We control the contractors, we are representing GEAR (Inspector MRI, 10 years)	“If everything is fine you continue, if something happens you’re out” (inspector MRI, 10 years) “you work rather ok and you live like you can” (Inspector MRI, 10 years)

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