Dossier: Occupational safety and health intervention

Note

Alistair Gibb[a]
https://orcid.org/0000-0002-3660-010X

Manoela Gomes Reis Lopes[b]
https://orcid.org/0000-0003-4262-2871

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

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

[a] Loughborough University. Loughborough, England, UK.

[b] Universidade de São Paulo, Faculdade de Saúde Pública, Departamento de Saúde Ambiental. São Paulo, SP, Brazil.

[c] Universidade Estadual Paulista "Júlio de Mesquita Filho", Faculdade de Medicina de Botucatu, Departamento de Saúde Pública. Botucatu, SP, Brazil.

Contact:
Manoela Gomes Reis Lopes
E-mail:
lopes_manoela@yahoo.com.br

The successful safety and health experience in the London 2012 Olympic Park construction: an interview with Alistair Gibb

A experiência bem-sucedida em saúde e segurança na construção do Parque Olímpico de Londres 2012: uma entrevista com Alistair Gibb

Abstract

Alistair Gibb, a civil engineer, has been a professor at Loughborough University, United Kingdom, since 1993. He is a researcher in safety & health and in construction innovation technology. He is a member of the European Construction Institute, and of the Institution of Civil Engineers. Before he became a professor, he worked as a manager in the construction industry, which provided him with a useful interface by linking academia and industry experiences. Dr. Gibb lead researches about the successful safety & health performance during the London 2012 Olympic Park construction, as there were no fatal accidents and it was delivered on time and within the budget. In November 2015, to better understand this experience and to contribute for the prevention of work accidents in large construction sites, Brazilian researchers from the FAPESP Thematic Project (Process No. 2012/04721-1) invited Professor Gibb to participate in the 50th Forum AT (occupational accidents' forum), about safety & health in large construction sites. This interview was granted at that opportunity.

Keywords: occupational health; safety management; construction.

Resumo

Alistair Gibb é engenheiro civil e professor da Universidade de Loughborough, no Reino Unido, trabalha na área de pesquisa em saúde e segurança desde 1993 atuando em saúde e segurança na construção civil e também em tecnologia da inovação. É membro do Instituto Europeu de Construção e da Instituição de Engenheiros Civis. Antes de se tornar professor, trabalhou como gerente na indústria da construção, o que lhe proporcionou interface de suas pesquisas entre a academia e a indústria. Durante a construção do Parque Olímpico de Londres 2012, realizou pesquisas relacionadas à saúde e segurança no canteiro de obras, experiência considerada bem-sucedida para a saúde e segurança, por não ocorrer acidentes fatais, pela entrega no prazo e dentro do orçamento. Com o objetivo de entender mais sobre essa experiência de sucesso e contribuir para a prevenção de acidentes de trabalho em obras de grande porte, pesquisadores brasileiros do grupo de pesquisa do Projeto Temático Fapesp (Processo nº 2012/04721-1) convidaram o professor Gibb para participar do 50º Fórum AT[1] sobre saúde e segurança em obras de grande porte em novembro de 2015. Esta entrevista foi conduzida durante esse período.

Palavras-chave: *saúde do trabalhador; gestão da segurança; construção civil.*

Interviewers (I): You got to be doing a lot of research in close proximity with industry. Why is this? And what are the benefits and challenges of this interaction between academy and industry?

Gibb: I came from industry, so when I returned to university as an academic I naturally wanted to work with industry. Also, in the way the UK works on research, if you have industry backing it helps to get an application route for your study. Besides, I was very much motivated by making a difference, and I really do believe that in a number of areas, particularly health and safety, it is really just the industry that can make a difference. We academics may have some good ideas but we don't change things in the workplace, so you must work with industry. I don't think that you can research such a practical topic without working closely with industry.

I think that the benefit of working with industry is that you get real life data. If you have a relationship of trust and can treat that carefully, they let you see the data, which is a great benefit. I think the biggest challenge is probably impatience: the industry wants an immediate solution to the problem. We academics know things don't happen overnight, we need to do the research, to think on the data that we are collecting, to gather the evidence, and maybe we also tend to be a bit slower than the industry. To provide evidence-based results, we need to take that time. So, I think that the biggest challenge is impatience. But the uptimes are much greater than the challenges.

I: Many of your research projects have involved multidisciplinary university teams: people from social sciences, psychology, human factors, and safety science. What benefits have this brought to your work, and what challenges?

Gibb: About the challenges, the different domains think very differently. Many people, especially academics from a particular discipline, will really believe that their approach is the right way of interpreting things. Thus, if you are talking about how human beings behave, how the work environment changes, and if you take the human factors view, or the social sciences view, or the safety science view, they will be different perspectives, but often each person thinks that their perspective is the only one. The challenge is to bring those views together and to improve the answers that you get, because you have different perspectives, different lenses. So you are looking through different lenses and that is the challenge.

In a personal sense, I find it very motivating to work with people who think very differently to the way I think. It doesn't produce easy results; we find it very hard, for instance, to agree our ways on publications but I've been very fortunate, working for many years with several individuals that respect each other and the other's positions, while holding to their own positions. I think there are benefits, and I hope that this is reflected in our works as well.

I: The construction of the London 2012 Olympic Park was very successful, especially in health and safety of workers. Why it was this?

Gibb: I suppose that people say it was successful because the statistics were good, then the outcome was good: nobody was killed. Based on the UK performance statistics, it was expected for three or four people to die because of the number of worker hours on the project. That was a real challenge; therefore, it was successful because that didn't happen. In the Olympic Park (OP) itself, the accident frequency rate was also successful, and it was around in 0.16/100.000 worker hours. That was less than a third of the UK average in construction sites, which was at the time 0.55/100.000 worker hours. If you take the accident statistics, construction tends to be one of the worst sectors. In UK, agriculture is the worst, then they have figures on all employment, of all workers working anywhere. At the time, this all employment figure was 0.21, so the OP was less than the reference for all jobs. And, for the final year, it went down to 0.12, so they were doing very well. Fatalities were zero, and then also major and first aid incidents, and the reportable accidents.

As far as why it was successful, I think that there were many things. It was the top priority for the main client. The government set up a body called the Olympic Delivery Authority (ODA), and the likelihood that they would kill three or four people was put to them right at the beginning. And they said, "this will not happen!" So they were keen all the way from the beginning because they didn't want that legacy.

They also appointed a delivery partner, like a manager of the project, made up of people from construction backgrounds. Many organizations joined together to actually manage the process, and safety was a top priority for them as well. Each of the various different stadia and events had their own contractors, and that was sort of cascaded down, so for them that was really important, and they engaged people at that senior level.

Also in the UK, over the last maybe one or two decades, there's been an greater appreciation among senior managers of organizations, in sectors like construction, that we can't carry on killing people,

hurting people. Thus, in a certain way, it wasn't only the Olympic Park; this is what has been happening in the UK and in other countries around the world.

In addition, they had some good systems and the eyes of the world on them, because the press was there all the time and everything was covered by the press, so they were perhaps more careful. But also, they had a real emphasis on people, on the softer issues as well, then it wasn't just systems, it wasn't just innovation, really, it was good management and concern for people and engagement with the workforce. The softer issues were the ones that made a difference. When I say softer issues, I am talking about how the workers, their supervisors and managers were administered. Perhaps traditionally, in UK at least, in construction there's been a very authoritarian, a very top-down and somewhat oppressive, aggressive management structure. What we noticed was quite a difference in that. When we talked to the workers, they felt that they were trusted, respected, all sorts of things were happening, so they were underpinning the success. I don't think that these were explicitly aims of the project but that's what we found that really made a difference. Therefore, it was good project management, good construction management but, in addition, perhaps a greater emphasis on the people, on their role, and on engaging with them as well.

The other thing though that is relevant is that in Europe, we have some regulations which require construction designers to consider the workers' health and safety and to think about how this is going to be built and how it can be built safely. In the UK, these are called Construction Design Management Regulations[2]. They have been in place since the mid-1990's, gradually changing over time, and I think they made a big difference. There is always some contention whenever regulations are there. There are different ways of applying them, sometimes well and sometimes not so well, but what that meant was that there is a degree of competence and ability to think about construction, and there is also a culture of involving the construction people in that process. In the OP, for example, the velodrome´s roof was one of the successes of designing for safety[3]. It was originally planned to be a structural steel roof and then it was made a cable net roof. Not the only one, but one of the reasons was that it allowed more work to be done at the ground because they could make all the connections on ground level and then stress the cables up, so there was less work at height on site. It was a big success for constructability and productivity; therefore, cost and safety and those other things very much go together. I'm a firm believer, whenever possible, especially in designing, in bringing productivity, maintainability, buildability, and constructability together with health and safety, rather than necessarily pulling them out as a separate exercise. Because if you're designing something, you really want to speak to the people who are going to be involved, and historically that hasn't happened. So, all of that was, of course, before they started working on the ground. Thus it was, I think, quite a major impact.

I: How long did the design of the project take before they started building?

Gibb: I don't know. They tend to appoint the Olympics about an 8-year period in total when they have got to host the Olympics. Supposedly, some work has been done beforehand, but then they must turn that into a reality and do the design and then the construction. In the case of London 2012, that was already going to be a year shorter, because one of the good things they did was deciding to finish the construction one year earlier. I think that was significant and a good move because in the previous Olympics, the greater health and safety problems appeared by the end, when people were behind the schedule and lots of people were "thrown" into the job. And even if they had not met that date, then the 12 months would be 11 months, or even 10, that would have been OK. So it was that decision of planning to finish well in advance that really mattered.

I: Did you have a committee, like an interinstitutional committee to follow the building management of the site? What was the role of each participant, for example, the Health and Safety Executive (HSE)[4], the academics, companies? How was the coordination among them?

Gibb: Interestingly enough, the HSE was probably involved less with London 2012 than they were in other projects. But the reason was that, very early on, before they started building, when the award was made and this discussion was held about killing three or four people, the senior people – and these were well-known figures, ex-athletes and sports people – once they said they mustn't do this, there was a lot of discussion at that time to make sure that should be the safest Olympics that has ever been built. And the HSE was involved in that, at a very senior level.

I: And the academics?

Gibb: The academics weren't involved at that turning point. Lawrence Waterman was one of the people that was very important. He is an industrialist and

has worked as a health and safety professional. He is now also a visiting professor at Loughborough, so he had a lot of links with us in academia.

But in terms of the Olympics itself, it was the ODA organization, the HSE, and the delivery partner who were the project managers, really sitting around the table and thinking what to do about this. So there was a commitment at that early stage about health and safety. They didn't put lots of inspectors on the job, they were involved at the senior level and those senior people were key on the OP. They had a thing called SHELT (Safety, Health, and Environment Leadership Team) composed by the very senior people of the organizations involved and they met probably once a month, or once every six weeks. That had never been done before. Those people round the table, they were sort of open to talk about what had happened and their main purpose was safety and health and environment. Therefore, I think that early stage, of very senior commitment, sort of set the precedent for everybody else to be involved.

I: Could you please define the key points for success on the Olympic Park and how these principles or ideas had worked?

Gibb: More generally in the population, health and safety has a very bad reputation. So, at a public level, I think there is a distrust of health and safety because they think there are too many rules and too many warning signs. But as construction is a hazardous industry, and therefore we need to do something about it, there has been an appreciation over the last few decades with more focus on health and safety, more coverage in construction programmes in universities, more training and so forth. The industry and its contexts have been improving. When it came to the OP, there was an involvement of the leadership and the senior management. Before, it would be only the site manager, the project manager, it's their problem and the senior executives would not get involved at all. That was one of the big things for the success.

In about the last six months or so of the OP construction, the HSE realized how things were being successful from the health and safety perspective and they asked my team from Loughborough to do an investigation and a report[5], to look at the underpinning human and organizational factors. We then got a senior researcher who spent a lot of time talking to people. She sat in many of the meetings that were going on. Many of the main people were still there and could remember things. What came up were, again, the softer issues: it was respect, trust, fairness, empowerment, consistency and clarity of the message; it was motivation, challenge, actually

challenging to improve, to raise the bar; it was about collaboration, good communication, openness, having a system that gave some assurance. But also taking action beforehand, pre-emptive action, looking to see what might happen and acting before it did so. Then, there were the things that people thought were different from previous projects and, once again, many of those were human factors issues, organization and so forth, but had more to do with people than systems. So that is really what came out.

I believe construction suffers by not having longitudinal research, and now we are trying to negotiate a contract at another major project in UK, in which we can do a longitudinal study. We believe we got some accurate results from the OP but it was still a reflective study. Overall, people were remembering what happened previously. It would have been a lot better if we had been involved from the beginning.

I: How do you evaluate this experience? Do you think it was unique in the building sector or it was a normal practice in the UK construction business?

Gibb: I think that the UK is moving that way, the best clients and companies are doing this. There were things that were taking the best in the UK and some others things were special in the Olympics. Certainly, the legacy that comes from there is that every big project that has followed wanted to do better than the London 2012. It was quite a head of steam, quite a motivation to do that. Smaller projects aren't doing this, and I think that this is the case in most countries –the big global companies are the ones that tend to move quicker or to move ahead. Smaller projects are a real struggle.

On the OP you had a very supportive client, the delivery partners wanted to make a difference, and you had the eyes of the world there, so they didn't want to make a mistake. Therefore, there is a tendency of putting good people on the project to ensure that everything is done properly. The danger is whether you have a culture where there is not corruption, but a culture to hide things. Thankfully, in the UK it is harder to hide things, then you improve.

We were also in a recession, and that was one of the unique things in London 2012. There was less work elsewhere, so the contractors could put better people than they could have done otherwise, and they stayed for longer, until the end. Traditionally in construction, by the end of a project you move the "A-team" project manager to a new project and bring someone perhaps less experienced.

There was also an element of luck. I believe that this is the case; sometimes the difference between

a close call or a near miss and an actual accident is very small. But as my old boss used to say: "the harder I work the luckier I get".

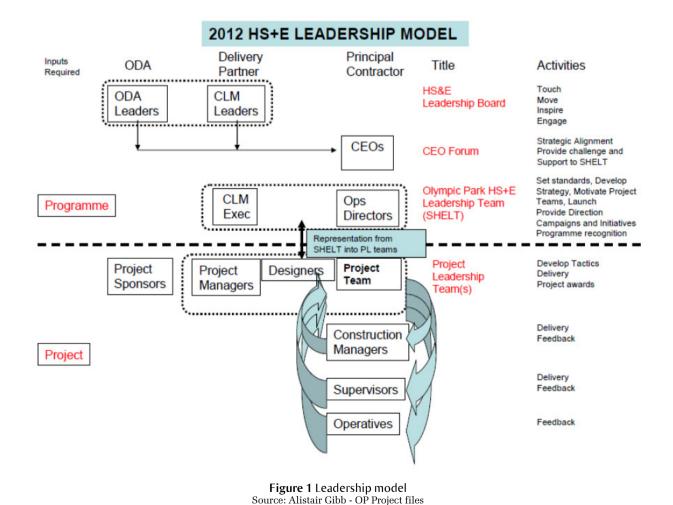**I: How many companies did you have working together at the OP?**

Gibb: I don't know exactly, but in each of the main stadia there were separate companies, and most of those companies were joint ventures, so it would be two or three companies working together.

I: Did they have past experience of working together?

Gibb: Some of them, for instance the team that put the main stadium together had designed and built other stadia elsewhere in the world, and some of the football stadiums in UK as well. Thus, in part of the tendering process, their experience to work together was considered. So they would have been maybe 8 different packages and I would guess it was around 8 sets or so of different company sets.

I: Did these companies have good results before the Olympic Park? Were they traditional companies, top level in safety and health?

Gibb: Many of them were, but not all. And because the way in which construction works in the UK, many of them were big names. But most big names don't actually employ the people. We had two or three big names working together, but the subcontractors and the sub-subcontractors are the ones actually employing people. Many of them were very well-known companies but not all of them had good records in safety and health. And it was interesting to see how that worked. Because you had all this close collaboration across the board, some of the less experienced companies were learning from the more experienced ones. You had the SHELT team meeting (**Figure 1**) and they would openly discuss the problems. Therefore, in health and safety, at least there was a good degree of collaboration among competitors, which of course doesn't normally happen.

Figure 1 Leadership model
Source: Alistair Gibb - OP Project files

I: In the UK, unions historically have had some power to control work conditions. How did they take part in the London 2012 project?

Gibb: In the UK, unions haven't been particularly strong since the 1970's, particularly in construction, other than being supportive. On the OP, the unions were very supportive, they worked together with the employers. I don't think they had any extra power, neither there was need for that, because in a sense the employers were very much on board with the unions, so it didn't raise itself as an issue. I honestly don't know the straightforward answer to what powers they could have had if they needed them, since as they didn't need them it wasn't really a major factor, because they were working along with the employers and the other groups.

I: How was the safety professional role in this case? Please tell us about the power, independence, and integration with other sectors, such as production. In Brazil, it is very common that they are kept separated and don't participate of the whole production system.

Gibb: I think one of the things I observed in the OP is that the responsibility of occupational safety and health is a line management responsibility, not the safety professional responsibility. And that has been emphasized – it is the supervisor, it is the site manager or project manager, who is responsible. Thus, health and safety professionals were advising, giving guidance, and so forth. The good side is there was not the culture of the safety professional acting as a policeman, this is part of the management work. So, from that point of view, it was very positive.

However, the integration across different sectors is a challenge in the UK as well. We have a body called Institution of Occupational Safety and Health (IOSH)[6], which is a nongovernmental organization and one of the professional bodies for occupational safety and health professionals. IOSH has various different special interest groups, but they tend to be sector-specific, like construction, catering, or agricultural group. So, I think there is a certain degree of interaction between sectors but, generally speaking, construction people stay with construction people and so forth.

I: You spoke a little about the role of the public sector, especially the health and safety sectors, in this process. Are there any other public organs that will act on this subject or the main role is for the HSE?

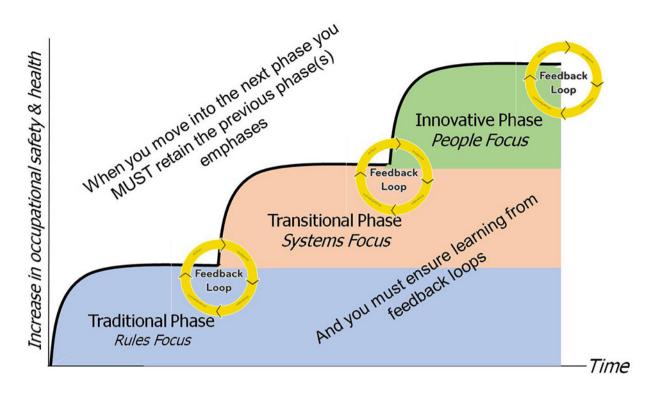**Gibb:** Yes, the main role is for the HSE. They are, in the UK, set up as the law makers. Effectively, the government puts the law in place but the HSE will propose and write them. They are also the enforcer and people who give guidance. Thus, there is just one organization, unless you are speaking of the nuclear sector, for which there are separate bodies. Certainly, the HSE is the body for construction, and they work collaboratively. In the OP project, they worked collaboratively very early, and funded some research. They were very influential in saying we do not want this to be just a good project: "we want other people to learn from the project". Hence the legacy documents, all of which are available on the internet[7], because the HSE put money into making them available and producing some nice summaries of them.

I: What do you see as the big challenges for occupational health and safety professionals in the UK and in the rest of the world?

Gibb: It would be nice if we stopped killing and hurting people. I suppose that is the biggest challenge. But I think there are different challenges in different regions, and I wouldn't claim to be an expert. I've done quite a lot of work in various countries, but it is really difficult to come into another region and comment without spending a good deal of time.

Pybus[8] developed some theory about the maturity of the health and safety culture (**Figure 2**).

He has three different stages of maturity. The first stage is the traditional phase, which is mainly a rule-based stage. Thus, it is necessary to get regulations right, making sure people obey the rules, and the regulations result in rules on site that are also obeyed. Then you get some improvement in health and safety, but then it sort of plateaus out and you don't get more improvement. Pybus' second phase is the transitional phase and is mainly about systems. You get the management system and some of the training aspects right, and again there is an improvement and a plateauing. The third one is the innovative phase, and again you get an improvement and then, in some cases, a plateau. But the innovative phase is about people; so you have rules, systems, and people. You can't jump straight to the top. So, in that innovative phase you have things like behavioural health and safety. But if you try to implement a behavioural health and safety approach too early in an environment, whether a company or a region, when you haven't got the other things in place, then it is not going to work. You can't do that, you will end up blaming the workers for the accident. If it is implemented within a culture of responsibility, everyone takes responsibility and then you implement it. So, at the UK at the moment the big companies are in that third phase.

Figure 2 Stages in the evolution of a culture of safety
Source: © Gibb, adapted from Pybus[8] and Lingard & Rowlinson[9]

On the OP there were these phases, you didn't ignore them, you built on them. There were rules, the system and the processes were there, but you were really working with the people, with behaviour and culture. So, I think that the UK is there on the big projects; smaller companies are probably still in the systems phase, and the very small companies are still mainly in the rules phase. There are still a lot of micro companies which don't know what the rules are, or that don't obey the rules. It differs depending on the size of the organization. I think, from my knowledge of various regions and countries around the world, there are some regions that need to get their rules and regulations in place, and not only in place, but actually obeyed. There is a large number of companies across the world where that is the case. It is a question of implementation appropriateness.

I: I am curious about something you have emphasised. This government decision, or the contractors' decision in relation to the OP to not consider acceptable having deaths. My curiosity is this: in your opinion, what kind of situation, whether political, cultural aspects, can support this kind of decision? What is the story behind that?

Gibb: I wish I knew. Really. Because if I knew I would be able to peddle that around the world. I

think that in the UK, and I can only speak about UK in this particular case, but certainly since I started working in the industry our fatality rate, for instance, was about six and now we are about a third of what it was. We're killing two people for every 100.000 workers[10]. So, we have got better, you can see that downward trend which I think it is a combination of good laws, of those laws being implemented, fines being placed, and all that sort of things that are in there, but also a change in the culture. Much of that has been almost propaganda over the years, but that message has got through. It's happened in other things as well. For instance, if you take seat belts in cars in UK, it took about thirty years from when they first invented them, and then they put some laws that you have to fit the seat belts, later that you have to wear the seat belts in the front, lots of television adverts, and then they improved the seat belts, and then they made it legal to fit them at the back of the car. So, most people now in the UK wear seat belts. But I don't think it is one thing, it is a whole number of things, and a real desire to make that difference. And I think this is important for accidents as well.

One of the things I worry about, I'll be honest with you, is the zero-accident culture which is fantastic as a target. The problem is, if one person had died from an industrial accident in the Olympics, people would have said that they had failed. But they

wouldn't have failed, because one is still better than three or four. The trouble is if you only focus on zero. In some ways, having a target of zero is fantastic, but being realistic to say we are here now, as a nation, or as a company, or as a region, and we need to get there. What are our targets to actually do that? It is a little bit like Pybus, let's get the rules sorted, let's get the system, let's get all the things.

I: Another curiosity is about having and making the law, having the instruments or the structure, something prepared to enforce this application. Because here, for example, for us it is extremely common to hear sometimes about accidents and the press questioning the rules. And we have the rules, as if only the existence of a rule was sufficient to prevent the accident. About the enforcement, how is this idea treated strategically in UK nowadays?

Gibb: Being honest, that situation must exist in the UK as well, in some places. My observation is that for more and more companies, starting with the big ones and moving down, that situation is changing. There are some legal things that have changed as well. We have a Corporate Manslaughter Law[11], which is a new Law, where the board of directors can be held for manslaughter, not murder, if somebody dies working for that company. Now, that is quite a difficult law to enforce, but just the fact that the law has been brought in and all the publicity around it has made people seat around the board room and then think and talk about it in meetings, so... that is one thing.

Once again, I think it is a combination of things, and somehow, we seem to, whether the press, whether individual people, one way or the other we are holding people accountable. And just setting the rule is not good enough. What did you do about it then? And this isn't just the legal side, I think it is the expectation of the people. So, if someone is not obeying the rule, then quite clearly that is wrong. But what we are certainly doing, from the research side, is saying "why isn't that person obeying the rule? Have they not been trained properly? Did they not fully understand the consequences? Or is it a silly rule anyway? Are they doing something which actually doesn't really require that? Or do they think they are doing something that doesn't require that particular action?"

Of course, protection is the last level, but gloves and personal protective equipment is a good example because it does affect workers. I don't think there is an easy answer, we will still have workers that will take the gloves off because they want to do the fine work. But what started to happen is, perhaps five or ten years ago, there would be one standard glove for everyone. Now there are fifty gloves, and good companies are asking the workers which glove you want to choose. So, having set the rule, there is an engagement with the workforce and it does help. I don't think it completely removes the challenge, and we still will have people who decide not to obey the rules.

I: In relation to these rules, we create the laws determining something and the laws are not being implemented. It is not for real!

Gibb: That's right! And there could be some truth in that as well. One of the more innovative aspects, from a research perspective we are now looking at, industry is not really thinking this way yet, it is a theory from Hollnagel: Safety-I and Safety-II[12]. Safety-I is based on rules and procedures, and safety is measured by lack of safety and adverse outcomes such as, for example, accidents, incidents, etc. Some of the things in Safety-II is finding out what safe looks like, and measuring safe rather than measuring lack of safety. So rather than just looking at accidents and incidents and so forth, it is like if we can describe what safe looks like for this particular work activity, and then we can measure it.

I: For me this is very close to the French Ergonomics approach: the real work and the prescribed work. How to make a decision? How to understand what happens in real situations? And it is necessary to have a space for auto regulation, to evaluate "this is not so good" and then choose other way. Understanding before the accident happens, this is the idea of Hollnagel. What is the situation that constrains people to do their work?

Gibb: And we are definitely finding that. The English expression would be: "work as envisaged and work as realized". It is different. One envisages a certain way, one writes the method statement, its risk assessment for a set of assumptions, but in reality things are different. We just finished a project where we've been looking a lot at workarounds, shortcuts, people adjusting the way things are done, not always the regulations, but the accepted practice. That is a tough one, and I think we have a long way to go in the UK in construction, because it is hard to give people that ability to make specific rules, and how much flexibility you have. But I think we need to find a way of doing that. It is a challenge.

I: Would you like to say some final words?

Gibb: I think that we have really covered a lot of things. The challenges, I guess, is the same. We

need to find ways of hurting or killing less people, we need to have target zero, and, if we are realistic about that and move from where we are to where we want to get, then I think there are opportunities in there. But if we just try and ignore the real situation, a little bit like you've said, "work as envisaged and work as realized", then we will just carry on almost with blinkers on, thinking that we are improving things and we are not! And, therefore, I think that it is being acknowledged that tension between having a great goal and yet the realism to understand that we are not there yet, and what are the steps to reach that goal. Until we start doing that in a realistic way, whether governments or companies, we would be missing the goal, because we either think it is unachievable, or we think it is totally achievable without the effort and the changes required along the way. I don't think it is going to happen overnight. So, it is a real challenge, a worldwide challenge. The blood is the same colour whatever the colour of the skin or the language people speak. Academia can work together with industry and help people understand the outcomes of those things is part of that journey.

Autorship contributions

Gibb AGF is the interviewee. Lopes MGR, Vilela RAG, and Almeida IM were the interviewers.

References

1. Fórum AT. Saiba mais sobre este projeto [Internet]. 2014 [acesso em 2017 mar. 18]. Disponível em: http://www.forumat.net.br/at/?q=node/5

2. Health and Safety Executive. Managing health and safety in construction. Construction (design and management) regulations 2015. [Internet]. 2015 [acesso em 2018 mar. 18]. Disponível em: http://www.hse.gov.uk/pUbns/priced/l153.pdf

3. Frontline Consultants. London 2012: the construction (design and management) regulations 2007. Dutyholder roles and impact. [Internet]. 2012 [acesso em 2014 out. 28]. Disponível em: http://www.hse.gov.uk/research/rrpdf/rr941.pdf

4. Health and Safety Executive. About HSE [Internet]. [acesso em 2014 out. 28]. Disponível em: http://www.hse.gov.uk/aboutus/index.htm

5. Bolt HM, Haslam RA, Gibb AGF, Waterson P. Pre-conditioning for success: characteristics and factors ensuring a safe build for the Olympic Park. [Internet]. 2012 [acesso em 2014 out. 27]. Disponível em: http://www.hse.gov.uk/research/rrpdf/rr955.pdf

6. Institution of Occupational Safety and Health. Who we are [Internet]. [acesso em 2017 mar. 18]. Disponível em: https://www.iosh.co.uk/About-us/Who-we-are.aspx

7. Health and Safety Executive. Research reports [Internet]. 2012 [acesso em 2014 out. 28]. Disponível em: http://www.hse.gov.uk/aboutus/london-2012-games/research-reports.htm

8. Pybus R. Safety management: strategy and practice. Oxford: Butterworth-Heinemann; 1996.

9. Lingard H, Rowlinson S. Occupational health and safety in construction project management. New York: Spon; 2005.

10. Health and Safety Executive. Health and Safety statistics for the construction sector in Great Britain, 2017 [Internet]. 2017 [acesso em 2018 mar. 5]. Disponível em: http://www.hse.gov.uk/statistics/industry/construction/construction.pdf

11. United Kingdom. Corporate manslaughter and corporate homicide act 2007 - Chapter 19. UK: The Stationery OYce Limited; 2007.

12. Hollnagel E. Safety-I and Safety-II: the past and future of safety management. Farnham: Ashgate; 2014.