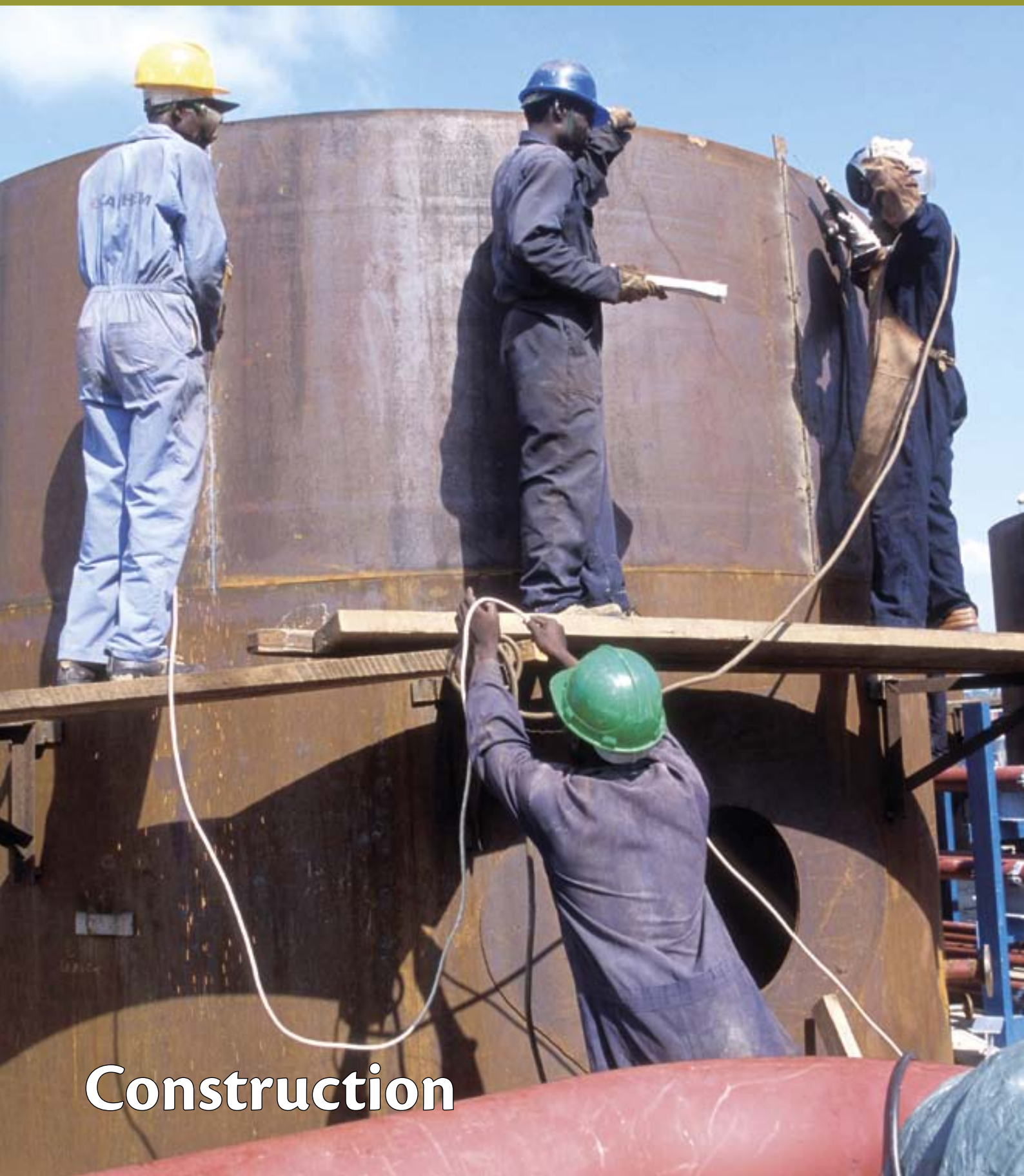


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ON OCCUPATIONAL HEALTH AND SAFETY

Volume 23, number 3, December 2013



Construction

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Editor in Chief

Suvi Lehtinen
E-mail: suvi.lehtinen@ttl.fi

Editor

Marianne Joronen
E-mail: marianne.joronen@ttl.fi

Linguistic Editors

Alice Lehtinen
Delingua Oy

Layout

Kirjapaino Uusimaa, Studio

The Editorial Board is listed (as of January 2013)
on the back page.
A list of contact persons in Africa is also on the back page.

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Construction work and occupational safety and health

The construction industry is believed to employ over 7% of the world's entire workforce and contributes to more than a 10th of the global GDP. It currently shows increasing trends, not only in terms of volumes of work done, but also in terms of the complexity of construction projects. Today many cities in the world have been transformed from what they used to be in the early 1990s due to on-going improvements to road infrastructure, power lines, telecommunication systems and multi-storey buildings etc. It is not therefore uncommon to witness a mushrooming of on-going construction work in both rural and urban setups. A recently released study by the Global Construction Perspective and Oxford Economics (Global Construction 2025) forecasts an increase of 70% in the volume of outputs from the industry by 2025. Another global survey by KPMG International, which involved face-to-face interviews with 165 executives from construction industries, similarly showed an increase in revenue of up to 5% in 2012/13, as reported by more than half of the respondents. Major drivers are the increased demand for better infrastructure, realized economic growth, urbanization, and population growth.

Apart from being a prominent source of pollution, construction work is characterized by the entire spectrum of health and safety hazards, namely physical, mechanical, ergonomic, biological, and chemical hazards.

Due to the complexity of the industry and the hazards it contains, occupational health and safety in construction work should start at the designing table and continue throughout the construction phases until the safety and health of end users is ensured. Internationally, ILO Convention Number 167 (Safety and Health in Construction Convention) and its Recommendation Number 175, both of 1988, provide guidelines and standards for safety and health in different stages and different types of construction work, including demolition work as described under Article 24. In accordance with

this, many countries in the world have enacted laws and regulations to guide health and safety during construction work.

Despite international and national efforts to ensure health and safety in the construction industry, it remains dangerous, and construction workers have continued to succumb to accidents both major and minor arising from their work. The major causes of accidents in this sector include, but are not limited to, falls from height, work with defective harnesses and scaffolds, electrocutions, and transport-related accidents.

Recent incidents involving the collapse of a 14-storey building in Dar es Salaam, Tanzania, and a similar recent episode in India are but a few examples of the many places facing similar accidents arising from construction work. It is important to note that most of these incidents occur in developing countries, where law enforcement and technological advancement still need improvement.

This issue (3/2013) and the assigned theme Construction work & occupational safety and health comes at an opportune time, when the memories of the construction industry tragedies of our times are still fresh and we are called upon to discuss and share experiences of the best practices and approaches to health and safety within the construction industry. This may in the long run have a positive impact and work towards a sustainable reduction of morbidity and mortality in the construction industry.



Dr Akwilina Kayumba

The Chief Executive
Occupational Safety and Health Authority
OSHA, Tanzania
info@osha.go.tz

Ten factors to improve occupational safety and health in construction projects

The International Labour Office (ILO) estimates that some 2.3 million women and men around the world succumb to work-related accidents or diseases every year; this corresponds to over 6000 deaths every single day. Worldwide, there are around 340 million occupational accidents and 160 million victims of work-related illnesses annually. The ILO updates these estimates at intervals, and the updates indicate an increase of accidents and ill health. The construction industry has a disproportionately high rate of recorded accidents.¹

Improving occupational safety and health (OSH) in the construction industry is a slow but achievable process. Let me start by setting the context of my own country, the United Kingdom (UK). Photo 1 shows myself when I was working as a civil engineer on a construction site in 1970. The site worked 12 hours a day, seven days a week. I had just met the person who would become my wife, so in order to spend more time with her, she sometimes accompanied me to work; in the photo, she is helping with some data logging. It is obvious that OSH was not considered important at that time. We had no safety clothing, there was no guard-rail (there was a drop of 10 metres the other side of the wall), there is no fencing round the site to protect the public from entering it, and the whole site is untidy and rather chaotic. This state of affairs was commonplace on sites in the UK at that time.

¹ <http://www.ilo.org/public/english/region/eurpro/moscow/areas/safety/statistic.htm>

Photos 1, 2, 4, 5 by Richard Neale



Photo 1. Richard Neale on site in the UK 1970



Photo 2. Construction site in Cardiff, UK 2010

Photo 2 is of a site in the city of Cardiff, UK, in 2010; that is, 40 years later. The construction company obviously had taken OSH very seriously, providing good barriers between the site and the public, safety fencing on all floors, and fans to catch falling debris. The construction company had adopted the principle of 'zero incidents' and generally this is what they achieved.

This transition was achieved in the UK over a period of 40 years, so how can African countries make a similar transition? As a result of extensive searches in the literature and my own experience of the construction industry in 14 countries over more than 40 years, I came to the conclusion that there are ten main factors that need to be considered, which I shall describe briefly.

With Africa being such a big continent, it is likely that current OSH practice varies greatly. Photo 3 shows poor OSH provision, which may be commonplace. I took the photo 4 in Dar es Salaam in 2010, which shows that some effort is being made. The operatives are obviously in a dangerous position but they are wearing safety helmets and one has a safety harness; if the harness had been attached to something firm, instead of being looped back into his belt, he may have been relatively safe. This illustrates one crucial aspect of good OSH systems – the need to implement them thoroughly and comprehensively. This is further emphasized by the photo 5 (on next page), taken in the same city on the same day, which shows an operative working at height in a most precarious position.

So, here are my ten factors that influence improving OSH.

1. Developing a national culture of safety

Construction projects do not operate independently of the society in which they are located. However determined the project managers may be to run a safe and healthy site, it is almost impossible for them to do this if the prevailing national culture is that 'life is cheap' and 'we cannot afford safety measures'. Developing an effective OSH culture has to start at senior government level and be implemented throughout the government, employers and employee organizations.

2. International agreements influence national policies and national laws

The obvious agencies to influence governments' attitudes to OSH, and cause them to take action, are the sponsors of this Newsletter, the ILO and WHO, both of whom work quite tirelessly towards this end, but there are other organizations, such as the G20 group of nations, all of whom could do far more than they do currently.

Photo by Fiona Murie



Photo 3. Precarious and inefficient working conditions. See Training Package: ILO Construction OSH (reference 3)

3. Funding agencies must insist on good OSH through their contracts

In many countries in Africa, a significant proportion of construction projects are funded, at least partially, by external funding agencies. These agencies have a responsibility to enforce good OSH practice through the contracts that they fund. The purpose of most externally funded projects is to enhance the well-being of the citizens of the country, and this includes the well-being of all those engaged in the construction process. Therefore, external funding agencies must see themselves as prime agents of beneficial change.

4. Comparative studies of the OSH environment and practices

In a range of African countries comparative studies would be useful in identifying the importance and relevance of such possible key factors as culture, climate and differences between urban and rural environments.

Much of the information and technology for OSH has evolved in industrialized countries, such as the USA, Europe and Australia. African countries are obviously very different and very diverse within the continent. However well intentioned, attempts to simply apply industrialized country practices and procedures are unlikely to succeed. A comprehensive study of these issues, leading to recommendations of how to improve OSH locally, may well be one of the most important of these ten factors.

5. A comprehensive, generalized model on the business case for OSH should be developed

In my discussions about effective OSH with quite a variety of construction companies throughout the developing world, cost has always been put forward as a major obstacle.



Photo 4. Construction worker using a safety harness. See Training Package: ILO Construction OSH (reference 3)

Nevertheless, it is quite reasonable to argue that a good business case can usually be made for investing in OSH. Photo 3 shows an obvious example; the operatives in the photo cannot be working at maximum efficiency; if their workplace had been properly designed, they would be very much more productive.

It is also obvious that when temporary structures or excavations collapse and kill or injure people, the construction project suffers from additional costs and delays. There are also other factors such as reputation, which helps a construction company to obtain work, and insurance costs. A succinct Australian publication gives helpful guidance on preparing an OSH business case (1), but what is needed is a comprehensive African study leading to clear and detailed guidance.

6. OSH has to be managed actively

Most construction work is planned in some way, but it is commonly the technical construction process that is the focus of the planning and OSH is then considered only when the technical construction process has been agreed; that is, OSH is an 'add on' in the minds of managers. In many cases, this practice is just not effective. OSH must be actively managed and planned as an integral



Photo 5. Dangerous working at height.
See Training Package: ILO Construction OSH
(reference 3)

part of the planning process, and if no safe construction method can be found, the construction team should go back to the designers and help them to amend the design.

Realistically, this process will be much more effective if the designers embrace OSH principles at the outset of their design process. “Safe by design” is a subject of increasing interest throughout the world, with the objective of eliminating or significantly reducing hazards and risks by careful design, while at the same time meeting the functional requirements of the project.

7. Workers should be more directly involved in planning and implementing safe and decent work

Safety practitioners and observers have widely agreed that the traditional belief that employers are solely responsible for workers’ safety at work should change.

To create safe working conditions, workers should be allowed to participate actively in OSH and cooperate with employers. Since they are closer to their work, it is felt that the workers themselves are the most qualified to make decisions about safety and job improvements.

Evidence shows that various benefits could be yielded if workers worked together with employers, including the reduction of death and injury rates at work. However, to make workers’ participation in this field

effective, several criteria are crucial: legal support, management support, trade union support, training, and the positive quality of the workers involved. (2)

8. OSH personal protective clothing and equipment (PPCE) must be developed to suit the diversity of cultures and physiques of both men and women workers

Currently, most of the PPCE that is currently available is designed for quite robust males, and is western/European in design and appearance. In many countries men are physiologically smaller and less strong (their diet may influence this) and so the PPCE available is unsuitable. There is also a serious issue with attempts to use items designed for temperate climates in hot or humid conditions.

Large numbers of women work on construction projects in Africa, and the PPCE may not fit them (and in some cases may be harmful to a woman’s physique) and is often culturally unacceptable in appearance. This presents a major obstacle to improving OSH. So the development of suitable work-wear and safety equipment for women is crucial. I am currently working with my friend Dr Tabarak Ballal of the University of Reading, UK, on a research and development proposal to develop women’s work-wear and protective equipment, and we shall be very pleased to receive comments and information from readers of this Newsletter.

9. The technology to improve OSH, including better control and warning systems, communication devices and better (safer) machines, should be further developed

Modern construction machinery is used increasingly in Africa. Thrust upon an unskilled and untrained workforce, this machinery can be lethal. Therefore, manufacturers and suppliers have an important obligation to ensure that the machines are designed and made to be as safe as possible, and incorporate realistic safety devices.

10. Effective education and training in OSH is required globally; it should be designed in such a way as to measurably enhance attitudes, skills and knowledge

This is obvious but the point I wish to make is that it must be realistic and practical. Lectures on regulations may be relevant, but

there is also a need for educators and trainers to get involved in the reality of construction work; they should be “guides by your side” rather than “sages on the stage”.

A good source of practical training material, freely available for download from the Internet, is ILO Construction OSH (3).

Concluding remarks

In this short article I have given a brief review of the context of OSH in construction projects, followed by outline explanations of ten factors that, if addressed with determination and expertise, could facilitate a general improvement. These factors are really quite wide-ranging, which illustrates the difficulty, but because the problem itself is wide-ranging, they are all important.

Since most construction projects are intended to enhance the general well-being of the citizens of a country, it is quite unacceptable for large numbers of these same citizens to be killed, injured or otherwise damaged in the process.

Acknowledgement

The structure of this article is derived from a chapter in a book edited by Professor George Ofori (4).

Dr Richard Neale

Visiting Professor of
International Development,
University of Winchester, UK
Richard.Neale@winchester.ac.uk

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An assessment of the implemented occupational health and safety practices in Botswana construction industry

Introduction

The construction industry is one of the major industries in the world (1). The industry is also a major employer of labour, employing from 9% to 12% (and sometimes 20%) of a country's working population (1). The construction industry is reported to be a major industry, noted as the largest in Europe, but it has been reported as the sector that exhibits the poorest record in occupational health and safety (OH&S), with huge financial and human costs (1,2). Whilst the construction industry is reported to contribute from 5% to 15% of the national economy of most countries, it is ranked among the three industries with the highest rate of work-related injury risks (3). This is even so with the known difficulty in collecting accurate statistics on the extent of accident occurrences in construction, since many accidents go unreported and undetected (1).

Labour statistics for 2010 from Statistics Botswana show that the construction sector employed 23 200 people in 2010, constituting 6.2% of the total formal sector employment. During the 2012 SADC OH&S assessment tool piloting process in Botswana, it was revealed that the construction/building sector has a fatality rate of 0.26 per 1000 workers, which is the highest in all sectors in the country.

The current figures from the Division of Occupational Health and Safety (DOHS) indicate that 61% of recorded fatal accidents in 2006–2013 were in the construction industry. This industry contributed 55% of major accidents and 20% of minor accidents, while contributing 50% of all work-related accidents and injuries. Furthermore, the workers' compensation statistics indicate that over six million Botswana Pula (approximately 700,800 USD) was paid in compensation in 2010–2011 in the construction, building, exploration and quarrying industry alone, which was indicated to be over five times the amount compensated in other sectors.

The above does not give an actual picture of the data because Botswana, like other developing countries, does not have comprehensive information on its occupational acci-

dents and injuries due to the lack of a proper recording and notification system. This is mainly due to its fragmented national OH&S system and the ignorance of workers and employers. The notification of accidents is very passive; hence the existence of significant under-reporting of accidents. Furthermore, the Factories Act 1973 (currently the main law) is limited in its inclusion (excludes some types of construction while covering others) and specification for specialized industries (focusing largely on factories). These figures are not comprehensive; they warrant inspection of the monitored and unmonitored OH&S practices in the country.

Objective and aim of the study

Botswana is a rapidly developing country and the development of infrastructure is on the increase. The objective of this study was to provide an overview of OH&S practices in the construction sector in Botswana. The aim of the study was to assess the extent of implementation of OH&S practices in the construction sector in Botswana.

Methodology

This was a cross-sectional descriptive study. The study was in two parts: the first part included the use of a formulated inspection checklist for use during construction site visits and the second part included a review of existing inspection reports from visited construction sites by DOHS inspectors on past inspections.

First part

The data collection tool was a formulated construction site health and safety inspection checklist. This checklist was formulated on the basis of the LBNL (Lawrence Berkeley National Laboratory) Construction Safety Checklist, the ILO Safety and Health in Construction Regulation, the Tailored Free and Security Ltd Site Health and Safety Inspection, and the South African Department of Labour's Construction Health and Safety guide.

The entire checklist took approximately 45–60 minutes to complete. Participation in this data collection process was voluntary and all involved companies were informed of the aims and objectives of the research.

The checklist listed the required OH&S guideline as a single item, then allowed the interviewer to mark one of three ratings. The interviewer responded ‘yes’ if the guideline item was implemented, and ‘no’ if it was not (indicative of non-implementation) and ‘not available’ (N/A) if information on whether the guideline was met or not was unobtainable (due to unavailable records on site or the construction site cycle stage not requiring electrical installations, the use of hazardous substances, etc.). Items under the same category were listed together.

The data collection procedure here was in two parts: part one comprised an escorted walk around the construction site using the checklist; part two involved a brief interview with the site manager/SHE officer. The brief interview lasted 5–10 minutes and consisted of questions assessing the degree to which employers met their responsibilities in ensuring that workers were trained, medically screened (depending on the type of job), and protected. This category was named the employer duties category and contained a total of 10 items.

The overall checklist comprised the following 11 categories:

Rating given in Percentage (%)

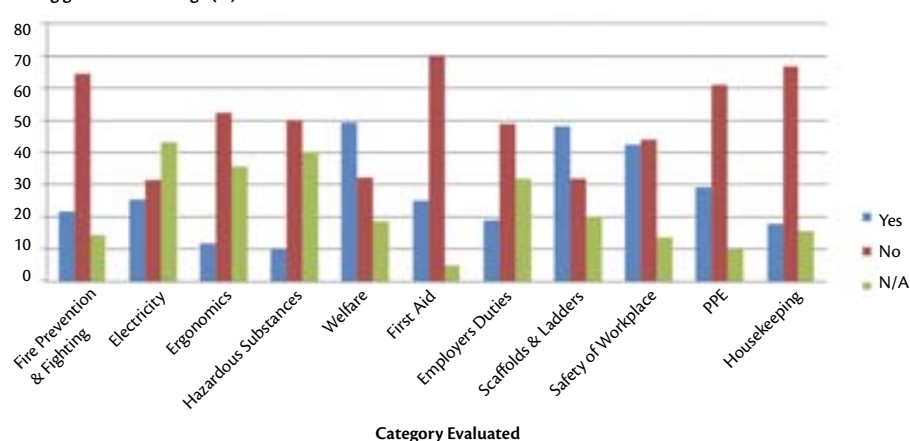


Figure 1. Results from OH&S Construction checklist for sites in Gaborone and Francistown. ‘Yes’ denotes implemented guidelines, ‘No’ denotes non-implemented guidelines and ‘N/A’ denotes unobtainable data.

Second part

Existing departmental inspection reports (Gaborone area) only from the OH&S inspection of construction sites were reviewed to determine the extent of implementation of OH&S practices in the construction sector. The existing information from the inspection reports was sectioned and analysed in the same 11 categories as used in the first part of the study for data uniformity.¹

Results

Construction Checklist Findings

The following results depict findings

from 10 construction sites (7 in Gaborone and 3 in Francistown).

The results from Figure 1 show that of the 11 evaluated categories, 55% of them were rated as not implemented as per the assessed guidelines (having a non-implementation ranking of 50% or more). Comparatively, the categories evaluated had an implementation rating of 27% (with an implementation ranking of 42% or more).

Figure 1 above shows that the categories with the highest non-implementation (relative to the issues assessed in that category) percentage were (in ascending order) employer duties (49%), hazardous substances (50%), ergonomics (52%), Personal Protective Equipment(PPE) (61%), fire prevention and fighting (64%), housekeeping (67%), and first aid (70%).

The categories with the highest implementation rating were the welfare (49%), scaffolds and ladders (48%), and safety of workplace (42%).

Inspection Reports Review findings

The following results depict findings from 20 past inspection data reviews.

The results from Figure 2 show that of the categories with the highest implementation rating were first aid (87%), safety of workplace (53%), fire prevention & fight-

¹As the inspection reports were in a different format to the checklist, only information on the number of implemented guidelines was recorded. No information was recorded detailing the extent of non-implementation of a guideline. Only the level of implementation is presented.

Table 1. The categories evaluated including the description and number of items under each category.

CATEGORY	NUMBER OF ITEMS	DESCRIPTION
1. Employer Duties	10	See above
2. Safety of the workplace	12	Fencing, guard-rails, harnesses, supports, signage and other precautions used to protect workers and visitors/pedestrians
3. First Aid	2	A qualified first aider, first aid room and stocked first aid box
4. Welfare	6	Basic sanitary facilities
5. Ergonomics	4	The extent to which the use of excessive force or unsafe material handling was minimized
6. Hazardous substances	4	Handling of hazardous substances, labelling and its management
7. Electricity	5	Installations of electricity, utilization and maintenance to ensure safety
8. PPE – Personal Protective Equipment	10	Degree to which workers were provided with suitable PPE
9. Fire prevention and fighting	7	How fire hazards were labelled and stored and if workers were aware of fire emergency procedures
10. Housekeeping	5	Safe storage and packing of materials so none obstructed walkways or posed a risk to workers
11. Scaffolds and ladders	5	Secure and adequately erected scaffolds with the proper protective devices installed and functional

ing (47%), PPE (47%), and scaffolds & ladders (40%).

Comparison of findings

Figure 3 shows that there are similarities and differences between the recorded data from the checklist and from the inspection reports. While the welfare, scaffolds & ladders, and safety of workplace categories had the highest implementation ratings from the checklist findings, the first aid, safety of workplace, fire prevention & fighting, PPE, and scaffolds & ladders categories had the highest implementation ratings from the inspection report findings.

Differences (of at least 20%) are noted in implementation ratings within the welfare, fire prevention and first aid categories. Similarly (of either 10% or less) ranked categories include the employer duties, hazardous substances, electricity, scaffolds & ladders and housekeeping.

Discussion and analysis

It is understood that the maintenance and regulation of health and safety on construction sites is problematic since each type of work presents different hazards and solutions (4). This is because construction work is dynamic and complex and consists of diverse and highly specialized work (5, 4); construction workplaces are always changing, evolving as new tasks emerge and workers arrive (4). The dynamic nature of construction sites has an effect on site safety, as workers must continually make and remake safe working relationships with new/changing workers and contractors (5). Additionally, the changing workers and work processes make it difficult for workers to participate to keep the workplace in good housekeeping order (6).

The findings from the inspection reports and the checklist (although different to an extent) show that there is generally a low implementation rate to the required OH&S practices within the construction industry (with the exception of the first aid category which had an 87% implementation rating from past sites). Since the inspection reports included reports completed by numerous inspectors (in comparison to the checklist data which was completed by two inspectors given a training manual), the differences noted in the implementation ratings between the inspection reports and the checklist may be due to discrepancies in understanding among the inspectors regarding

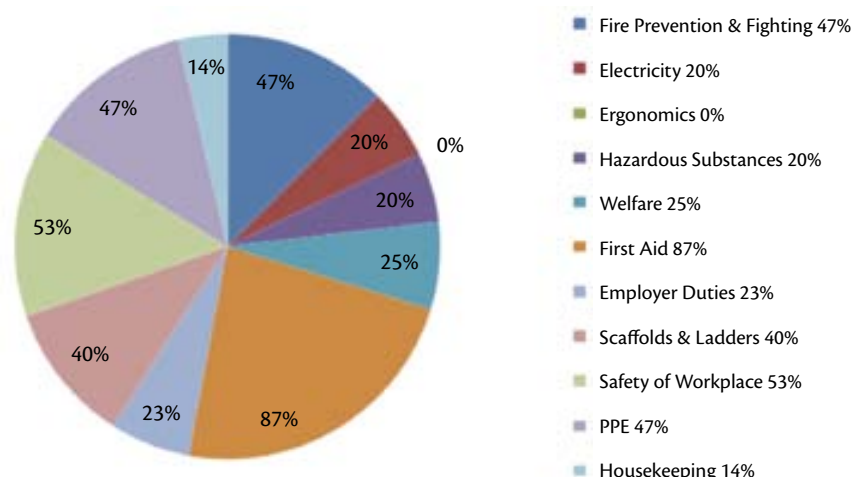


Figure 2. Implementation level of OH&S guidelines ranking results from departmental inspection reports in the Gaborone area.

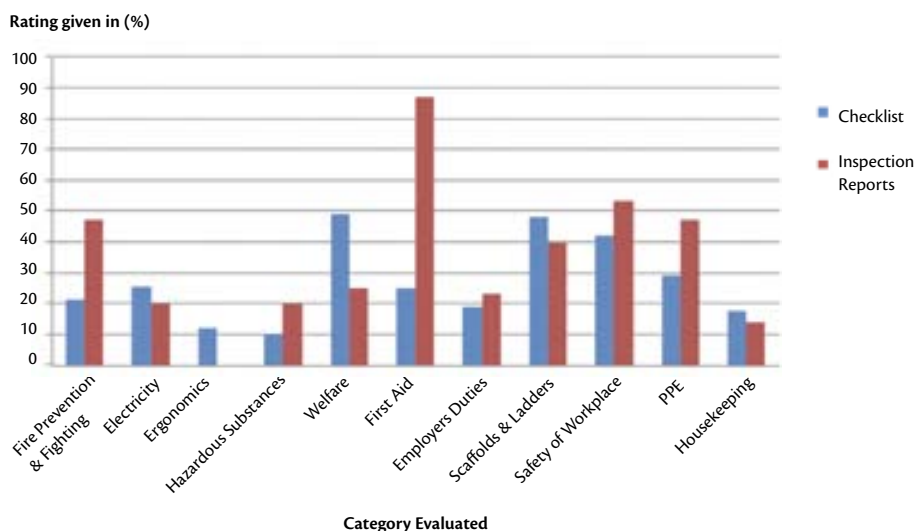


Figure 3. A comparison of the implementation level of OH&S guidelines ranking results from departmental inspection reports versus the checklist findings.

what is an acceptable standard to establish appropriate implementation (as each may have had a slightly different understanding).

The checklist data suggest that more OH&S guidelines on construction sites were not implemented than implemented (based on the reported 55% non-implementation ranking in comparison to the 27% implementation ranking). Given that much of the work processes undertaken on construction sites have been reported to be physically dangerous (6) (presenting injury risks for musculoskeletal disorders, respiratory tract carcinomas, occupational hearing loss, dermatitis and lung disorders (3); exposing workers to dangers such as falling, being struck by falling objects, or being struck by/

against objects (6); and being rife with clutter, packaging materials, waste materials and tools (6) resulting in accidents and near-accidents), the emergence of the specific non-compliance trend observed is noteworthy as the commonly contravened categories are arguably related to these identified risks. Pollack et al. as cited in Weeks (5) reported that 93% of fatal injuries among construction site workers in the US were the result of falls, transportation accidents, contact with objects or equipment and exposure to harmful substances (such as electrocutions from various machinery and equipment). The fact that housekeeping, hazardous substances, PPE, fire prevention and ergonomics were the most poorly regulated categories on sites

is significant as the better management of these could serve to improve the safety of workers on site. In addition to the dangers and difficulties on construction sites, the presence of negligence places workers at increased risk.

Summary and recommendations

In an effort to reduce the problems experienced, OH&S considerations ought to be included, implemented and upheld in the entire life cycle of the construction project process (including design, procurement, maintenance, demolition, etc.) and not confined to a specific construction phase (2). In addition, safety and health implementation should include an endeavour towards the creation of tasks adapted to workers' functional capacity, and regulated according to the highest labour standards (7). A focus on this will help in ensuring that workers within the construction industry are more likely to work without adverse effects on their health and retire healthy at retirement age (7).

The findings that PPE was given but not specified for the type of task (e.g. workers using noisy welding and torch cutting equipment not given ear plugs or goggles), that most sites did not have fire extinguishers visible (or an emergency procedure/training in case of a fire), that no basic ergonomics was utilized, that employer duties were largely overlooked, and housekeeping was a major problem point towards a general presence of oversight or unpreparedness, when it comes to the implementa-

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tion of OH&S guidelines. Based on the findings of this study, it seems that a majority of these risks can be prevented or minimized through the proper wearing of PPE, better handling of hazardous substances, better housekeeping practices and improved ergonomics.

It is not the authors' opinion that the burden of improving the situation falls on the shoulders of one party alone; employers, employees and regulating bodies all have a role to play in minimizing the risks of this already highly risky sector. These findings stress the need for action to be taken, to guarantee that working conditions are safe and healthy. This calls for a comprehensive and integrated and effective occupational safety and health legislation that supports a systems approach model with strong advo-

cacy for preventive safety and health culture.

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Sethunya Tau

Sinah Yamogetswe Seoke,

Department of Occupational Health and Safety

Ministry of Labour and Home Affairs

Bag 00241

Gaborone

Botswana

syseoke@gov.bw; sethunyatau@gmail.com



In memory of Nelson Mandela (1918-2013)

*“Let there be justice for all.
Let there be peace for all.
Let there be work, bread,
water and salt for all.
Let each know that for each the body,
the mind and the soul have been freed
to fulfill themselves.”*

Nelson Mandela

“We have lost a champion of freedom, of tolerance and of dialogue”.

“It is fitting that the world is commemorating Nelson Mandela's life on Human Rights Day. Let us honour his memory and his legacy by respecting fundamental rights and advancing social justice,”

ILO Director-General Guy Ryder

Read ILO's tribute to Nelson Mandela www.ilo.org.

In June 1990, the 77th Session of the International Labour Conference played host to Nelson Mandela, at the time Deputy President of the African National Congress (ANC). On that occasion, Mandela paid tribute to ILO for fighting apartheid.

Construction health and safety (H&S): Key issues

Introduction

Historically, the construction industry worldwide has contributed a disproportionate number of fatalities, injuries, and disease, and it presents several challenges. These challenges include separation of design and construction, multi-stakeholder influences, fragmented contributions, unique project teams, exposure to the elements, and a transient and contract workforce.

Status

Statistics in the form of injuries constitute the traditional motivation to address H&S as they reflect the loss of life and they invariably constitute an indictment of the industry. The construction fatality rate in South Africa was reported to be 25.5 / 100 000 full-time workers (1). However, the cost of accidents has contributed to the realization of the opportunity cost of accidents. In South Africa, this was estimated to be approximately 5% of the value of completed construction (2), whereas the cost of implementing H&S is estimated to be between 0.5% and 3% of project costs (1).

Motivation to address H&S

Traditionally, legislation has been cited as the reason for addressing H&S. Obviously, contractors that are 'law abiding' heed such legislation; however, those that do not require a different approach. This is the challenge in terms of promoting H&S in construction, underscored by the Department of Labour finding that 52.5% of South African construction sites were non-compliant in terms of H&S (1).

Construction is a multi-stakeholder issue

Historically, construction H&S was viewed as the contractor's problem. However, anecdotal evidence, experience, research, and guidelines have engendered a gradual realization that all stakeholders influence H&S, either positively or negatively. The International Labour Office (ILO) (3) clearly

stated what clients and designers should do in their 1992 publication *Safety and health in construction*.

Clients

The ILO (3) states that clients should:

- Coordinate or nominate a competent person to coordinate all activities relating to H&S on their construction projects;
- Inform all contractors on such projects of special risks to H&S that they are aware of, and
- Require tenderers to make provision for the cost of H&S measures during the construction process.

Clients can contribute to construction H&S through a range of actions: committing to contractor H&S; committing financial resources; including H&S as a criterion for pre-qualification; scheduling H&S requirements prior to the bidding process; structuring documentation to ensure equitable provision for H&S by contractors; requiring a formal H&S programme, the use of permit systems for potentially hazardous activities, the designation of a contractor H&S co-ordinator, and reporting and investigation of accidents; conducting H&S audits during construction, and adopting a partnering approach (4).

Project managers

Project managers are in a unique position to influence and contribute to construction H&S in that they coordinate design delivery, integrate design and construction, and oversee the construction process.

Designers

Although there are numerous proponents of and specialists in terms of 'designing for construction H&S' worldwide, in general, designers have yet to grasp and undertake the required interventions. This, despite the clearly stated rec-

ommendations of the ILO (3) that designers should:

- receive training in H&S;
- integrate the H&S of construction workers into the design and planning process;
- not include anything in a design which would necessitate the use of dangerous structural or other procedures or hazardous materials which could be avoided by design modifications or by substitute materials; and
- take into account the H&S of workers during subsequent maintenance.

Designers should conduct design hazard identification and risk assessments (HIRAs) throughout projects, from initiation and briefing, through concept and feasibility, design, tender documentation and procurement, and construction. Then, given that 'designing for construction H&S' is one of sixteen 'designing for constructability' principles, such reviews should address H&S.

Furthermore, given the legal requirements pertaining to designers in many countries, designers should follow a structured process in terms of 'designing for construction H&S', and be able to provide documentary evidence of due process.

Quantity surveyors and cost engineers

Quantity Surveyors and Cost Engineers should facilitate adequate financial provision for construction H&S by providing an equitable basis for tendering or bidding on projects by contractors. An alternative is the inclusion of a provisional sum in the documentation which would ensure that construction H&S is allowed for. The payment of amounts relative thereto should be on the basis of 'proven cost'. A further alternative is the inclusion of detailed H&S preliminaries (5).

Contractors

The physical process of construction and its activities are obviously undertaken by contractors, the greater percentage being undertaken by subcontractors. The industry worldwide has evolved in terms of structure, general contractors now employing a limited workforce, the subcontractors undertaking most of the trades. However, the advent of labour-only subcontracting and pyramid subcontracting in the form of multi-level subcontracting has exacerbated the situa-

tion, and resulted in numerous challenges, not least the ability of general contractors to manage their supply chains. In essence, delivery is fragmented and executed by a plethora of organizations with differing levels of expertise, resources, and experience, and organization and H&S culture.

Contractors should have an H&S programme regardless of organization size, and ideally contractors would have a 'stand-alone' H&S management system or an integrated management system.

Manufacturers and suppliers

Materials may be heavy, large in surface area, contain hazardous chemical substances, have sharp edges or rough surfaces, and thus constitute a materials handling problem, and also other problems.

Materials manufacturers therefore influence construction H&S, and furthermore, designers are often left with limited choices, although they can consider a less hazardous material should the initial choice be hazardous.

Competencies

The draft 2013 South African Construction Regulations make reference to knowledge, training and experience, and where applicable, qualifications specific to the work or task.

However, Sanghi (6) suggests that competencies are divided into two categories: the surface, which is required to be at least effective, and core, which distinguishes superior performance from average performance.

The surface competencies are:

- Knowledge: information regarding content, and
- Skills: ability to perform a task.

The core competencies are:

- Self-concept: values, aptitude, attitude, and self-image;
- Traits: self-confidence, team player, and handles ambiguity; and
- Motives: focus on client success, and preserves organization / personal integrity.

The irony with respect to competencies is that the focus of, say, H&S enforcement agencies is on knowledge and skills; yet, it is the core competencies that are invariably critical in a dynamic environment such as construction.

Emotional intelligence

A recent study conducted by Smallwood, Emuze, and Bloomberg (7) investigated the role of emotional intelligence in managing construction projects and construction H&S. Self-regard, emotional self-awareness, flexibility, problem solving, and stress tolerance, inter alia, constitute attributes that affect how well activities are carried out by individuals. Thus, construction activities that are people intensive require a measure of emotional quotient to enhance project performance, especially with regard to H&S. Emotional quotient is important due to: intrapersonal emotional quotient; relationship with oneself; interpersonal emotional quotient; stress management; adaptability, and the general mood of employees.

Green building

'Green' refers to the design and construction practices which will have an influence on the environment. Construction practices include H&S issues. Sustainability, however, is a broader notion that not only refers to environmental impacts, but also to the economic, resource, and social facets of humanity. Construction H&S is obviously a sustainability issue. Despite the aforementioned arguments, in general the advent of 'green' building has not promoted the cause of construction H&S, and sustainability has generally ignored the issue of construction H&S. However, in recent months the Green Building Council of South Africa (GBCSA) has added a Socio-Economic category to their rating tool, H&S being one of seven such criteria.

Barriers to performance

The Construction Industry Development Board report Construction Health & Safety in South Africa: Status & Recommendations (1) highlighted the causes of poor construction H&S performance. At organizational and site level it is attributable to a lack of management commitment, inadequate supervision, and inadequate or a lack of H&S training. Furthermore, a lack of worker participation, personal appreciation of hazards and risk, and work pressure also contribute. The preoccupation with cost, quality, and time, and the related lack of understanding and appreciation of the synergistic role of H&S constitute further barriers. The low level of respect for people who are regarded as a low value resource, does not provide a basis for H&S endeavours. The general lack



of awareness with respect to the role of the various stakeholders, and its contribution to the existence of hazards and consequent risk, and the potential of tools and techniques to improve H&S, not only constitute barriers, but lost opportunities. Public awareness in its broadest terms is not realized due to a low level of H&S reporting in the public domain. H&S measurement focuses on outcomes or trailing indicators, such as fatality and disabling injury rates. Also, predictors of performance can be measures, such as the 'percentage of workers that have received hazard identification and risk assessment training'. Small contractors lack the necessary resources and expertise. Legislation, including regulations, is not accompanied by appropriate guidelines, which negates the potential impact of such legislation and regulations. H&S enforcement agencies lack construction expertise, which expertise would assist contractors in the form of advice and guidance as opposed to 'checks' and issuing notices. H&S statistics are superficial and do not provide guidance in terms of the necessary focus.

Improving performance

The Construction Industry Development Board report (1) also included a section 'Improving Construction H&S in South Af-

rica', the contents of which are likely to apply to most developing and many industrialized countries worldwide. Management and leadership at all levels among all stakeholders are critical, and a prerequisite therefore is awareness. Awareness of the role of H&S in overall project performance, the role and responsibilities of the various stakeholders, and the tools and techniques that can enhance H&S performance. In a similar vein, respect for people is a prerequisite for allocating the optimum resources to H&S. H&S reporting at the corporate level will also raise the level of awareness and status of H&S among all stakeholders, shareholders included. Small contractors require special attention in the form of a developmental approach. Relevant H&S education and training at all levels in the industry will empower people to make the requisite general and H&S contributions, which includes the tertiary education of all built environment disciplines. Legislation should address the contributions of all stakeholders. H&S enforcement agencies must possess the requisite construction expertise. H&S statistics should be current and comprehensive. H&S measurement should also address performance or leading indicators to provide an indication of likely H&S performance. Professional built environment associations

or institutes and councils should focus on construction H&S, particularly in terms of accreditation of tertiary education programmes and continuing professional development. Clients should optimize their contributions, including H&S as a criterion for selecting contractors, facilitating financial provision for H&S in project documentation, and including project specific H&S requirements. The media should afford H&S optimum proactive focus, particularly in terms of highlighting successes and the benefits of optimum H&S. Contractors should consider the implementation of H&S Management Systems including accreditation, and participation in H&S star grading and rating systems, H&S competitions, and H&S and general recognition schemes. From a national perspective, H&S targets should evolve relative to key performance indicators, such as the fatality rate, with a view to reducing injuries and enhancing overall H&S performance. This will also enable benchmarking. The establishment of dedicated H&S agencies, examples of which exist around the world, should be considered. Their mandate could include, inter alia, regulation, inspection, investigation and enforcement, and promotion, awareness, information and advice, and promotion of research. The development of better practice

guides, practice notes, and standards, in addition to guidelines to accompany legislation and regulations, will also contribute to improving H&S as there is generally limited reference material available. The development of a national construction H&S agenda will focus further attention on H&S issues.

Conclusions

Management and leadership are critical among all stakeholders to ensure that a multi-pronged effort towards improving construction H&S is sustained. However, commitment is merely a starting point, but involvement and participation have more direct connotations and relevance. Furthermore, although decisions and performance are influenced by surface competencies in the form of knowledge and skills, the core competencies have a major influence, and so has also emotional intelligence.

Workers must be empowered to take ownership of their workplaces and their actions, a prerequisite being comprehensive H&S training of the workforce, subcontractors' workers included.

The cost of accidents contributes substantially to the cost of construction as it is included in contractors' costs and consequently estimates, and therefore clients ultimately 'pay', thereby motivating their involvement in contractor H&S.

Promoting H&S on the basis of legislation has not been successful and given the cost of accidents and the benefits of optimum H&S, H&S is best promoted on a financial basis.

Construction H&S is a multi-stakeholder issue, and therefore only committed contributions from all will create project environments that are conducive to realizing optimum construction H&S. Clients, being the financiers and initiators of projects, have a particularly important role to play. Given that design dictates the materials and methods to be used, designers exert either a positive or negative influence, and therefore have a critical role to play. Therefore, 'enabling' legislation that requires multi-stakeholder contributions to H&S is a prerequisite.

Given the extensive contributions by subcontractors, most of which are small contractors, supply chain management is critical. Therefore, general contractors must

prioritize and be effective in terms of supply chain management. However, an industry-wide initiative in the form of a model is required to resolve the H&S challenges faced by small contractors.

The current focus on measuring outcomes is largely futile, and therefore appropriate measurement in the form of measuring predictors of likely performance has the potential to contribute to an improvement in H&S.

An H&S agency, which champions H&S in all respects is necessary to drive the H&S agenda, as the narrow approach of H&S enforcement agencies does not provide the requisite impetus.

Recommendations

The section 'Improving H&S' essentially included recommendations, therefore key recommendations are included below.

The industry needs to transform in terms of values and 'human resource' (HR) management so that people are respected, which will provide a foundation for H&S endeavours. Although this also relates to a nation's culture, at industry level, an enabling environment can be created by infusing built environment professionals' tertiary education with construction H&S. This in turn will create an opportunity for the development of the requisite management and leadership required.

Historically, legislation has been used to promote H&S; however, due to the link to profitability, promoting H&S on the basis of the cost of accidents and enhanced overall performance as a result of optimum H&S, is likely to have a greater impact on contractors and other stakeholders in terms of committing to H&S and allocating resources thereto. This recommendation is linked to awareness, the level of which needs to be raised across all stakeholders, and the general public.

Built environment tertiary education must address construction H&S in the form of the strategies, systems, and interventions related to the respective disciplines, which must be reviewed during accreditation visits.

The construction industry has been grappling with H&S performance and more specifically, injuries, for decades. Clearly it is time for a paradigm shift in terms of approach. This approach should include fo-

cus on developing the core competencies and the emotional intelligence of people involved in the industry.

Professor John Smallwood

Dept. of Construction Management
Nelson Mandela Metropolitan University
Port Elizabeth, South Africa

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Health and safety regulatory framework in Tanzania: existing shortfalls and the way forward

Introduction

The construction industry operators in Tanzania do not give priority to the health and safety of workers despite the fact that workers are the ones who make the industry important in the national economy. The industry is the fifth largest source of employment in Tanzania, which employs about 2.9%¹ of workers in the formal sectors (1). A number of different building materials are used at construction sites. Jobs and working tools change frequently, depending on the stage of the construction project. Most of the jobs are manually intensive; some of them are machine-assisted. The construction industry is the second highest in terms of injuries, after mining (2). The industry is also associated with more injuries and diseases than other industries. It is responsible for about 10% of all occupational accidents (3, 4).

As in other industries, the construction industry seems to find it difficult to integrate occupational health and safety objectives with other production and economic objectives. A study on occupational health and safety (OH&S) in the construction industry conducted in 2004 highlighted common known features of the industry, including widespread non-compliance with regard to occupational health and safety (5). The study revealed four main problems. These were: 1) lack of OH&S policy at the enterprise level; 2) lack of OH&S management systems; 3) a low level of OH&S knowledge and education among workers, including site supervisors and contractors; and 4) unsafe work practices and behaviours at construction sites.

Generally, the occupational health and safety performance of the construction industry in Tanzania is unacceptable. There is little promotion of OH&S in the industry, which is probably caused by the competition among the contractors and the need to complete projects within the budget and on time. This indicates that there must be deliberate efforts to make sure that cultural and behavioural

change among the industry operators is emphasized by setting incentives for improving OH&S performance.

In view of the above, several stakeholders have discussed the non-compliance with regard to OH&S in the construction industry. Some existing gaps and shortfalls in the regulatory framework have been identified in order to devise a turnaround strategy to promote OH&S in the industry.

Existing health and safety regulatory framework

In Tanzania, occupational health and safety was administered by the Factories Ordinance, cap 297 of 1950, which was enacted during the colonial era. This piece of legislation had a number of limitations in terms of scope and enforcement. Some of the limitations included the fact that it could not cover all workplaces and categories of workers. Building sites and workers in the construction industry were among those that were not covered. The legislation also did not encompass occupational health. Rather it only focused on industrial safety and did not address social, economic and technological changes.

To address those limitations, the Tanzanian government established a semi-autonomous executive agency (Occupational Safety and Health Authority – OSHA) in the Ministry of Labour. The agency was set up in 2001, and it was given the responsibility to ensure the more effective and efficient management of workers' health and safety and of a safe work environment. Two years later the Government enacted the Occupational Safety and Health Act of 2003, which repealed the Factory Ordinance.

Other government institutions responsible for administering occupational health and safety, especially in the construction industry, are under different ministries, such as the Ministries of Health, Works and Infrastructure, Environment and Local Government. The main OH&S regulator in the construction industry is the Occupational Health and Safety Authority (OSHA). However, other public institutions have some health and safety responsibilities at different levels, depending on their area of jurisdiction. These

¹ In Tanzania, a vast number of construction workers also work in the informal sectors.

institutions are the Contractor's Registration Board (CRB), the National Construction Council (NCC), the Public Procurement Regulatory Authority (PPRA), local authorities, and the Environmental Protection Agency.

Within these institutions there are several pieces of legislation administering health and safety in the construction industry: the Occupational Safety and Health Act of 2003 and the Contractor's Registration Board Act of 2010. The Occupational Health and Safety Act of 2003 and its Rules in the Construction Industry are the main legislation administering occupational health and safety in the country (6). Although these Rules were established under the Factories Ordinance, they are still being applied because they were incorporated in the Occupational Health and Safety Act of 2003. The Contractor's Registration Board Act of 1997, which was amended in 2010, and its Rules on safety and health are other important legislation in administering safety and health in construction industry. The main function of the Contractor's Registration Board Act is to regulate and develop a competitive and sustainable construction industry that includes contractors who observe health and safety during project execution (7).

The National Construction Council Act of 1979 and its amendment of 2007 are additional legislation promoting the development of the construction industry in Tanzania. However, this legislation does not clearly mention how to administer health and safety in the industry (8). The Engineers' Registration Act, No. 15 of 1997, together with its amendment of 2007 and the Architects and Quantity Surveyors (Registration) Act No. 16 of 1997, and its amendment of 2010 are other pieces of legislation which regulate professionals' practices in the construction industry. The main function of these two pieces of legislation is to make sure that projects are designed and constructed in accordance with health and safety standards (9). However, the pieces of legislation now mentioned seem to have several shortfalls, which are discussed below.

Shortfalls of existing OH&S regulatory framework in the construction industry

The OH&S legislation appears to have some gaps and shortfalls that lead to inefficiency in the administration of safety and health in the construction industry. The main short-

Photo by Joshua Matiko



Workers in an awkward posture as they are performing steel fixing work in the preparation to construct a floor.

fall is the fact each regulatory body is operating in a silo-like manner. That means there are no clear coordination of activities and no sharing of information among regulatory bodies. Each regulatory body has been established under a different Act and the bodies are administering their own Acts. None of these Acts refers to another or acknowledges the existence of other Acts.

Other shortfalls include:

- Most of these Acts apply only to large-scale projects undertaken for the purpose of commercial and industrial use. That means the Acts do not apply to small and medium-sized projects, especially small residential buildings. Some Acts also apply only to the projects that last for more than six weeks (10).
- Almost all Acts place all responsibilities for the promotion of OH&S on the main contractor. This implies that the employer (the client) has no responsibility to promote OH&S. This is one of the biggest gaps in the regulatory framework. Since the client is the financier of the project, the main responsibility to promote health and safety should be given to the client.
- Some of the legislation requires the appointment of safety and health supervisors, but no qualifications have been set for safety and health supervisors (10, 11).
- Safety and health supervisors should undergo specific OH&S training and after its completion, they should also be accredited by the competent authority.
- Some legislation requires the compilation of a health and safety arrangement plan for a building exceeding the height of three storeys, but does not require that the plan is submitted to the authorities for approval (10, 11). Furthermore this particular provision does not define what details the plan should include. The details required of the plan should be specified: a plan should be drawn up for all buildings regardless of their height, and the plan should be submitted for scrutiny and approval.
- Inadequate enforcement of the existing legislation is another shortfall within the OH&S regulatory framework. For instance, the legislation requires the preparation of a safety and health policy and the carrying out of a workplace risk assessment (12). According to the results of a survey conducted in 2001 only six (18.2%) out of 33 directors who responded to the questionnaire had a safety and health policy in their companies (6).
- The existing OH&S regulatory framework does not set OH&S requirements

for a contractor to qualify to be awarded the project. The requirements could include the need for the contractor to demonstrate the adoption of the highest level possible of the safety and health management systems, including the establishment of an OH&S policy that complies with the principles or standards determined by the competent authority.

- There is no reliable mechanism for reporting and recording occupational accidents and diseases. The existing mechanisms serve for the purposes of compensation or upgrading the rank of the construction firm. Often a number of accidents are not reported and accidents that are reported are not analysed. For this reason, annual statistics on occupational accidents and diseases are not produced.

The way forward

If the aim is to improve health and safety performance in the construction industry, all of the parties involved should be given roles to play. Clear responsibilities should be defined for the key players and boundaries of jurisdiction between regulatory bodies should be clearly demarcated by harmonizing the existing legislation. Regulatory bodies in collaboration with stakeholders should regularly review the OH&S legislation and any other related provisions, approved regulations or codes of practice in the light of experience and technological progress in the construction industry. This will ensure the clarity, consistency, and comprehensiveness of an OH&S legislation that reflects the national conditions and is without conflict between regulatory bodies. This will also enhance collaboration, the coordination of activities and the sharing of information related to administration of OH&S activities among regulatory bodies.

A systemic approach to dealing with health and safety promotion at construction sites should be emphasized. This includes establishing national health and safety guidelines, which in turn are customized at enterprises level. The guidelines should set the minimum OH&S requirements to be met by contractors before the contract is awarded. The requirements could be in the form of a pre-tender or post-tender OH&S qualification system, and a mechanism to audit and enforce the system should be put in place. The guidelines should set a comprehensive

mechanism for reporting and recording occupational diseases and accidents. The mechanism would facilitate the publication and dissemination of statistics on occupational accidents and diseases and other injuries to health which arise in the course of work.

Workplace risk assessment at construction sites is another essential element. Hazards associated with activities should be identified and the effects of exposure to those hazards should be evaluated. Measures to control the hazards found to be significant in causing injury or ill health among workers should be implemented in order to bring the risk level as low as possible. In this regard there should be programmes for capacity building, where skills and competences can be acquired in OH&S-related fields, but risk assessment and the implementation of hazard control measures are also needed.

Provision should be made to allocate enough funds to cover the costs of OH&S activities in construction projects. This should be done in the bidding process; bidders should be required to demonstrate in the bidding documents how the construction firm will prepare and implement OH&S programmes on site. Professionals and designers should also consider health and safety aspects during the designing stage, and

provision for health and safety should be shown in the bill of quantities. Professionals should also ensure that the project design includes adequate information about any aspect of the project, including articles, substances, structures, or materials, that may affect workers' health and safety while they carry out construction work. In this case, the client should assume full responsibility for ensuring workers' health and safety during the construction of the project. The client should also ensure that the main contractor is responsible for co-ordinating the promotion of health and safety by subcontractors, in a manner that is in conformity with the main contractor's safety and health programmes. In some cases where a construction project poses some special safety and health concern, it may be appropriate for the client to lay down additional, more detailed requirements.

Joshua Matiko

Occupational Safety and Health Authority
OSHA
P.O. Box 519
Dar es Salaam
Tanzania
jmatiko@osha.go.tz

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Construction safety and occupational safety and health in Botswana

Development comes at a cost to any developing nation, especially developing countries where accident rates are high. The costs to nations are loss of lives, loss of skills which were acquired at high cost, and loss of valuable income through compensation that could have otherwise been used for development. Families lose breadwinners and find themselves in a poverty trap; unexpected expenses are in-

curred for burial. Contractors lose valuable time because of stoppages, leading to time overrun that translates into monetary loss. Insurance premiums go up and eat into the contractors' profit. Like most developing nations, Botswana suffers from the same fate. As construction sites spring up all over the country, regulation of these sites is of paramount importance in reducing high accident statistics.

The construction industry is the most dangerous sector when compared against other sectors of the economy in Botswana. Whilst it is desirable to develop our countries, hazards that are part of the job and remain a challenge must be tackled, and we strive to make construction sites safe workplaces. The challenges faced in regulating construction sites include inadequate regulations, lack of personnel trained in occupational safety and health, the failure of contractors to be proactive, and a semi-literate to illiterate workforce.

Inadequate regulations

The Building Operation and Works of Engineering Construction Regulations lack some of the fundamental clauses that could go a long way in improving safety on construction sites. The regulations do not provide for the appointment of trained safety personnel who could be at the forefront in delivering safety and health services. It is not a legal requirement for contractors to register their sites before they set up a site so that it could be assessed whether they have safety plans and trained personnel to enable safe completion of a project. The regulations do not explicitly state that the principal contractor has overall responsibilities for the safety of the sites and for the health of all employees on them. The relationship between the principal contractor and sub-contractors is not clearly spelled out. Remedies for contravening the regulations, such as fines, are still low and are not a deterrent to contractors. The trade union or employees' representatives are not protected against victimization and it is not a legal requirement for employees' representatives to accompany government inspectors during the inspections. Employees do not have the right to remove themselves from danger when there is reasonable cause to do so. This is not an exhaustive list, but the above inter-

Photo by Gaabetwe Motladi



Photo 1. This picture shows a trench 2 metres deep that did not shatter when the walls caved in, causing two fatalities and one case of serious injury.

ventions that are lacking from the Building Operation and Works of Engineering Construction Regulations could go a long way in improving safety and health in the construction industry in Botswana.

Safety and health competencies

Regulations alone are not a panacea in dealing with the challenges of occupational safety and health in the construction industry. Trained manpower also has a role to play in dealing with the matter. At the moment there is a serious competency deficit in the sector. Most contractors do not have trained personnel who understand the complexity of issues on the construction site and are able to come up with interventions. It would be unfair to paint all contractors with one brush, as some contractors have employed competent safety and health practitioners and the situation of those contractors is much better than among those who do not have competent safety and health practitioners. Contractors that lack competent safety and health practitioners are the ones that have high numbers of accidents. It would be good for our economy if contractors whose safety and health performance is poor could learn from those that are doing well. Benchmarking, the acquisition of competencies and emulating best practices should be aspirations for poor performers in occupational health and safety.

Accident statistics

During the last three years, the construction industry has accounted for most of the fatalities reported to the authorities when compared against manufacturing and service industries. The total number of workplace accidents reported to the Department of Occupational Health and Safety was 118. Of that number, 65 occurred in the construction industry alone. This represents more than half (55%) of all reported accidents. Of these accidents, 24 were serious accidents and 21 were minor accidents. Out of the 27 fatalities reported, 20 fatal accidents – almost three out of four (74.1%) – had occurred in the construction industry. From the analysis above it can be deduced that the construction industry is hazardous and contributes a great deal to the accident statistics.

The causes of the fatal accidents were: electrocution; the collapse of trench walls that did not shatter; the collapse of building walls; the collapse of a water tower; inadequate guarding of machines; and persons

Photo by Kweboyabo Mphengula



Photo 2. A poorly wired distribution board that caused one death by electrocution.

falling from height. Electrocution accounted for six fatalities; the collapse of trench walls accounted for two; the collapse of the building walls accounted for two; falling from heights accounted for eight; an object falling on a person accounted for one; and machinery and equipment accounted for one death.

Apart from the fatal accidents, most other serious accidents also took place in the construction industry. During the period under review, 24 serious accidents as well as 21 minor accidents were reported by the construction industry.

Way forward

While the statistics may paint a gloomy picture, all that is possible is being done to address the challenges posed by the hazards in the construction industry. There are on-going activities to deal with the situation. The Department of Occupational Health and Safety is in the process of developing an occupational health and safety policy that will pave way for a review of the legislation. The reviewed legislation will ensure that challenges are addressed.

One contractor has been running a campaign that aims at achieving one million man-hours without injury, which has been very effective. Since the introduction of this campaign, no serious or fatal accidents have occurred at the contractor's construction sites.

At the moment the Department of Occupational Health and Safety has a seat on the Environmental Impact Assessment Committee, which will also assist in dealing with challenges at the planning stage. The country has developed occupational safety and health standards that will form a part of the legislative review. Some institutions in

the country offer training in occupational safety and health at Bachelors' Degree level as well as Diploma courses. It is hoped that in the near future, occupational safety and health will be managed by competent personnel who have been trained in that particular field.

Johannes Olefile Mosanawe

Department of Occupational Health and Safety

Private Bag 00241

Gaborone

Botswana

Email: jmosanawe@gov.bw

Themes for the African Newsletter in 2014

1/2014 Healthy workplaces – managing stress
manuscripts by 21st February

2/2014 Diversity in the world of work
manuscripts by 16th May

3/2013 Chemical safety
manuscripts by 30th September

Other topics in the field of occupational health and safety are also welcome.

See for further details on
www.ttl.fi/AfricanNewsletter
or contact the editors:
E-mail: marianne.joronen@ttl.fi

EcoLusaka project: education for the construction sector in Lusaka, Zambia

Background and content

Ecolusaka project is VTT's EcoCity concept for a sustainable community and neighbourhood regeneration and development

VTT Technical Research Centre of Finland is the biggest multi-technological applied research organization in Northern Europe. VTT provides high-end technology solutions and innovation services to enhance its customers' competitiveness, thereby creating prerequisites for society's sustainable development, employment, and well-being.

VTT has done research on different aspects of sustainable building for decades. There is a continuous stream of international research projects dealing with sustainability metrics and building performance, indoor climate and energy efficiency, product development, sustainability assessment and decision support tools. The focus nowadays, to an increasing extent, involves the idea of sustainable neighbourhoods, which also encompasses the infrastructure and economic and social assessment. At present VTT has 50 to 100 experts doing research on a sustainably built environment.

Based on the wide expertise accumulated, and building on recent experiences carried out in different parts of the world (China, Russia, Finland, Kenya) which can be somehow considered the origin of the new formulation of the concept developed by VTT in line with its Research and Innovation Vision 2020, VTT's EcoCity concept provides a framework for a sustainable community and neighbourhood regeneration and development that focuses mainly on developing countries and emerging economies. The third phase in the evolution of VTT's EcoCity concept [Fig. 1] started after the 6th World Sustainable Building (SB) Conference that took place in Helsinki on 18–21 October 2011. One of the main objectives of SB11 Helsinki was "to expand the international research community's focus to consider people and their needs, particularly those in the developing world" (1).

Among the main challenges addressed by VTT's EcoCity concept are:

- Climate mitigation and climate adaptation
- Sustainable urbanization
- Affordable housing
- Integrated planning and funding availability
- Capacity building for local solutions and services
- Citizen empowerment and participation
- Cross-cutting themes: gender issues, etc.

To respond to these challenges, the concept is built around a strong collaboration with reliable local partners in order to answer local needs previously identified and discussed with them. The flexibility of EcoCities' approach allows the implementation of expert solutions depending on local conditions and customized to varying socio-economic realities worldwide (2).

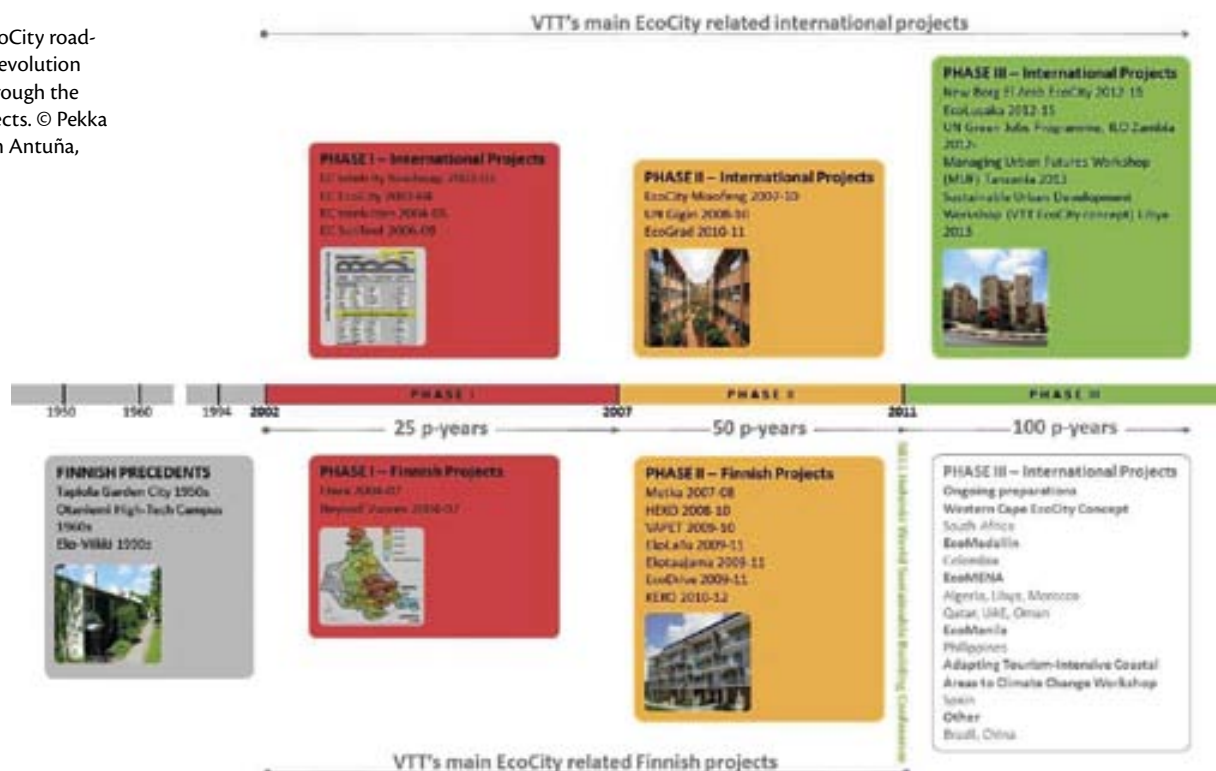
EcoLusaka project

The recently started EcoLusaka project (15 July 2013 – 30 September 2015) is funded by the Institutional Cooperation Instrument (ICI) under the Ministry for Foreign Affairs of Finland (MFA). During the project the Finnish partner, VTT Technical Research Centre of Finland, will strengthen the capacity of the Zambian partner, Thorn Park Construction Training Centre (TPCTC), based in Lusaka, to provide education on sustainable construction and disseminate the results for wider use in the Zambian construction sector. TPCTC is a vocational training institute registered with the Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) of Zambia (Reg No. TVA/298). Its purpose is to educate both future workers and working professionals for the construction sector by providing targeted training courses on artisanal construction skills.

The main actions to be implemented by EcoLusaka project are:

- Capacity building of the local partner
- A new educational curriculum introducing the principles of sustainable construction
- Updating of the current structure of the training facilities

Figure 1. VTT's EcoCity road-map showing the evolution of the concept through the main related projects. © Pekka Huovila & Carmen Antuña, August 2013.



- ties with the aid of ICT technologies
- Improvement of existing facilities and equipment
- Strategic Business Plan
- Links to the UN Joint Programme on Enhancing Competitiveness and Sustainable Business among MSMEs in Building and Construction Industry (through the ILO Office in Zambia)

Approach to capacity building

EcoLusaka's approach to capacity building can be explained better through the links between the components of the project and the four areas of emphasis in Finland's development policy:

- 1. A democratic and accountable society that promotes human rights** (human resource development, educational curriculum, dissemination of information and raised awareness among local stakeholders)
- 2. An inclusive green economy that promotes employment** (human resource development, educational curriculum, development of business and technology, increased job opportunities)
- 3. Sustainable natural resources management and environmental protection** (human resource development, educational curriculum, development of business and technology, improvement of facilities and equipment)

4. Human development (human resource development, educational curriculum, development of business and technology, dissemination of information and raised awareness among local stakeholders).

Likewise, the cross-cutting objectives (gender equality, climate sustainability and reduction of inequality) highlighted in the above-mentioned policy are integrated into EcoLusaka. In addition, it should be stressed that EcoLusaka project's content and approach have a strong potential for replicability in other countries of the region, and also for scalability involving the whole construction sector at national level in collaboration with key stakeholders. Finally, the main capacity building methods used by EcoLusaka will be:

- a training course in Finland
- on-the-job training
- workshops
- seminars with key stakeholders within the construction sector.

Training the local partner

As part of the activities of the EcoLusaka project, a training course to build the capacity of TPCTC staff was carried out in Finland from 24 August to 1 September 2013. The programme of the course was developed by VTT to meet requests made by

Thorn Park Construction Training Centre (TPCTC) and included:

- a common module on issues related to sustainable construction and other skills (e.g. ICTs)
- specific modules meeting the needs of the different groups of expertise
- site visits and technical visits according to the interests of the different groups

Occupational safety and health: lessons learned from the Finnish practices

During this training course in Finland, the TPCTC staff visited the Finnish Institute of Occupational Health (FIOH). The visit was an eye-opener to the reality of health concerns in Finnish industry. It was interesting to learn that FIOH works hand in hand with the government to promote occupational safety and health (OSH) in the various sectors of the Finnish economy, thereby illustrating the government's commitment to the health of its citizens. It was also interesting to know that specialized training is offered to occupational health physicians, nurses, hygienists and psychologists. This is an initiative that provides the work environment with well-qualified OSH staff, the purpose being to ensure that health and safety measures are implemented in the work environment.

While at FIOH, it became clear that research findings in the construction sector show that:

- Safer firms provided incentives for the workers based on a specific level of performance in terms of safety.
- Safer firms evaluate their field supervisors on their safety performance.
- Safer firms are those where the management is fully involved in the implementation of health and safety through sensitization and the review of project safety reports.
- Safer firms provided orientation training for everyone working on the project.
- Safer firms imposed sanctions for subcontractors who did not comply with the project safety requirements.
- Safer results were noted when subcontractor safety meetings were held daily.
- Safer firms were those that gave their workers more hours of additional training.

Since OSH is one of the main concerns during our various site visits, it became interesting to note how much has been invested at all of the different workplaces visited. For example at Kuusakoski recycling plant, where different types of materials are recycled for the extraction of useful elements such as iron, aluminium, copper, glass, etc., the extraction process involves the physical crushing of waste materials. This often generates noise that is harmful to workers' ears. To prevent this, workers are provided with

ear protectors to reduce the amount of noise reaching the eardrum. In addition, workers are provided with helmets to protect themselves from flying objects and safety gloves to protect themselves from sharp objects. Among the Thorn Park staff, this brought a sense of awareness that industry is not just about making profits but also about taking interest in the welfare of workers in matters of safety and health.

At ABB, one of Europe's leading manufacturers of different industrial equipment, OSH is also a major concern. The company is committed to achieving excellence in OSH and works towards this objective through both strategic, group-led programmes and business-specific initiatives. ABB has also invested in training sessions around the world. For Thorn Park as a training institution, this sparked an enormous motivation towards training in the area of OSH in the Zambian context.

Improving the health and safety of construction activities in Zambia

Over the past 20 years, Zambia has experienced massive growth in the construction industry, which accounts for 18 per cent of the total workforce. Although the country is committed to providing safe and healthy work environments for all Zambian citizens, especially those in the construction sector, a year hardly passes without reports of workers striking or getting injured as a result of poor working conditions. Among other ef-

orts, new legislation has been adopted that encourages the protection of workers in their workplaces. Falling under the Ministry of Labour and Social Security, Occupational Safety and Health Services Department, the vision of this new legislation is "to attain a working environment that is free from occupational accidents and diseases among workers" (3). Zambia has also enacted the Factories Act which lays down general rules and regulations that every employer has to comply with. These include:

- a clean work environment
- safe clothing, head gear and footwear
- adequate ventilation
- prevention of overcrowding
- first aid
- lighting
- sanitation facilities
- basic training on safety and health
- fire extinguishers and hydrants.

With all these measures in place, however, there has not been much improvement in the area of prevention of accidents in Zambia (4). The following are some of the major causes:

- lack of adequate sensitization concerning occupational health and safety in various sectors of the economy, e.g. through the media, circulation of brochures, etc.
- lack of adequate funding to carry out this sensitization
- lack of tough laws imposing fines on factories that violate health and safety standards
- lack of monitoring channels to ensure that the prohibition concerning the employment of people whose safety and health are at risk is observed
- lack of proper systems for reporting accidents.

There is enough potential in Zambia for reducing the levels of accidents in the construction sector. The following are the suggested areas of improvement:

- the implementation of massive sensitization through the media, by organizing discussion forums on the subject with stakeholders in the construction sector
- improvement of monitoring systems that make sure employers implement the health and safety rules
- limiting the hours of employment of all persons whose work poses safety and health risks

Photo by Pekka Huovila



View of the entrance to Thorn Park Construction Training Centre in Lusaka, Zambia.

- imposing a fine on factory owners who violate laws or regulations
- the involvement of the management in making sure that health and safety rules are implemented
- encouraging workers to discuss concerns about health and safety and making sure that there are avenues for them to do so; for instance, the formation of health and safety committees
- training and retaining a sufficient staff of OSH professionals to support the national recording and notification systems
- partnerships between the government and various training institutions in order to provide occupational health and safety courses tailored for the construction industry.

Carmen Antuña Rozado, Senior Scientist, MSc (Arch), EcoLusaka Project Manager
Pekka Huovila, Key Account Manager for EcoCities

VTT Technical Research Centre of Finland
Tekniikantie 4 A, Espoo
P.O. Box 1000, FI-02044 VTT, Finland

Beenzu Chitenge,
Lecturer in Power Electrical Engineering
John Kalumba Mwansa,
Lecturer in Power Electrical Engineering
Kennedy Mwanza,
Lecturer in Carpentry and Joinery

Thorn Park Construction Training Centre
Wamulwa Road, Thorn Park
P.O. Box 39070
Lusaka, Zambia
tctc@zambia.co.zm

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Reducing workplace accidents in construction work in Brazil

Introduction

The construction industry is an important segment in Brazil's economy. It generates a large volume of wealth and jobs for all social classes. Investments in governmental construction projects and the accentuated increase of real estate credit have been fueling the expansion of this segment and its productive chain in all of Brazil's regions. The construction industry incorporates more than 2.6 million formal jobs, corresponding to 7.1% of the country's job total.

The construction industry is known around the world as one of the most hazardous sectors, especially in terms of fatal workplace accidents. In Brazil, the risk of a construction worker suffering a fatal accident decreased from 32.7 deaths per 100,000 workers in 2000 to 18.6 in 2009. The majority of these deaths were due to falls. Despite the reduction, the level of risk is still high when compared to those in the United States, England, and Finland, countries that have adopted safe practices and are references for safety to the world.

The costs related to health hazards are difficult to estimate due to the lack of research data and data from administrative sources. Considering only loss of productivity related to workplace accidents that cause temporary sick leave greater than 15 days, there is an estimated annual loss of one million work days in Brazil's construction industry (1).

A reduction in accidents involves a set of initiatives to be applied by companies, individuals, and society. The Quick Wins* methodology is an alternative for identifying simple solutions in building sites that are fast, low cost, utilize few technological resources, and can result in large-scale gains. It is noteworthy that effectiveness depends on worker participation and on involvement by company management.

Step by step process in forming Quick Wins Teams

First step: Selection of priority sector(s)/process(es)

Company management must define the priority sector(s)/process(es) in order to choose those workers who will compose the Quick Wins Team(s). Management must consider the indicators of accident-related sick-leave and other information which points to the sectors/processes with greater EHS problems. More than one sector/process may be selected at the same work site. Therefore, more than one Quick Wins Team may be formed at the same work site.

*Methodology developed by IAPA - Industrial Accident Prevention Association.

Second step: Selection of workers to compose Quick Wins Team(s)

In order to form a Quick Wins Team(s), diverse criteria must be considered. It is recommended having a team which is diverse in terms of gender, function/position, deficiency, age, and experience. Priority must be given to workers who are motivated by the theme of EHS and have a leadership profile, that is, who have the potential to exert a positive influence on fellow workers.

One of the team members must be chosen to be the leader and conduct the team in the identification and implementation of the Quick Win(s).

Third step: Training the Quick Win Team(s)

An engineer or safety technician with construction industry experience must conduct an initial four-hour training programme to align Environment, Health and Safety (EHS) knowledge, such as definitions and concepts of accidents/incidents, hazards, risks, and environmental aspects and impacts. The programme will present examples of risk situations existing at job sites and creative solutions for those situations by means of photography.

Additionally, the facilitator explains in a detailed manner the steps of the process to establish a "Quick Win", as demonstrated in Table 1.

Fourth step: Monitoring of the actions of the team and evaluation of the quick gain(s).

At implementation of the first quick win, the

Table 1. Phases of the Quick Win process.

PHASE	EXPLANATION
Priority Focus	What is/are the most relevant EHS problem(s) of the sector/ process?
Problem Description	What is/are the situation(s) found and what is the damage that is being caused or may be caused to workers?
Causes: Identify the root cause of the problem	E.g.: Why does this situation exist? Why is this situation causing damage? Other causes.
Controls/Solutions	What can we do to solve or control this problem? Short Term: List the various solutions that can be implemented in a period of 30 days. Long Term: List the various solutions that can be implemented in the long term.
Prioritizing	Considering the controls/solutions established above, which ones should be prioritized to aggregate greater value to the improvement of work environment and consequently workers' health? (Short Term and Long Term)
Implementation	For short-term low cost solutions, devise a 30-day action plan defining: What, Who, Where, When, and How. Implementation shall be immediate. For long-term solutions, direct the identifications and possible solutions for analysis and actions by the person in charge of the job.
Measuring	What will we measure in the next four weeks? How will we measure? Who will measure? Where will we measure? When will we measure?
Evaluation	After four weeks of implementation, have we controlled/solved the problem?

engineer or safety technician responsible for training accompanies all phases of the quick win processes (Table 1).

Monitoring of the actions is carried out by approximately three visits to the building site during a maximum period of two months. During the visits, he/she meets with the team to unfold the phases and resolve all questions. The team presents, preferably with photographs, the hazardous situation encountered and its solution. After

evaluation of the Quick Win, it is suggested that the team presents the results to management, to the Internal Accident Prevention Commissions (IACP), to workers of other sectors, and to present the achieved results in critical analysis meetings.

Some results

SESI/BA prepared approximately 120 teams from 2009 to 2012.

Photo 1 shows the participation of

Photos by SESI/BA



Photo 1. Quick Wins Team Training.



Photo 2. Site inspection utilizing a camera.



Photo 3. Identification of risk situation at the job site.



Photo 4. Identification of risk situation at the job site.

SITUATION No 1. BEFORE



Photo 5. Disorganized storeroom: materials placed in passageway without identification and not separated.

AFTER - SOLUTION FOUND



Photo 6. Construction of shelves in the storeroom and organization of the existing materials.

SITUATION No 2. BEFORE



Photo 7. Existence of opening in a floor slab, causing risk of workers and materials falling.

AFTER – SOLUTION FOUND



Photo 8. The opening was closed with plywood.

uations and posterior presentation and discussion with fellow workers still in training.

Some of the proposed solutions might not be the best to eliminate the existing hazard, though they minimize the risks. See examples of simple and immediate solutions for problems identified at the building site.

Discussion

The principal element of the Quick Wins Teams methodology is the participation of workers in the identification of EHS improvements at the workplace. Quick Wins has high value for the company and its workers, yet it is easy and inexpensive to implement.

The objective is effective participation of workers and their representatives to do what they can to reduce/eliminate hazards and/or environmental impacts at the workplace. It is important that workers play an active role and that they work in collaboration with fellow workers and management in order to introduce significant improvements in workplaces.

Workers have deep knowledge of their work and how to make it safer. Their participation in Quick Wins Teams is one way that they can utilize this knowledge in active collaboration in order to improve EHS matters in the workplace.

The challenge in forming Quick Wins Teams lies in establishing a relationship of trust between the company and workers in health, safety and environment (EHS) matters. The key elements in this process are: demonstrate short-term results to management, motivate workers to participate in the implementation process of workplace im-

workers in a training programme to prepare a Quick Wins Team in a construction job.

Training for Quick Wins Teams has a practical part in which the workers conduct

an inspection of the building site for immediate identification of possible EHS risk situations (see photos 2, 3, and 4). One good practice is to use a camera to register the sit-

SITUATION No 3. BEFORE

Photos by SESI/BA



Photo 9. Existence of exposed nails used in the shoring of circulation areas, causing risk of injury to workers.

AFTER - SOLUTION FOUND



Photo 10. Placing of Styrofoam on all exposed nails.



SITUATION No 4. BEFORE



Photo 11. Periphery of slab with no protection, causing risk of workers and materials falling.

AFTER - SOLUTION FOUND



Photo 12. Protection of slab periphery with rails and netting.

Introduction

The International Symposium on “Culture of Prevention – Future Approaches” was successfully held on 25–27 September 2013 in Helsinki, Finland. The Symposium was a memorable event and deepened the understanding of the culture of prevention, and set the Road Map to the Frankfurt World Congress in 2014. Here are some key figures regarding the Symposium:

- 173 participants from 24 countries
- 5 keynote speeches
- 59 oral presentations
- 25 poster presentations
- 4 World Café reports.

The aim of the Symposium was to bring together researchers and experts from European and international networks in the field to discuss the aims, means and solutions of developing a culture of prevention in organizations and workplaces. The Symposium discussed the culture of prevention related to occupational risks, such as accidents, workplace violence and psychosocial risks at work. The focus was also on organizational culture and modes of operation in organizations, and on the attitudes and behaviour of individual employees.

The executing organizer of the Symposium was the Finnish Institute of Occupational Health (FIOH), in collaboration with the Korea Occupational Safety and Health Agency (KOSHA), the National Institute of Occupational Health and Safety (INRS), France and the International Social Security Association (ISSA), Special Commission on Prevention Committee. Other Finnish organizations were also involved in the organization of the Symposium.

Background

On 29 June 2008, the XVIII World Congress on Safety and Health at Work signed the Seoul Declaration on Safety and Health at Work. The Declaration included statements concerning national governments' responsibility for perpetuating a “national preventative safety and health culture”, for systematically improving their national safe workplace performance, and for providing

provements, and create a culture of accident prevention.

Lívia Maria Aragão de A. Lacerda

SESI-Serviço Social da Indústria,
Social Service for Industry
Rua Edistio Pondé, 342, Stiep
CEP 41770 – 395 Salvador, Bahia, Brazil
laragao@fieb.org.br, www.fieb.org.br

Tatiana Farah de Mello

SBN Quadra 1 – Bloco C
Edifício Roberto Simonsen – 5° andar
70040-903 Brasília-DF, Brazil
tatiana@iel.org.br, www.cni.org.br

Maria Fernanda Torres Lins Faiçal

SESI-Serviço Social da Indústria,
Social Service for Industry
Rua Frederico Simões, 125, sala 901,
Caminho das Árvores
CEP 41820-774 Salvador, Bahia, Brazil
mariaf@fieb.org.br, www.fieb.org.br

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News from the International Symposium on “Culture of Prevention – Future Approaches”

a health standard with appropriate enforcement to protect workers. This Symposium continued the international co-operation in the area of prevention culture that was launched by the ISSA International Culture of Prevention in 2011 in Istanbul, Turkey, and which will continue in the XX World Congress in Frankfurt, Germany 2014.

Content of the Symposium

The Symposium programme covered the following areas:

- Prevention culture as culture
- Evidence of the benefits of prevention
- Ways in which to promote a culture of prevention
- Challenges and barriers to promoting safety culture
- Sources of support for prevention, health promotion and social accident insurance
- Developing safety and prevention culture – from research to implementation and dissemination
- Promotion of a culture of prevention
- Comprehensive management of safety and health: from leadership to initiative
- Good practices, case reports and evidence-based policies
- The future of the culture of prevention.

Next steps

The Symposium proved to be a useful forum for the exchange of ideas, generating research and collaboration, networking, and social interaction. The Proceedings of the Symposium will be published at the beginning of 2014. It will be freely available on



Photo by Olli Urpela

the website of the Finnish Institute of Occupational Health.

Markku Aaltonen, Team Leader

Arja Äyräväinen, Planning Co-ordinator

Promotion of Occupational Safety Team
Finnish Institute of Occupational Health
Topeliuksenkatu 41 aA
FI-00250 Helsinki
Finland
Email: markku.aaltonen@ttl.fi

References

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Contact persons/country editors

Director

Department of Occupational Health and Safety
(Ministry of Labour and Home Affairs)
Private Bag 00241
Gaborone
BOTSWANA

Samir Ragab Seliem

Egyptian Trade Union Federation
Occupational Health and
Safety Secretary
90 Elgalaa Street
Cairo
EGYPT

Ministry of Labour and Social Affairs

P.O. Box 2056
Addis Ababa
ETHIOPIA

Commissioner of Labour

Ministry of Trade Industry and
Employment
Central Bank Building
Banjul
GAMBIA

The Director

Directorate of Occupational
Safety and Health Services
P.O. Box 34120-00100
Nairobi
KENYA

The Director

Occupational Safety and Health
Private Bag 344
Lilongwe
MALAWI

H. Ali El Sherif

Chief Medical Officer
Occupational Health Service
Ministry of Health and Social Services
P/Bag 13198
Windhoek
NAMIBIA

Mrs Ifeoma Nwankwo

Federal Ministry of Labour
and Productivity
Occupational Safety and
Health Department
P.M.B. 4
Abuja
NIGERIA

Peter H. Mavuso

Head of CIS National Centre
P.O.Box 198
Mbabane
SWAZILAND

Chief Executive

Occupational Safety and
Health Authority (OSHA)
Ministry of Labour and Employment
P.O. Box 519
Dar es Salaam
TANZANIA

Commissioner

Occupational Safety and
Health
Ministry of Gender, Labour and
Social Development
P.O. Box 227
Kampala
UGANDA

Kebreab Zemer Ghebremedhin

Ministry of Labour and Human
Welfare
Department of Labour
P.O. Box 5252
Asmara
ERITREA

Dr Edith Clarke

Program Manager
Occupational & Environmental Health
Ghana Health Service
Private mail Bag
Ministries,
ACCRA, GHANA

Editorial Board

as of 1 January 2013

Director, Department of Occupational Health and Safety

Ministry of Labour and Home Affairs
BOTSWANA

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OSH Information Expert
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ETHIOPIA

Chief Inspector of Factories

Ministry of Employment and
Social Welfare
GHANA

The Director,

Occupational Safety and Health
Ministry of Labour, Industrial Relations
& Employment
MAURITIUS

Chief Inspector of Factories

Ministry of Labour
SIERRA LEONE

Seiji Machida, Director

Programme on Safety and Health
at Work and the Environment (SafeWork)
International Labour Office
Geneva, SWITZERLAND

Evelyn Kortum

Technical Officer
Occupational Health
Interventions for Healthy Environments
Department of Public Health and Environment
World Health Organization
Geneva, SWITZERLAND

Jorma Rantanen

Past President of ICOH
ICOH International Commission
on Occupational Health

Harri Vainio

Director General
Finnish Institute of Occupational Health
FINLAND

