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MATERIAL, TECHNOLOGY, WORK ORGANISATION - CONSTRUCTION WORK IN TRANSITION

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Contents

Note from the editor

Talking about material innovation, technology and work organisation is maybe too much and too complex for one CLR News. Each of the three elements could fill an issue or even books. The contributions gathered, however, give very interesting insight into current developments and some of its consequences on working conditions and work relations.

Take for example the various elements of the Danish lean production concept as described in Sidse Buch's contribution. It is interesting that the concept obviously gives space for stronger worker participation not only at the workplace but also in the planning of companies' construction activity. Similarly, she supposes positive effects for workers' safety and health and, importantly, the stabilisation of standard employment. Interesting too is the combination of optimising processes, the coordination of increasing flexibility and human resource tools. This is distinct to the classic approach to lean production (Womack et al) and its various adaptations in manufacturing processes.

The socio-technical character of technological innovation is discussed by Colin Gleeson. He precisely describes the impact that the design of a technology and its components have on the qualifications needed and on aspects of work organisation and points to social negotiations and (non-formal) agreements as influential factors. This becomes especially obvious as concerns national policies on energy efficiency. The same tendency is described by Julius Petzall, in relation to the growing (re)use of wood in construction, which is not only an economic fact based on a sector's success, but is driven by political preferences, changes in taste and design preferences and, therefore, as well the result of societal taste (Bourdieu).

Similar to Buch in Denmark, Gerhard Syben sees the reintegration of previously separated and specialized tasks as an option for improved working conditions. Further, like the other authors, he discusses the strong impact of Building Information Modeling (BIM) on changes in the qualifications needed. Comparing these diagnoses with precarisation tendencies and changes in the employer-employee relation, as described in connection with the so called "platform economy" (see Jörn Janssen's review in this CLR-News), we face non-uniform and partly contradictory developments in construction work.

In connection with this phenomenon, I see two areas of activity for trade unions. First, the various aspects of change and innovations in materials, work processes and technology as well as work organisation require attention and empirical work, aimed at gaining awareness of ongoing

developments and identifying parameters that trade unions can/need to influence. Second, trade unions should increasingly try to influence the various parameters and social decisions that influence the design of technology, work organisation or the division of work. Regarding the latter, it would be interesting to see how far pathways to higher autonomy and participation also depend on framework or structural conditions such as the labour law regime, the quality of social partnership and the institutional recognition of trade unions. This latter aspect becomes obvious when reading the guest contribution from Mrs Streck, presenting the European Construction Technology Platform (ECTP) and enumerating topics dealt with during the 7th European conference of the ECTP. The perspectives given in the last paragraph of her contribution, in particular, concluding the discussion of the closing session, present many links to social aspects related to economic activities and, in a narrower sense, aspects for which trade unions have concepts, ideas and demands that we should present and articulate at those kind of conferences.

Rolf Gehring

Sidse Buch, BAT

LEAN CONSTRUCTION AS A MEANS TO INCREASE WORKER INVOLVEMENT

Lean Construction principles introduce a bottom-up approach to the construction process and put the construction worker into focus as being the only participant in the construction process directly generating value to the customer. The use of Lean principles delegates responsibility and influence to the construction workers and recognizes their skills regarding planning, coordination and decision-making. Lean Construction leads to better health and safety, job satisfaction and higher wages and makes the construction worker more valuable to the company.

Lean Construction represents a renewal of the construction process with the purpose of increasing productivity. The concept is based on a changed understanding of construction projects and their management, inspired by new thoughts on manufacturing.

Lean Construction is to a certain extent an adaptation and implementation of the Japanese lean manufacturing principles within the construction process. Unlike manufacturing, construction is a project-based production process where the product generally is a prototype, and Lean Construction is concerned with the alignment and holistic pursuit of concurrent and continuous improvements in all dimensions of the process.

The main goal is to design production systems to minimize the waste of materials, time and effort in order to generate the maximum possible amount of value.

Designing a production system to achieve the stated ends is only possible through the collaboration of all project participants (owner/client, architects, engineers, suppliers, contractors, construction workers, facility managers, end-user)

at early stages of the project. In response to the collaboration -element, Lean Construction moves away focus from the success of a single organization/participant to that of the project.

Lean Construction as a trade union strategy

Already in 2001, the Danish Construction Trades (BAT) became interested in Lean Construction and the several benefits for the construction workers associated with the concept. From a construction worker's perspective, Lean Construction represents a means to facilitate cooperation between the many participants in a building project: from client and architect to consulting engineers, contractors and construction workers.

A smooth collaboration based on good communication, mutual trust and respect for each other's competences provides the basis for an optimized building process. Experience shows that eventually this will result in improvements for the economy, quality, timetables and health and safety.

For the construction workers, Lean Construction is all about being involved in the management of the processes on the building site. Involving the workers' knowledge and competences in the phase of execution, to gain influence on your own work situation and to have more responsibility, increases engagement, job satisfaction and makes for a better understanding of and insight into the entire project.

Many results show that by involving and empowering construction workers and letting the teams take over the management on the building site, everything works out more smoothly, and order is created out of chaos. The site is cleaned up, flexibility has top priority, planning and coordination is optimized, timetables and budget lines are kept, fewer work accidents, conflicts and errors occur, and wages are higher. The reason is that it is much easier to take

ownership of and feel responsibility for a task when you are an integrated part of the solution, participating in decision-making and having influence.

Another advantage is that, by involving the construction workers in the planning and delegating responsibility, the need to use permanent teams of workers increases, which will counter employers' tendency to employ temporary workers and self-employed and combat social dumping.

Historical development

The concept of Lean Construction has evolved since the early 1990s. The main forces behind were Professor Lauri Koskela from University of Huddersfield, Professor Glenn Ballard from Berkeley University, Professor Luis Alarcón from Universidad Católica de Chile, Professor Greg Howell from Stanford University and engineer, project manager and external lecturer at the Danish Technological University Sven Bertelsen.

Based on evidence from research and practical observations, papers and meetings between the followers of the principles, the community of Lean Construction gradually evolved. Every year the International Group for Lean Construction (IGLC) meets for the exchange of new developments and experience, and from being a handful of people at the first meeting in 1993 there were 603 participants from all over the world at the 24th conference of IGLC in 2016. The participants represented a wide range of contractors, architects, engineers, owners, research institutions and universities.

The principles and the toolbox

The most important principles behind Lean Construction are:

- Determine what creates value for the customers (owner/client/end-user).
- Identify the value chain that delivers and creates the value and eliminate obstacles.
- Create continuous process flow in the value chain.

- Use the "pull" system to avoid overproduction (customer-driven).
- Build a culture of systematic learning and continuous improvement involving everyone in the organization.

Even though construction is not assembly line production, a range of the tools found in lean manufacturing as practised by Toyota and others has been adapted to be used in the fulfilment of Lean Construction principles. Similarly, tools and methods found in other areas, such as in social science and business, are used where they are applicable. In addition, tools have been developed especially for the particular conditions and characteristics of construction. In fact, if they will assist in fulfilling the aims of Lean Construction, any tool, method or technique is considered a part of the toolkit available for use. A sampling of these tools includes BIM (lean design), A3 (problem solving), Value Stream Mapping, Six-Sigma, Total Quality Management, 5S (standardization), daily crew huddles (planning) and Just-In-Time (lean supply).

Last Planner System

Central to Lean Construction is the Last Planner System of Production Control (LPS), developed by Glenn Ballard in 2000.

Last Planner creates a pull process, where the project is not determined by the plans, but by the actual situation at the building site. Hence the name: it is the last part that regulates the process. Activities and tasks will not automatically begin because the plan says it, but because the situation on site says “Now we are ready”. It sometimes means that you start earlier and other times later than planned.

The philosophy behind LPS is the need for an even workflow, which calls for predictable activities in order to predict durability. The work is planned at the construction site at weekly or daily short meetings between the tradespersons, which create the basis for a good collaboration across the trades. At the meetings, the tradespersons jointly plan their

Tradespersons engaged in the plannning process

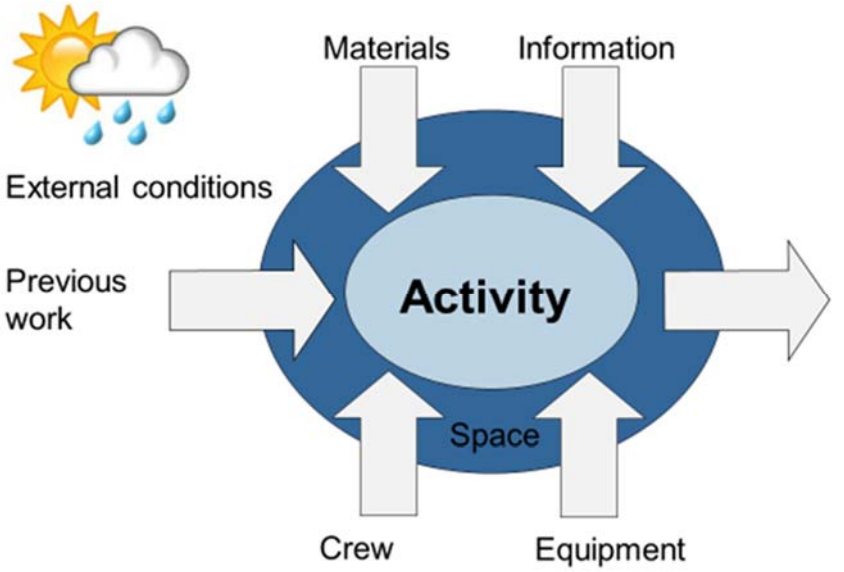
individual activities and tasks in respect of each other's tasks and are in this way directly involved in the planning and coordination of the activities on site.

The point is that the overall performance of the construction process can only be improved by focusing on the process and the flows instead of on the isolated activities. This way a lot of waiting, failure and misunderstandings are reduced, which a traditional construction process is normally full of. From this it follows that Last Planner is a driver for better cooperation across trades and systematic learning of failures in the process.

A key concept is the understanding that an activity must be healthy, before it can be carried out. This means that seven preconditions must be met:

1. Previous work must be done.
2. Materials must be ready.
3. Equipment must be ready.
4. There must be qualified personnel.
5. The right information – drawings and descriptions – must be at hand.
6. There must be appropriate and safe space to carry out the activity.
7. External circumstances should be cleared: contracts, approvals, weather etc.

Figure 1. The seven preconditions



Source: Sven Bertelsen

Trust-based Lean Construction – a case-study

From January 2013 until August 2013 a concrete unit in NCC Construction in Denmark carried out a pilot project called Trust-based Lean. The aim of the project was to develop new methods for productivity gains to the benefit of NCC and the entire Danish construction industry.

The project was realized with funding from the Foundation for the development of the Building and Construction Industry[1] and supported by representatives from both trade unions and the employers' organization.

1. The Foundation for the Development of the Building and Construction Industry (Bygge- og Anlægsbranchens Udviklingsfond) is a common foundation between the leading social partners of the construction industry in Denmark: United federation of Danish Workers (3F) and The Danish Construction Association (Dansk Byggeri).

Inspired by the principles of Lean Construction, the focus was on the targeted development of better working processes and better management- and corporation processes. Furthermore, the project studied recognition of formal skills development as an integrated means to reach specific business targets. A cornerstone in the project has been involving workers directly in solutions suggested.

The pilot project was carried out on two building sites in Copenhagen, involving 45 blue-collar and 10 white-collar workers. The results show a reduction in both building time per floor and waste on site and an increase in job satisfaction. The case proves that via Trust-based Lean a company that is already effective can gain noticeable improvements regarding productivity, work flow, health and safety and employee satisfaction - and that collaboration and an open dialog together with efficiency and job satisfaction are inextricably connected.

Trust in Lean

The name trusted-base Lean was chosen seeing that the project draws on both traditional Lean principles (value for the customer, visibility of the value stream, flow, pull through the value chain, continuous improvement etc.) and a number of trust principles (strong leadership, a collaboration culture, involvement and motivation, delegation, visibility, transparency and openness etc.).

The trust-method thus motivates both management and collaboration processes while the Lean-method facilitates the work processes. The two methods combine in a common concept, where the 'hard' and the 'soft' aspects are mixed in a carefully coordinated process. The trust principles are arguable fundamentals and prerequisites for success when it comes to change.

- Trust-based Lean starts bottom-up and is based upon involvement of the workers with the goal of optimizing the building process and increasing efficiency. It is all

about reducing the use of materials and time, and the workers represent the key to an optimal function of the process.
- The workers give systematic and continuous input and come up with good ideas as to the best building methods throughout the whole process.
- The project is based upon respect through a strong leadership- and corporation culture where trust, dialogue, responsibility and motivation are some of the key words.
- Through activities like board meetings, coaching sessions and workshops the workers have come up with a number of improvements on site.
- One of the most important elements of Trust-based Lean, the board meetings, is organized in the crews once a week with participation of the construction management. The crew foreman stands beside the board, collecting the ideas of his colleagues regarding improvements. Small as well as big ideas are discussed by the management and workers together, and maybe the ideas are tested. If an idea proves good, it will be transferred to production.
- All kinds of ideas are allowed, from a different placement of toilets to the fitting of a construction element on the ground in order to take it up afterwards.
- Rules regarding the opportunity for everybody to be heard have been made in the crews. This has meant that everybody now comes up with improvements, and the tone and social manners have increased considerably.
- Apart from that, the crew forepersons have been trained, and the workers receive two days of intensive training in the new way of thinking.

Results of the pilot project
- Job satisfaction was significantly increased – Job satisfaction rose from 4.0 to 4.4 on a scale of 0-5 with 5 being the highest. The well-being and the atmosphere on the worksites improved.
- Faster construction time – The construction time was reduced between 25 and 40 percent. This is significant,

even taking the repetition effect into account.
- Less waste – Waste of materials was reduced considerably in different areas from 10 to 50 percent.
- The salaries rose – The salaries of workers improved up to three times over the ordinary salary development in the industry.
- Toolbox – A toolbox was developed, contributing to anchoring the concept and getting started on new sites.

Recent developments

Following the Trust-based Lean-project, NCC Denmark has now implemented Trust-based Lean on every site in the concrete unit, and other units in NCC have been carrying out similar pilot projects. Hence, the project is now continuing without external funding.

Another remarkable project is Better Bottom Line, which is a cooperative project between the largest union for construction workers in Denmark, United Federation of Danish Workers (3F), and the employers' organization Danish Construction Association (Dansk Byggeri). Better Bottom Line has been running for a couple of years with good results.

Consultants from the union and the employers' organization help the participating companies to achieve better productivity and efficiency inspired by the Lean Construction-toolbox. The focus is that management and employees together are the driving forces for better results.

The keywords are cooperation and better communication across the company. The aims are less wasted time and fewer frustrations. Happy colleagues and employees who take responsibility. A better working environment and increased safety. And a better bottom line for everybody!

THE BENEFITS OF INDUSTRIAL TIMBER BUILDING AND WHY IT'S PREDICTED TO BECOME MORE PREDOMINANT

Julius Petzäll Mendonca

The benefits of industrial timber building are numerous. In Sweden both politicians and industry refer more and more to the need for industrial timber building to be developed and supported. The usual argument is that Sweden, and by extension the world, is facing major challenges regarding the issues of lack of housing, unemployment and climate change. We need to understand that industrial timber building is part of the solution to these challenges, not part of the problem. Let's talk about why:

1. A new LCA (Life Cycle Analysis)[1] shows that the construction of an 8-storey house built of solid wood only emits 40% of the amount of carbon dioxide as a similar house built in cement. In addition, the same study shows that 80% of carbon dioxide emissions from a house (over a period of 50 years) are attributable to the construction phase; only 20% stems from the operational phase.
2. Wood is a renewable raw material; in Swedish forests an 8-storey house is growing every minute. In addition, wood binds carbon dioxide while it grows and it binds most carbon dioxide during the early stage. That is, the more actively you manage the forest, the more carbon dioxide is fixed in the wood rather than in the atmosphere.
3. The construction period is shortened by almost half when using industrial timber building techniques. This is because the assembly time is much faster. More wall elements can be transported in each truck (due to the low weight), resulting in less disruption to both traffic and the residents around the construction site.
4. The residents of the countryside help to eliminate the housing shortage in the cities. Most people who work in the timber industry partly live in the countryside. Those

1. https://publikationer.sverigesbyggindustrier.se/Userfiles/Info/1129/Strandparken_BI_rapport_slutversion_160613.pdf

who manage the forest also live on the countryside. So the dwellings produced will help solve the housing issue in the cities while also solving the unemployment issue in the countryside.

These are clear reasons for how industrial timber building could help to address the housing issue, the unemployment issue and climate change. But there are many other benefits that are worth sharing. In Sweden there is a discussion on how to come to terms with the labour capacity constraints that exist in the construction sector. Fewer and fewer young people turn to the construction industry and Sweden must rely on access to foreign labour. The apprenticeship period needed to become a construction worker in Sweden is generally long. It is considered much faster to obtain labour to work with industrial timber building than construction workers for on-site construction. The construction workers currently available would in the future primarily be involved in the assembly of wooden houses at the construction site, land preparation and so on. In other words, industrial timber building could help reduce Sweden's need for foreign labour and thus provide a greater opportunity to control the Swedish labor market.

Another effect on the construction workforce of increasing industrial timber building is that it is easier to control the working environment and working conditions. If we move most production from the construction site to a controlled factory, it is easier to maintain a safe work environment and control work at the factory. However, I am convinced that there will continue to be a serious shortage of construction workers, even with increased production of multi-storey wooden houses. Sweden in particular will need a strong construction workforce given the government’s flagging housing policy in recent years. In addition, more people than ever are estimated to move into the cities, and it is difficult to build what is needed even with today’s transfer of population from rural to urban.

Politicians have a major task to break the monopoly of the cement industry. The companies in the wood industry are usually small in size and are eaten up by the big cement industries with respect to procurement. Likewise, zoning plans are often set based on masonry. For example, a zoning plan says that the house must be XX meters high and the client wants XX floors. But when building with wood slightly thicker beams, girders and construction elements are required. The implication of too rigid zoning is that it prevents construction in wood and so does not allow for multi -storey wooden buildings. Politicians must also begin to demand that municipalities and public procurement agencies choose the most environmentally friendly option, not the cheapest. The timber industry needs the support of politicians to reign back the cement industry's century-old lead. The climate deal in Paris also requires that in the future the construction industry has to be more climate efficient and industrial timber building is the best solution to this due to the low environmental impact of the timber industry. But one thing is certain: the cement industry will still have a strong position in the construction material market for the foreseeable future. It is therefore important that politicians in various ways make it easier for the timber industry to compete.

Fortunately, a lot is happening regarding the development of the wood industry sector in Sweden. Several existing companies plan to expand or invest in new factories. The capacity of industrial timber building is currently at a maximum and order books are full for years to come. With investments made now, there will be an increase in capacity but not enough to saturate market requests. Politicians have also started showing an interest in the issue. Industrial timber building is given big space in government-appointed programmes such as: the National Forest Programme, the cooperation programme for the circular and bio-based economy, and the roundtable discussion on increased industrial timber building. Within the next few years, we are

guaranteed to see an increase in the production of wooden houses, and also an increase in investment from major construction companies

To sum up, politicians have big problems to solve the issues of housing, unemployment and climate change. Industrial timber building is a solution to all problems in one. That's why industrial timber building should be seen as a contribution to the solution, not the problem.

Gerhard Syben

A NEW TOOL FOR PROFESSIONALS IN CONSTRUCTION COMPANIES

Forms and consequences of introduction of Building Information Modeling in Germany – first findings of an empirical study

In the construction industry in Germany, enterprises, experts, federations and state representatives agree that Building Information Modeling (BIM) will be the future *modus operandi* (the unions have not yet made a statement on this, but they will certainly assent). However, the real dissemination of BIM at present is still at a low level. The advantages of using BIM are however estimated as many and so substantial that German construction companies will hardly miss out on the possibilities of BIM to improve their competitiveness by increasing productivity and the quality of planning, as well as providing accuracy and security in relation to cost and deadline estimates.

Concerning research on BIM in Germany, until recently literature was focussed either at the level of its aims (explaining why BIM should be used) or on technical references and tips on how to use it.[1] Social research on how processes and structures of organisation inside the enterprise or between enterprises co-operating inside a project change

when companies employ BIM, as well as on the consequences for work and the work places of employees and for the competences required, has been non-existent. This gap has now begun to be filled in recent empirical research work. Based on interviews with research and planning experts and companies in the field, a first explorative study was undertaken on the forms and consequences of introducing Building Information Modeling for work in construction companies.[2] The study contains a preliminary inventory as well as conclusions and hypotheses for further research.

Construction companies as drivers

According to the findings, up till now the drivers for the introduction of BIM in Germany have been on the side of the construction companies. Despite various initiatives from the Federal Government and from employers' federations to foster BIM and make it popular among potential applicants and despite some isolated applications used by a few big clients, such as from the automotive or chemical industries, the average client at present is not using BIM for tendering processes or awarding contracts. In particular, private architectural and planning companies – most of which are small and very small enterprises – still refrain from using BIM. The latter is important as in Germany these actors play a crucial role between private clients and the construction sector because, in general and according to the legal framework, contracts cannot be awarded without employing an architect. This means that, as long as architects do not use BIM, there is no incentive for construction companies to do so.

1. Cf. for example: Hausknecht, Kerstin; Liebich, Thomas: *BIM-Kompendium. Building Information Modeling als neue Planungsmethode.* Stuttgart 2016; Przybylo, Jakob: BIM – *Einstieg kompakt.* Berlin-Wien-Zürich 2015
2. Gerhard Syben: *Folgen des Building Information Modeling für die Arbeit in Bauunternehmen.* Bremen 2016. http://www.baq-bremen.de/images/stories/pdf/BAQ_Folgen_der_Arbeit_bei_BIM_20-11-2016.pdf. The study was financed by the construction industry employers association of Lower Saxony and Bremen.

Thus, whereas it seems to be a future dream that construction companies will receive a 3D data model from the client with the tender documents, this is something that may have unexpected consequences. The study has shown that, missing an incentive on the client's side, some construction companies intending to use BIM simply have started using it on their own account. They are themselves working out the design and planning necessary to produce 3D data models of the building required. And if they do so, the question may arise: why still employ an architect, if the work of design and planning has already been done? However, experts and enterprise representatives included in the study denied that the general intention of construction companies is to kick architects out of the process. Apart from this, they see developing BIM as a suitable way of increasing the use of partnering models, which are in Germany in some respects hampered by the legal regulation of the tendering process as well as by the habits of the actors involved. The same is true for lean construction, as assessed by the experts interviewed.

Thus, it is the individual construction company, expecting an important step in terms of innovation and wishing to partake in its advantages, which is taking the initiative to introduce BIM. And this action is not confined to big companies; medium-sized, owner-led companies (with just about 100 employees) too, which are characteristic of the German construction industry, have started to do the same.

The growing importance of a qualified workforce

What are their first steps? When starting out, companies procure themselves the resources needed: software, hardware if necessary, and, above all, competences. Competences mean: civil engineers (sometimes also architects), who are qualified and experienced in tendering processes and planning and especially interested in the application of IT-technology. As these professionals are not normally available on the labour market, companies either look inside their own workforces for those who may be able and willing to develop themselves

to become a BIM-manager. Or they try to hire graduates from universities, who have written or intend to write their thesis on the problems of introducing BIM into construction companies. These professionals then form some kind of a working group or task force inside the company, in charge of finding out the best way to implement BIM in the company and to prepare the company for going in that direction. This route to BIM is supported by the conviction shared by the entire BIM-world in Germany, that there is not and cannot be a general solution of BIM to fit all, but that each company has to find out its own way of implementing its particular mode of using BIM. Secondly, the conversion from traditional to BIM-based procedures in a company is never undertaken at once and in one step, but is in the beginning restricted to certain individual projects, with others processed in the traditional way. So the company, that is those employed in the areas of tendering and organising construction projects, can accumulate competences and experiences on how BIM is working and how to make the best use of it, before shifting over to its general use. Thus the implementation of BIM is worked out step by step according to the readiness of the employees to master the new procedures.

This form of transition is supported by and enforces the human resource management strategy of most German construction companies, that qualified personnel represent their main business resource. To successfully use BIM, companies are convinced of the need for professionals who have above all an in-depth knowledge of construction, its procedures, processes, structures and tasks; BIM in German construction is not a playground for IT-freaks. The knowledge of construction required must exceed the ability to collect and process data. The competence required is the ability to analyse data, to understand information and to meaningfully evaluate potential situations on site. Thus, experts interviewed for this study were convinced that calculating operations and routines will no longer determine the work of engineers in the tendering and production engineering

processes; these jobs will be done by the BIM software. Consequently, qualified engineers will have more time for what is genuine engineers' work: planning, reflecting on procedures and evaluating and optimising them in terms of time and cost as well as avoiding collisions and clashes in activities during the construction process. The experts expect that BIM will be a new tool for professionals in construction companies.

Some experts interviewed for this study expected furthermore that the change in job requirements and the revaluation of jobs in the future could open the window to offering better working conditions, not only through a revaluation of job content, but by improving in particular working time conditions. Engineers in construction today are under considerable pressure, and normally suffer from extended working hours. In particular, an increasing number of engineers with young children – also male ones – complain that they suffer from constraints on their family life caused by excessive working time. BIM could potentially help companies to offer a better work-life-balance to their most valuable workforce and thus improve the position of the company as well as the entire industry on the labour market.

BIM focusing the tendering process

In implementing BIM, the main focus for a change in procedures is the tendering process. Tender documents and design and planning drawings are already delivered in electronic format. Thus, in the first instance, the form taken by work activities in the tendering process does not change. Also the data on which the calculation of prices is based are the same. A change is first required when data on prices have to be prepared in a way that they can be interrelated automatically with data on quantities. Processing this is a challenging operation, which has not yet been mastered by many companies. At the same time, with BIM all information is contained in a data bank and can be retrieved when needed instead of being transferred manually.

One of the former core tasks inside the tendering process will be changed. Quantities will no longer be calculated by the company's estimator, but by the software. These data can be directly read out from the 3D-model (which is called 5D once it is linked to data from the time schedule and costs). Thus, estimators will have more time to reflect on the project, its processes and operations. Demands on and the aspiration level of their work will be increased. Again, this development is not without consequences. Well worked-out, detailed and consistent design and planning documents can also be produced by a client, in particular an active one. This could lead to a shift in power to the client, who will then be more dominant in the project partnership.

However, engineers must considerably earlier spend remarkably more time on planning details of the construction process with BIM. Procedures must be described precisely and in detail from the very beginning, otherwise a data model cannot be constructed at all. Thus, BIM forces the final state of a construction project to be already fixed in the first planning phase. The contractual specifications must be defined at a much earlier stage than is usual up till now. Final decisions must be and will be made during the tendering process. The transparency and comprehensiveness of the client brief will increase remarkably. With BIM, it will be possible – if required – to use the documents that a construction company has produced and submitted as a blueprint for the site. This could also lead to the integration of engineering (time and operation scheduling) and tender processing departments because the difference in the work of the two will disappear.

Thus, with BIM the tender price worked out by a company during the tendering process will be a real price. This is currently an important point for the German construction industry. In recent years, more and more companies have operated on the market on the basis of low tenders, which during the project have been systematically "improved" by follow-up proposals or variations. Quite often tenders have

been incomplete and insufficient so that companies working on the tender bids could not take into account all the risks involved in a project, rendering the tenders inaccurate and risky. The image of a cost-unreliable industry has become a severe problem for German construction. Experts interviewed for this study expected this policy to terminate with the implementation of BIM, because with BIM tender costs calculated will be the real costs. Supplementary costs can still arise, in particular and above all if clients change their mind and require modifications to the original plans. (This implies that construction projects include a certain inconsistency, which is quasi-natural and must also in future be managed jointly by the construction company and the client.) Construction companies are expected to benefit from any change, because with BIM and with the 3D-model they will be able to demonstrate to the client much better than before the consequences of subsequent requirements in terms of effort, time and money. Even if this does not reduce the number of variations, it will make discussions about them more objective. What will disappear will be follow-up proposals attributable to the construction company's own initial premature planning as well as to insufficient tender documents.

The greater accuracy at an early stage of the construction project needs a very significant effort in terms of manpower and time. However, this will be compensated at later stages – the one stage being dependent on the other. A remarkable relief will occur after the performance data bank has been worked out, linked with the 3D-model. But this precondition must be and can only be created by a company for itself.

BIM needs cooperation

Experts interviewed for this study designated BIM as a co-operative tool. Working with BIM it is clear that a construction project can only be run successfully if partners in the project coalition co-operate. However, it is not BIM that makes people work together; this must be the work of the participants themselves. The new and innovative aspect is not that co-

operation is demanded, but that this is a need that must be met, because otherwise the BIM-model will not work. Investment in coordination between the different participants in the project partnership involves an effort that has always been needed, but has very often not been delivered.

BIM will not only foster co-operation between the construction company and the client but also inside the company. Estimators can better explain what their concepts, approaches and assumptions have been and why they have proposed a certain process for the project. Site managers can make themselves much more easily familiar with a new project when using a 3D-model instead of a two-dimensional drawing on paper.

Furthermore, the experts interviewed expect that the role of site management will change; this will be true for the site manager and the foreman[3]. Due to the increasing accuracy of planning they will no longer be the "flexible reserve" or "sweepers" to resolve the consequences of insufficient planning. Rather they will control production on site and ensure that production corresponds with and conforms to the planning specifications as well as being faultless. With BIM above all, administrative work required from site management is expected to decrease and that which remains should more easily be executed. In consequence, site management will have more time for its original task: to manage the site. Experts interviewed furthermore expected construction companies to continue to include site management in decisions concerning production methods for a particular project, due to its specialised knowledge of production on site.

Another operation that will derive benefits from BIM is, according to the experts interviewed, logistics, mainly the field of responsibility of the foreman. The tasks and functions

3. The term 'foreman' is used throughout rather than the gender neutral 'foreperson' because it appears that there are no women in this position in Germany.

of the foreman in relation to the allocation and positioning of machinery, equipment and materials are not expected to change, but the form of these activities will. Instead of dealing with slips of paper, telephoning, mailing and using excel-tables, the foreman will operate the mouse, clicking on the respective parts of the building on the screen, and being informed by the model about, for instance, the minute when the delivery will arrive on site.

New roles, new competences

With the implementation of BIM, the experts interviewed expect new roles inside enterprises. Overall the management of a construction project executed with BIM needs a BIM-Manager. For the coordination of tasks participating in planning at various points - such as structural design, work and schedule planning, work preparation, design and planning of building services - a BIM-coordinator is needed. To create and maintain the 3D model is the task of the BIM-modeller. However, it is till now an open question as to whether there will be new jobs or just new tasks for already existing ones.

In contrast, it is a certainty that working with BIM will require new competences. All experts also agree that a profound knowledge of the construction process will remain the indispensable basis for working in the construction industry. What is provisionally termed 'BIM-competence' includes data processing and an affinity to IT technology and its use. Employees must know and be able to work with the respective software as well as operating devices. This is also true for working on site and for the workforce on site. The cooperative character of BIM will require basic knowledge of the entire construction process and adjoining tasks as well as the ability to communicate. New requirements and the need for continuous development will result, according to the experts, in enforcing further education and training at all levels.

NEW BUILD, RETROFIT, LZC TECHNOLOGIES.

Colin Gleeson, University of Westminster

In 2010, residential buildings in the European Union (EU) were responsible for some 25% of end use greenhouse gas emissions from direct combustion for heat and indirect emissions from energy transformation such as electricity (EEA Technical report No 18/2012)[1]. At the same time, across the EU, mortgage debt and homelessness are reported as on the increase and, with the exception of France, new social housing production decreased in most countries between 2009 and 2012[2]. Fuel poverty is a major problem for Europe as, according to BPIE[3], between 50 and 125 million people are unable to afford proper indoor thermal comfort. More specifically, in 2012, 10.8% of the total European population was unable to keep their home adequately warm, increasing to 24.4% when referring to those on low-income. Despite the fact that there is no common European definition for fuel poverty, the importance of the problem as well as the severe health impacts caused are widely recognised.

The response of EU member states has been varied. Austerity politics have tended to reduce investment in new housing and in some countries reduced spending on retrofit. Yet this is not the case for those member states where low energy housing policies are well established to ensure compliance with national energy/emissions targets and the Energy Performance of Buildings Directive (EPBD) requirements for 'nearly-zero energy' buildings by January 2021. Meeting the low energy design performance for both new build and retrofit has previously been shown to be problematic with an 'energy performance gap' identified by UK researchers and

1. http://www.eea.europa.eu/publications/end-user-ghg-emissions-energy/full-report-end-user-ghg
2. http://www.housingeurope.eu/resource-468/the-state-of-housing-in-the-eu-2015
3. http://bpie.eu/uploads/lib/document/attachment/60/BPIE_Fuel_Poverty_May2014.pdf

reported by Colin Gleeson in CLR-News 4/2015 (PP. 30-37). The performance gap literature focuses on appropriate architectural design and its execution on the building site. What lies at the heart of low energy construction is quality, a function of a knowledgeable and skilled workforce fully engaged in the production process. For construction trade unionists, this has led to a debate on appropriate vocational education and training (VET) as well as on the conditions of employment (Clarke, Gleeson, Winch, 2016). It could be argued that precarity, expressed for example as false self-employment, agency labour, piece-work payment, etc., enhances the alienation of labour and operates to disengage the construction worker from the pursuit of quality to the more basic pursuit of economic survival. Thus low energy construction is both technical and social, a socio-technical challenge for the construction sector.

How this challenge is addressed will impact on the lives of construction workers. A highly skilled, knowledgeable and competent construction worker is a necessary starting point. Such a worker is relatively autonomous within the labour process yet recognises the importance of communication and team working. Low energy construction is technically complex with detailed specifications for all junctions between the elements of the external envelope. Not only has insulation to be continuous but all junctions are fabricated to reduce the effects of thermal bridging. Unwanted infiltration of outdoor air must be limited to a specific air tightness in order to facilitate the design ventilation regime, whether natural ventilation with extract fans or whole house mechanical ventilation with heat recovery (MVHR). The energy specification of the envelope, its fabric energy efficiency, is the starting point for low energy, nearly-zero energy or energy-plus buildings. Retrofitting existing buildings demands, if anything, yet more knowledge, skills and competence than new build since it is the realm of unknowns. Anyone with experience of retrofit knows that the construction plan may be interrupted by the discovery of

hidden dilapidations, such as dry rot or structural cracking. The team must be able to safely respond without the constant reliance on supervisors if wide-scale and deep retrofitting is to succeed.

A low energy building still requires heating, cooling and power for lighting and appliances. The carbon footprint must be reduced or eliminated through low and zero carbon technologies (LZC) to produce nearly-zero energy buildings or energy plus buildings – those capable of exporting net energy generated on-site. The EU directive on renewable energy sources (EC, 2009) identifies both renewable heat and renewable power (electricity). Most will recognise renewable power as photovoltaics and wind turbines although it also includes micro-hydro or 'run of the stream' hydro-electric. Renewable heat is defined as the conversion of solar radiation to useful heat from the air, ground or water, biomass, bio-gas and waste incineration.

Any discussion of low emission, energy efficient buildings must consider energy supply as well as energy demand. EU electricity supply is subject to a transformation where coal and oil-fired generators are being replaced with low or zero carbon alternatives and thereby transforming the work of 'engineering construction'. This transformation is, in many member states, contested with arguments ranging from centralised gigawatt nuclear and/or coal and gas with carbon capture and storage (CCS) through to 'smart grids' and 'distributed generation' with its emphasis on local rather than central generation.

CCS technology is fraught with problems since the process involves separating and capturing CO2 in the flue gas, pressuring the gas to liquefaction and pumping the liquid gas to deep underground rock fissures or into undersea worked-out oil fields. Few CCS plants are in operation and there have been serious teething problems with those that are. CCS is also critical to hydrogen gas manufacture as an alternative to,

or to mix with, natural gas. Whilst natural gas is predominantly methane (CH4) and burns to produce CO2 and H20, Hydrogen (H2) burns to produce only H20 or water. However, since hydrogen does not exist on Earth as a gas, it is predominantly manufactured from natural gas resulting in CO2 emissions unless combined with CCS[4].

Alternatively, both power and heat may be supplied through 'distributed generation' with local power stations driven by 'combined heat and power' (CHP or cogeneration) supported by wind, large-scale solar thermal and PV along with renewable output from individual buildings. Wind 'turbineophobia' and NIMBYism[5] is associated with large-scale land-based wind farms and rural opposition often driven by a lack of control over ownership. Both Germany and Denmark have seen political engagement and struggle over ownership resulting in communally owned district heating and a profusion of locally owned wind generation - a taking back of the commons. Helsinki, in contrast, operates private district heating networks resulting in accusations of price gouging[6].

Electricity production, providing district heating or 'heat networks', supplies over 60% of Denmark's 5 million homes. Denmark has six large central district heating areas with around 400 small and medium-sized district heating areas. In 2014, 68.9 % of all district heating was produced by CHP or 'cogeneration'[7] and 98% of Copenhagen City heating was

4. Hydrogen is also used to 'sweeten' tar sand oil, to make it less viscous. CCS is used on Alberta tar sands oil. A video showing the basic process is available at: http://www.shell.ca/can/en_ca/about-us/projects-and-sites/quest-carbon-capture-and-storage-project.html. Hydrogen may also be produced by electrolysis of water (using PV) and thus provide energy storage. The hydrogen is re-converted to electricity by fuel cells - see for example AREVA Corsica: http://www.areva.com/EN/activites-4461/hydrogen-fuel-cells-and-energy-storage.html
5. Turbineophobia is unwarranted fear or hatred of wind turbines and not a real word. NIMBY = not in my back yard.
6. https://www.luke.fi/en/blog/district-heating-prices-go-wild-in-finland/
7. https://ens.dk/sites/ens.dk/files/Globalcooperation/regulation_and_planning_of_district_heating_in_denmark.pdf

from waste heat from incineration plants and CHP through a 1,300 km network of pipes[8]. Whilst Denmark is one of the smaller EU member states by population, the scale of transformation since the investment in district heating in 1979 indicates the EU-wide potential for energy transition and the potential for new jobs in the engineering construction sector.

EU policy for residential buildings is to promote the increase in renewable heat by the replacement of electrical resistance heating, gas, oil and coal fired heating with heat pumps, biomass boilers and solar thermal. Heat pump installations have been the subject of a number of European field trials including the most recent one in Britain, the Renewable Heat Premium Payment - Heat Pump (RHPP) trials, where 700 heat pumps were monitored for at least one year (Summerfield, et al, 2016). What is apparent from the resulting publications is the continuing wide range of performance where annual efficiency ranges from 400% plus down to less than 200% (Seasonal Performance Factors or SPFH2 >4.0 to <2.0). Heat pumps are not just an alternative to boilers; they are highly sensitive to appropriate design, installation and commissioning. Heat pump installations can also exhibit a performance gap similar to building envelopes. The advanced VET required of the design and installation team to achieve high performance also needs to encompass communication skills at handover to the occupant.

The transition to low energy buildings and renewable heat and power in the EU has been uneven. However, Germany and Denmark provide examples of a progressive approach to low carbon transition. German low interest funding has since 2006 supported the construction and energy-efficient retrofitting of 3.8 million homes, equivalent to one in three retrofits and half of all new-builds. A total of over 196 billion euros have been invested and carbon emissions have been

8. http://www.c40.org/case_studies/98-of-copenhagen-city-heating-supplied-by-waste-heat

reduced by over 7.7 million tonnes per year[9], thus reducing energy demand. Denmark has a similar funding programme that supports the construction sector and subsidised energy efficiency refurbishments in private housing[10], again reducing energy demand. At the same time, the UK has witnessed the demise of the Green Deal, a £540M plan to retrofit its 26M homes[11], proving that a supportive government policy remains critical to progress.

Across the EU and globally, the potential remains for trade union and progressive government alliances, whether at local or national level, to provide nearly-zero and zero energy buildings, supported by initial and continuing VET and bringing together the workforce responsible for both energy supply and demand. Since all governments have signed up to the Paris 2015 COP (Conference of the Parties) agreement, such alliances meet national government policy and trade union demands for a 'just transition'[12].

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THE OLYMPICS AND THE WORLD CUP IN RIO: HUMAN RIGHTS VIOLATIONS AND RESISTANCE

Fabricio Leal de Oliveira and Renato Cosentino

Human rights violations and organized resistance against sport mega-events in Brazil

The participation of Brazil in these major world events resulted in deep changes in our cities, and imposed large urban projects on the development agenda, including stadia to be renovated and/or built amongst other constructions related to the 2014 FIFA World Cup. In Rio de Janeiro, which besides hosting the main World Cup matches also hosted the 2016 Summer Olympics, the interventions were particularly significant. The city went through a process of urban restructuring and expansion with large public construction projects that mainly served real estate interests.

These projects were followed by a series of human rights violations, particularly the right to decent housing. The first documents to deal with the problem were Brazilian Human, Economic, Social, Cultural and Environmental Rights Platform (DHESCA)[1], which addressed the Rio de Janeiro issue, and the National Articulation of World Cup Popular Committees (ANCOP)[2] dossier, both published in 2011. According to ANCOP, at a conservative estimate, around 200,000 people were threatened and/or removed in the 12 cities that hosted the World Cup.

The ANCOP dossier, entitled "Mega-events and Human Rights Violations in Brazil", was simultaneously released in different Brazilian cities[3] on December 12th, 2011, with reference to

1. Available at https://issuu.com/plataformadhescabrasil/docs/2011_cidade_copa_rio_de_janeiro. Access on December 20th, 2016.
2. Available to download at www.apublica.org/wp-content/uploads/2012/01/DossieViolacoesCopa.pdf. Access on December 20th, 2016.
3. During the release, public events took place in seven of the 12 host-cities: Rio de Janeiro, Belo Horizonte, Curitiba, Natal, Brasília, Porto Alegre and São Paulo.

International Human Rights Day. Despite the emphasis on the Right to Housing, the first chapter, the document also contains complaints regarding Labor, Information, Popular Participation and Representation, Environment, Public Services and Goods Access, Mobility and Public Safety. This document has been updated year after year until the World Cup and it was the basis for the popular movements that would spread around the country in 2013.

The release of the ANCOP dossier brought to life the World Cup Popular Committees created by institutions, social movements, academics, political organizations and citizens opposing violations, abuses and illegal activities related to sport mega-events in Brazil. These local committees formed a nationwide group. Their beginnings can be traced to November 2010 with the occurrence of two meetings whose aims were to promote debates and deeper analyses about the impact of mega-events in Brazil.

The first seminar named "Popular challenge to mega-events" was held in Rio de Janeiro, supported by social movements that were already distinguishable in the Pan-Americano Social Forum of 2007 and were once again articulated during the Urban Social Forum, held in March, 2010. Simultaneously, in São Paulo, the School of Architecture and Urbanism of the University of São Paulo-USP and the UN Special Rapporteur on the Right to Adequate Housing held the seminar "Urban impact and human rights violation in sport mega-events". The two seminars put together different social actors and one of the results was the creation of local committees in the cities, something unheard of before in a country preparing to host a World Cup. In Rio de Janeiro, the Committee existed in effect up to the Olympic Games 2016, and also incorporated the production of denunciation dossiers[4] in its political actions.

4. The last issue of the document, available in English, can be found at http://issuu.com/mantelli/docs/dossiecomiterio2015_eng_issuu. Access on December 20th, 2016.

Dossier production, the promotion of public debates and political positioning as well as street occupation protesting against violations became the main activities of local committees. At ANCOP, the approval of federal laws that created specific exceptions, such as the General Law on the World Cup, or even UN international complaints were important to raising the debate on violations happening in Brazil at another level.

From June 2013 onwards, the spread of protests during the Confederations Cup and the creation of new groups and social collectives, as well as new forms of demonstration and communication, allowed for a broad evaluation and questioning of the social benefits of sport mega-events. Through critical and deep analyses of the model that accompanies the events and the urban restructuring suffered by Brazilian cities during their preparation for the games, the Committees were able to gain a better view of what was really happening: forced removals, privatization, public indebtedness, suspension of rights, among other violations.

In Rio de Janeiro, one of the most active committees, there were two main action foci: the fight against dislocation and for housing rights and the fight against public space privatization, such as in the case of Maracanã Stadium.

Rio de Janeiro: conflicts and resistance to mega-events

Even considering that data on the removal of housing units were not released by the government and that they are masked in government balance sheets concerning large urban projects, information about conflicts related to mega-events have been raised and organized by social articulations - such as the Popular Committee for the World Cup and Olympics - and scientific research[5]. According to the available information in December 2015, more than 22,000 families had

5. See, for instance, the book written by Lucas Faulhaber and Lena Azendo *"SMU 2016: Remoções no Rio de Janeiro Olímpico"*, edited by Mórula, Rio de Janeiro, 2015.

already been removed by actions implemented by Municipal Public Authority, and about 5,000 were in danger of being removed. Based on information from the Popular World Cup and Olympics Committee of Rio de Janeiro, it is estimated that the total number of removals may reach up to 77,000 people.

The main fields of social conflict in the Olympic City are related to the construction of sports facilities for the World Cup and for Olympics, the implementation of a bus transport corridor to improve access to events, favelas (slums) removal associated with claims of geotechnical risk and environmental preservation, large urban projects and urban "revitalization", and systematic acts of repossession of occupied buildings in central areas.

Among the many acts of resistance, some must be highlighted because they were able to interfere with the objectives of City Hall and its private sector allies. Two cases in particular deserve attention owing to their close relation to two major mega-event material symbols: the Olympic Park, heart of the Olympic Games 2016, and Maracanã Stadium, which hosted the final match during the World Cup of 2014.

The Olympic Park was implemented in a public area of around 1.5 million square meters, mainly occupied before by Nelson Piquet International Autodrome and by a small low-income community, Vila Autódromo, comprising 550 families and 1,300 inhabitants at the beginning of 2011. A great number of residents had been living there for at least three decades, and by the end of the 1990s they obtained the Grant to Real Right to Use from the Public Authority.

In order to build the Olympic Park, the Municipality of Rio de Janeiro contracted a public-private partnership (PPP) with the companies Norberto Odebrecht, Andrade Gutierrez and Carvalho Hosken, which included the transfer of more than 1 million square meters of public space to the private

consortium after the games. On this land the consortium was required to build apartment complexes and luxury hotels, as per the Bidding Terms. There was no place for a popular settlement in this new scenario, allowing the Municipality to begin the process of removing Vila Autódromo.

Among the many resistance strategies triggered by the Residents Association, the *Popular Plan of Vila Autódromo*[6] stands out, whose main objective was to show that community urbanization and Olympic Games' installations were compatible. The Plan, drawing on advice from researchers from two federal universities[7], showed that, as well as reducing the impact on the population itself, Vila urbanization would be a cheaper option for the public purse[8]. In May 2016, the expense to the public of buying land and the construction of a housing complex to resettle families, in addition to compensation for residents who refused to go to the complex, had already exceeded US$70 million, whereas the updated budget for the implementation of the Plan´s urbanization project and construction would cost up to US$6 million. Supported by social movements and groups and human rights organizations, the Popular Plan for Vila Autódomo became an important tool in the fight against removal.

Due to pressure and intimidation from the Municipality, the first demolitions began in 2014 and escalated from then on, when about 200 families agreed to move to the housing complex. However, the community´s resistance persisted, forcing the Municipality to use other strategies, such as offering large compensation, which resulted in more residents accepting to move and gave rise to instability for the ones

6. The first version of the Plan, release in 2012, is available at https://comitepopulario.files.wordpress.com/2012/08/planopopularvilaautodromo.pdf. Access on December 20th, 2016.
7. Universidade Federal do Rio de Janeiro-UFRJ and Universidade Federal Fluminense-UFF.
8. In November 2013, the Plan won the Urban Age Award, organized by the Deutsche Bank and by the London School of Economics.

who stayed. As the Olympics were approaching, the Municipality had to accept that the remaining residents would stay there - now only 20 families - and to implement a project (however precarious) for the urbanization and construction of houses.

More clearly than in other conflicts, the social result of the Vila Autódromo collective action had an important role in beginning to change (at least since June 2013) the way sport mega-events are perceived. It seems that a significant part of the population no longer see the games as a country achievement, but as a great expense destined to benefit the few.

In the case of the Maracanã Stadium renovation, achievements were of another nature. The so-called "Maracanã Complex" comprises Mario Filho Stadium (Maracanã) and a series of surrounding public facilities: Maracanãzinho Gymnasium, Célio de Barros Athletics Stadium, Julio Delamare Aquatic Park, Friedenreich Municipal School, the old Indian Museum, and buildings initially used by departments of the Ministry of Agriculture. Approximately 800 meters from the stadium, there are Metro Mangueira favela and, on the other side of the railroad that crosses the area, the Mangueira favela.

In addition to the renovation of the football stadium, interventions related to the complex for the 2014 FIFA World Cup and Rio 2016 Summer Olympics were intended to eliminate the Metro Mangueira favela in order to build new routes to improve public transport access and to build a shopping centre and other projects, which would mean the demolition of existing social facilities as well as surrounding buildings. Only Maracanã Stadium and Maracanãzinho Gymnasium would be kept. But social movements and actions forced the State Government to review its plans, at least in part.

Whereas the first residents removed from the Metro Mangueira favela were forced to accept apartments about 40 kilometres away, those who became organized with human rights institutions and resisted - about 600 families - were able to move to a nearby complex.

The many demonstrations, fragmented at the beginning, began to get stronger in a campaign that highlighted the public and popular aspect of Maracanã. The June 2013 demonstrations added strength to this campaign and the motto "For a Public and Popular Maracanã" spread around. Cornered by the repercussions from the demonstrations, Sérgio Cabral, then governor, declared he was no longer going to eliminate sport facilities, and right after that it was declared that the school would also be kept in place. The political fight changed the course of events. In November 2016, Sérgio Cabral was arrested after being accused of corruption connected to large public construction, among them the ones related to Maracanã.

Closing remarks

These few recent achievements deserve to be remembered and valued now, while Brazil faces a series of neoliberal measures. In December 2016, three months after the impeachment of president Dilma Rousseff, the parliament approved a constitutional amendment that freezes public expenditure for 20 years and prepares for changes in social welfare and labor laws, extinguishing the rights earned decades ago. On the other hand, the economic recession has given right wing state governments new excuses to cut benefits and privatize assets and public institutions. In large cities such as Rio de Janeiro and São Paulo, right wing governments won municipal elections, highlighting an agenda whose priority is to promote business and public-private partnerships. If, in the preparation of major sport events, the low-income population is the one to suffer more regarding basic rights, at the end of 2016 the number of people affected has increased, bringing difficulties and insecurity to all Brazilians.

Report

Anne-Claire Streck

7th open conference of the European Construction Technology Platform (ECTP)

The European Construction, Built Environment and Energy Efficient Building Technology Platform (ECTP), created in 2004, brings together the collective vision for a leading edge European Built Environment on behalf of its members. ECTP gathers 170 Member organisations from across the construction sector and from the whole supply chain of the Built Environment. It is one of the 38 European Technology Platforms (ETPs) which are industry-led stakeholder fora recognised by the European Commission as key actors in driving innovation, knowledge transfer, and European competitiveness.
The main areas of focus for ECTP include:

- Active Aging & Design
- Energy & Efficient Buildings
- Heritage & Regeneration
- Infrastructure & Mobility
- Materials & Sustainability

Every two years, the ECTP organizes a conference to address the burning issues for the sector in Europe. The 7th ECTP conference took place on 17th and 18th November 2016 at Bozar in Brussels (Belgium). The opening session, chaired by Emmanuel Forest, CEO of Bouygues Europe and President of the ECTP and Luc Bourdeau, ECTP Secretary General, introduced the main current challenges of the built environment. In his keynote speech, José Lorenzo Vallès, Head of Unit at the European Commission, DG Research & Innovation, reminded the participants of the importance of industrial participation within the EeB PPP and the need to develop technologies with a commercial exploitation potential. Robert Missen, from DG Move, brought his institutional and regulatory perspectives on transport infrastructures issues. Then, Jennifer Layke, Director of the

Global Energy Program Worlds Resources Institute and BEA-Sustainable Energy 4 ALL (SE4ALL) Coordinator, highlighted the importance of public-private collaboration. Juan Elizaga, ENCORD President, presented inputs to shape the future of an innovative built environment and also stressed the importance of the life cycle stages: design, construction, operation, maintenance and renovation. Then, Juan Manuel Mieres, representative of Solintel provided a SME perspective and addressed the issue of barriers for market uptake and energy efficient business models. Last but not least, EeB-CA2 CSA Coordinator, Régis Decorme from CSTB, presented the various services offered by the four EeB CSAs to foster EeB PPP projects impact.

Thematic parallel sessions addressed specific issues under the five current challenges of the ECTP. The session on transport infrastructure, chaired by Miguel Segarra (Dragados) and Alain Zarli (CSTB and REFINET Coordinator) addressed the issue of RDI priorities for the sector. The session on materials and sustainability innovation, chaired by Christian Artelt (Heidelberg Cement) and Gian Marco Revel (Universita Politcenica delle Marche) highlighted outcomes and impact from European research projects under AMANAC CSA. The issue of circular construction was also presented as an opportunity, going beyond building sustainability and involving several aspects such as the use of renewable materials, prefabrication, design for durability and re-use of components or recycling on site. The cultural heritage and urban regeneration research session, chaired by Isabel Rodriguez-Maribona (Tecnalia) presented EU case studies in energy efficiency in cultural heritage as historic cities or buildings, before discussing future needs of the sector. The session on building an age-friendly Europe was chaired by Alexander Peine (Utrecht University) and gathered representatives from the European Commission and from the housing sector to discuss actions needed to boost jobs and growth in the age-friendly housing domain. Last but not least, the energy efficient buildings session, chaired by Javier Bonilla (Acciona) highlighted the new technical solutions,

business models and regulatory frameworks to accelerate the renovation of Europe's building stock.

In addition to the five Committees' sessions, a session on digital transformation, chaired by VTT and Uponor addressed the major issue of ICT in the construction sector. A session chaired by Jesus Rodriguez, ECTP National Technology Platforms Network Coordinator, was also dedicated to presenting their last inputs and find ways to increase their collaboration. Finally, two sessions on the Positive Energy Blocks initiative and on financing solutions beyond project duration completed the agenda. Last but not least, the matchmaking event organised in the framework of the EeB-CA2 CSA, was the opportunity for 50 stakeholders to discuss potential technological, research and business cooperation during bilateral meetings.

The closing session focused on future RDI needs of the built environment, trying to elaborate on a potential vision for future progress and development of innovation supported by ECTP, with the ambition of further developing an Innovative Built Environment, i.e. a long-term provision of a high quality sustainable built environment (based on quality products and services), to the largest number of citizens, with the lowest environment impact. A few examples of concrete elements of such an ECTP vision in 10-20 years were given (e.g. the deployment and generalization of Positive Energy Blocks all throughout Europe, the deployment of Nature-Based solutions in the context of re-Naturing cities, or an integrated approach for the Construction sector to support cultural heritage for Europe), and it was commonly agreed that ECTP has a key role to play in fostering the creation of strategic and long term public-private partnerships supporting European, national, regional and local policies related to a resilient, inclusive and safe built environment, infrastructures, and their surroundings (related to e.g. energy, mobility, digital agenda, industry 4.0, smart cities, active ageing….). The next ECTP Conference will take place in 2018.

Reviews

Jan Cremers, Tilburg Law School

John Queirós & Bruno Monteiro (editors): **Trabalhos em Curso. Etnografia de operários portugueses da construção civil em Espanha** (Work in Progress. Ethnography of Portuguese workers in construction in Spain), ISBN: 978-989-8701-25-1, 140 p. Le Monde Diplomatique/Deriva Editores, Porto.[1]

In recent decennia, thousands of Portuguese workers were weekly commuting to Spain, the neighbouring country, in search of labour. Many of them worked in the construction sector. This book reproduces part of the results of an investigation into this phenomenon carried out under the project 'Recent dynamics of emigration movements in the Portuguese Northwest: the case of construction workers', funded by the Directorate-General for Consular Affairs and Portuguese Communities and headquartered at the Institute of Sociology of the University of Porto. A related article of Bruno Monteiro, one of the authors, was already published in CLR-News 2-2014: Portuguese construction workers in Spain: situated practices and transnational connections in the European field of construction (2003-2013). In our 'from the editor' in 2014 we commented that this work provides a 'glimpse into the work and time pressure to which migrant workers are exposed. The contributions also illustrate their motives and the struggle to survive'.

This is certainly also true for the contributions in this book that presents findings resulting from ethnographic research conducted by the editors between 2008 and 2013. The contributions shed a light on different aspects of the living and working conditions of Portuguese construction workers from the Sousa Valley in their workplaces in Galicia. Workers often commuted on a weekly or fortnightly basis between their residence in Portugal and the building sites in Spain, above all in Galicia, Madrid and the Basque regions. Their

1. The book was presented during a seminar at the Porto University on 5 December 2016: http://derivadaspalavras.blogspot.nl/search/label/Bruno%20Monteiro

working conditions were hard, with permanent time pressure and long working hours, huge safety risks and poor lodging. Notorious are also the many accidents on the way to and from work.

After the collapse of the construction sector in Spain, as a consequence of the financial crisis, the annual influx of Portuguese workers to Spain, which peaked with more than 70,000 workers on building sites in 2007, fell massively, with a particular impact on the construction workforce. From 2007 on, the exodus came to a standstill with a devastating effect on working lives and the standard of living. Included are interviews with workers, employers and Portuguese and Spanish trade union leaders. Other contributions (by Jorge Arroteia, Lorenzo López Trigal, Ana Cristina Pereira) complement the volume with contributions on the situation at home.

Ernst-Ludwig Laux / IG BAU

Bsirske, Busch, Höbel, Knerler, Scholz: **Gewerkschaften in der Eurokrise - Nationaler Anpassungsdruck und europäische Strategien.** (Trade Unions in the Euro-Crisis – national pressure for adaptation and European strategies) By , VSA-Verlag, Hamburg 2916, 240 pp., EUR 19.80, ISBN 978-3-89965-681-7.

Though the Euro-crisis has already been dominating the socio-political discussion for some years, this book, which is very much worth reading as it presents the effects of the financial crisis on trade unions, has only recently been published by VSA-Verlag. Active trade unionists and scientists have collected the results of common conferences and seminars and published them with subsidies from Hans-Böckler- and Friedrich-Ebert-Foundations. Based on country reports from Great Britain, Austria, France, Spain, Italy, Poland, Slovenia, and Lithuania, the effects of the crisis are summed up in the general chapters of the book.

In almost all countries, the confrontation with the crisis has led to a marked weakening of trade unions. The so-called 'structural reforms' have undermined the national systems of collective agreements. Wages have been reduced, weekly working times extended and the retirement age moved backwards. This deterioration in working conditions has been carried out very differently in individual countries. It is also clear from the country-specific descriptions that this new and worsening regulation of working conditions in some countries is being used by governments and employers in other countries as a means of blackmail in order to achieve there too cuts in collective agreements and social legislation.

Many national actions and strikes have been unable to prevent the wave of socio-political incursions decided at European level and almost all authors plead for enforced European coordination of resistance. Rainer Knerler and Frank Schmidt-Hullmann have set milestones in this book for "Challenges for a common European trade union policy from the point of view of the IG BAU" (German trade union for construction, agriculture and the environment), which have to be discussed in our future seminars, conferences and meetings on the sector in order to prevent further social dismantling and a deterioration in collective agreements.

Jan Drahokoupil and Brian Fabo: **The platform economy and the disruption of the employment relationship.**
ETUI Policy Brief, European Economic, Employment and Social Policy, No 5/2016.

Jörn Janssen

This review is an exception; it is not about a book, but about a just six-page Brief. But there are good reasons to choose this information, crucial to understanding the process of a secular transformation in employment relations. This transformation is not of recent date but it has consistently been ignored in the debates and covered up by misleading terms such as 'a-

typical' or 'non-standard' employment relationships. The year 2016 has marked a recognition of an irreversible process. In the public debate, we have become used to hear that the 'gig' economy is on the rise. Jan Drahokoupil and Brian Fabo have done an excellent job to lift the curtain and explain meticulously for everybody in a condensed summary including valuable references to further reading what we are confronted with for at least half a generation: "It first discusses the importance of outsourcing platforms, … The second section distinguishes between different types of platforms; it is followed by a discussion of statistical evidence on the use of platforms by workers. The fourth section identifies the different kinds of impact that the platforms have on the labour market and employment relations. The final section considers policies that would address the risks related to platform-mediated work." (p. 1)

The first section deals with the wider range of denominations of what Drahokoupil and Fabo suggest to call the 'platform-economy', challenging the European Commission's preference for the more acceptable term 'collaborative economy'[1]. The second section provides an overview of the diversity of applications of 'platforms' and thus the range of impact not only on employment but also on economic relations generally. The third section shows how this economy "is a very fast growing field" (p. 3) progressing at a different pace across the globe. The fourth section makes the readers aware of changes beyond the direct effects of these platforms "unsettling the rigidities of the currently existing forms of capitalism." (p. 5) The concluding section looks at policy implications and adjustments "to design and define the rules of the game." The authors suspect that "the debate on online platforms may very well drive the much broader normative debate about the type of society we want to live in." (p. 5)
We are always inclined to perceive our world in categories

1. European Commission (2016a) 'A European Agenda for the collaborative economy'. http://ec.europa.eu/DocsRoom/documents/16881

which are familiar to us. Thus, it happens that we identify new experiences with words of the past. It seems to me, that also 'platform-economy' is such a case where known words are applied to denote a new reality. But the 'platform' is only a place of relations, formerly 'employment relations' between people to be addressed as such if we want to understand the dynamic of changing relations. What we do know is that employment as an employer-employee relationship as a 'standard' is 'disrupted' or about to become obsolete. This is what this brief confirmed to me.

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