**Thesis Title:**

# Changes in Worker Perceptions of Health and Safety during the BG Tanzania Drilling Campaign (2011-2016)

**Submitted by:** Rachael Mayne

**For the Degree of**: Masters in Professional Studies (Risk)

**Date Submitted**: October 2018

**Contents:** **Page No.**



**Appendices:** **Page No.**

## A: ACKNOWLEDGEMENTS:

"Changes in Worker Perceptions of Health and Safety during the BG Tanzania Drilling Campaign (2011-2016)"

This completion of this research project would not have been possible without the support and enthusiasm of my colleagues within the Mtwara Supply Base, the overall sponsorship from the Shell Tanzania Head of Well Engineering, Mark Hesketh, and the advice and healthy challenges from my University Supervisors, Hemda Garelick and John Watt.

Support from the wider Shell Tanzania Asset Management Team has also been appreciated, particularly in allowing me to complete the field research element after I had finished working in the Shell Tanzania Asset.

The frontline workforce at the Mtwara Supply Base proved to be exceptionally generous in their time and inputs into the research, particularly during the field work data collection. This took place in the last two weeks of Base Operations, which was a highly testing and emotive time for all personnel at the supply base. It was a very humbling experience and great privilege to have been able to engage my colleagues within a different context to that of my existing role at the supply base at this time.

Particular thanks to Lila, Abdallah, Alex K and Marajani for their help in providing translations during the interviews with Swahili-speaking participants. Thanks go to Transcript Divas for their assistance in transcribing all of the taped interviews. Thanks too, are extended to Mama Rose for her support and assistance with translations of surveys and cross-checking of interview translations.

The project has been a long and winding, and at times bumpy journey in terms of the application of academic methodology within an operational setting. In this regard I would like to single out the Mtwara Community Liaison Adviser (who was also on a similar journey in the completion of his own Master's course) as a source of inspiration during some of the challenging moments of 'growing pains' which part-time students are prone to experience when completing coursework and acting on received feedback whilst continuing with their 'day jobs'.

Numerous friends and family members have provided moral support and words of comfort throughout the journey towards the research project completion, and this has been an amazing source of encouragement. Thanks so much to everyone who supported me in this way.

## Disclaimer

It should be noted that the views expressed within this document are mine and are not necessarily the views of my supervisory team, examiners, Middlesex University or Royal Dutch Shell PLC.

## ABSTRACT:

Research studies on the implementation of global health and safety standards mostly concentrate on the safety perceptions of workers (Gao et al., 2016) and safety culture (Lu and Yang, 2009). Most of the studies are medium to large scale in nature and are heavily reliant on quantitative data.

Very few studies have attempted to capture personal perspectives using qualitative techniques from individuals who are working within new venture environments regarding the implementation of global health and safety standards. In addition, no studies of this nature which had been completed by insider researchers were identified within the literature reviews for this research project.

This project was completed by an insider researcher who worked for BG Group/Shell during an extended gas exploration drilling campaign in Tanzania between 2011 and 2016. The research focuses on a cross section of local and expatriate workers from the Mtwara Supply Base facility in Tanzania. Participants included frontline and supervisory roles from within the operational team at the supply base.

The intent of the research was to complete a qualitative review of the impacts of implementing global health and safety standards at the Mtwara Supply Base over the five-year period between 2011 and 2016.

The mixed method data collection for the research involved the completion of 16 semi-structured interviews with expatriate and local staff and the completion of 55 multiple-choice questionnaire surveys by local staff, plus an analysis of the health and safety incident data for the Mtwara operational sites during that time.

The research findings confirmed that 15 out of 16 of the interview participants acknowledged changes in their perception of health and safety during their time working at the Mtwara Supply Base. These changes mainly involved positive personal impacts in terms of learning and personal development as a result of working on the project and in some cases changes to safe working outside of the working environment. Participants also commented on the transfer of best practice from the project into the local community and to third party contractor organisations who supplied services to the drilling project.

The survey data indicated that the majority of survey participants perceived an improvement in their own health and safety awareness which increased with their length of service at the Mtwara Supply Base. Survey participants also confirmed that in their opinion there were tangible indicators of improvements in relation to the Mtwara Supply Base HSSE performance during the lifecycle of the project. Examples included: a reduction in the number of injuries to personnel and increased numbers of health and safety interventions taking place (to stop unsafe behaviours/improve unsafe conditions which had been observed).

A review of the incident data for the Mtwara operational sites also revealed performance improvements at the supply base, with a reduced severity of incident rates as the drilling campaign continued.

Six emergent themes which were developed from the coding analysis of the qualitative data from the survey questionnaires and interviews:

1. Impacts of the implementation of HSSE standards on individuals
2. Impacts of the implementation of HSSE standards on the wider community
3. What worked well and why – organisational factors and HSSE improvements
4. BG/Shell Lessons Learned from the drilling campaign
5. Ideas for Shell to consider in future drilling campaigns
6. Ideas for improving occupational health and safety within Tanzania

From the emerging themes and survey data it was evident that the implementation of HSSE standards within the Mtwara Supply Base had a positive influence on the broader health and safety culture relating to other entities, both inside and outside the supply base. The research also identified wider factors which contributed to HSSE performance improvements, such as the local content policies which BG/Shell (and other operators) applied to their respective operations, the importance of effective community engagement, BG/Shell organisational factors, contractor management and the selection of expatriate supervisory personnel. The research concluded that impacts of these wider factors should also be carefully considered when planning future campaigns within Tanzania or other similar new start-up projects.

## GLOSSARY OF TERMS:

| Terms which are included within the Thesis text | |
|---|---|
| **BG/BG Group** | References to BG Group. BG Group was taken over by Royal Dutch Shell PLC in 2016. BG Tanzania was subsequently retained as a Subsidiary of Shell. |
| **Extractive Industries** | Industries which relate to the extraction of natural resources, such as Mining (Gold, Uranium, Tanzanite etc.) and Oil and Gas. |
| **First Aid Case (FAC)** | An incident is classified as a first aid case if the treatment of the resultant injury is limited to one or more of the fourteen specific treatments. These are:<br>1. Using a non-prescription medication at non-prescription strength;<br>2. Administering tetanus immunisations;<br>3. Cleaning, flushing or soaking wounds on the surface of the skin;<br>4. Using wound coverings such as bandages, Band-Aids™, gauze pads, etc.; or using butterfly bandages or Steri-Strips™;<br>5. Using hot or cold therapy;<br>6. Using any non-rigid means of support, such as elastic bandages, wraps, non-rigid back belts, etc.;<br>7. Using temporary immobilisation devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards, etc.);<br>8. Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister;<br>9. Using eye patches;<br>10. Removing foreign bodies from the eye using only irrigation or a cotton swab (not embedded bodies);<br>11. Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means;<br>12. Using finger guards;<br>13. Using massages; or<br>14. Drinking fluids for relief of heat stress. |
| **Hazardous Condition** | A physical situation with a potential to cause human injury, or damage to the environment or installation, or some combination of these. |
| **HiPo (High Potential)** | An incident or near miss, where under different, plausible circumstances the most serious credible outcome would be classified as the most severe category of harm/impact e.g. a fatality. |
| **HSSE** | Health, Security, Safety and Environment |

| | |
|---|---|
| **Lessons Learned** | Findings from reviews of situations/projects etc which capture learning points about what went well/what could be improved upon in the future. |
| **LNG** | Liquid Natural Gas |
| **Local Content** | An agreement which forms a condition of a licence to operate between a government of a 'host' country and a multi-national organisation which operates within the host country. The agreement usually includes requirements for the multi-national company to employ local workers, and to use local suppliers for services and products. The agreement will usually include performance targets. |
| **Lost Time Injury** | A disabling occupational injury which results from a work-related activity or from a single instantaneous exposure in the work environment and that results in a person being unfit for work on any day beyond the day of the incident. |
| **Medical Treatment Case** | An instance that is not a lost time injury or restricted work case but is more severe than requiring simple first aid treatment. MTCs include cases involving treatment of injuries administered by physicians and registered professional personnel. |
| **Multi-National Company/Organisation** | A company/organisation which has operations in several different countries. |
| **Near Miss** | Any unplanned or uncontrolled event (or a sequence of events) including process safety events, which, under slightly different circumstances, could credibly have resulted in an Incident causing harm to people, contamination and/or damage (loss) to asset, environment, company reputation or third parties. |
| **NEBOSH** | National Examination Board of Occupational Safety and Health |
| **Non-work-related Incident** | An incident which has resulted in harm to people, assets or the environment, but which has not occurred during a work activity e.g. a car accident which occurs as someone is driving on their way to their workplace. |
| **Null Hypothesis** | The null hypothesis, also known as the conjecture, assumes that any kind of difference or significance that is seen in a set of data is due to chance. |
| **OSH** | Occupational Safety and Health |
| **OSHA [in the context of Tanzania]** | The Occupational Safety and Health Authority (the Regulator in Tanzania) |

| | |
|---|---|
| **OSHA [in the context of Incident Data Classification]** | The Occupational Safety and Health Administration (USA Regulator) has specific definitions for incidents which result in injuries of differing severity. Many oil and gas companies have adopted these definitions when classifying their incidents using internal reporting systems. This data is then provided to the Association of International Oil and Gas Producers for benchmarking purposes. |
| **P-Value** | The p-value is the level of marginal significance within a statistical hypothesis test representing the probability of the occurrence of a given event. The p-value is used as an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. |
| **PPE** | Personal Protective Equipment e.g. Hard hat, safety boots |
| **Reflector** | A high-visibility vest |
| **Restricted Workday Case** | Any work-related occupational injury other than a fatality or lost workday case which results in a person being unfit for full performance of their regular job on any day after the occupational injury. Work performed might be: (a) An assignment to a temporary job; (b) Part-time work at the regular job; (c) Working full-time in the regular job but not performing all the usual duties of the job (i.e. light duties). |
| **Risk** | The probability of harmful consequences or expected losses (deaths, injuries, damage to property or livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.<br>Risk = Likelihood x Consequence. |

## 1: PROJECT INTRODUCTION

***"Changes in Worker Perceptions of Health and Safety during the BG Tanzania Drilling Campaign (2011-2016)"***

This concept of this research project was born out of my experience as a health and safety practitioner within the BG/Shell Tanzania Asset, which started in 2011. During the first half of 2011 the asset was in its' infancy and preparations were taking place to secure appropriate resources which would be required to support the arrival of the drill ship at the end of that year.

This introductory section captures generic considerations and situational specific considerations which the organisation was faced with before and during this early period of the in-country mobilisation of resources. It goes on to introduce the overall aims and objectives of the research project.

General considerations of a new oil and gas venture in Africa include (but are not limited to):

1. The experiences/lessons learned from previous new ventures within the oil and gas organisation and how these may apply to the new venture

2. Logistical and infrastructure challenges

3. Political, social and financial threats associated with the location (including corruption)

4. Legal requirements which apply to the new venture

5. The status of the oil and gas market within the country

6. The status of occupational health and safety standards within the country

7. The application of risk management standards in the context of the new venture

Bodur, Aplay and Asugman (2000)

BG Group was established in 1997, after the privatisation of the British Gas business. The Group was primarily concerned with natural gas exploration and the production and sale of liquefied natural gas. Although it did have operations which involved oil and coal, its main focus was natural gas. The company was UK based and had operations in over 25 countries. The BG Tanzania footprint increased substantially in the second half of 2011 in preparation for the arrival of the drill ship in December.

In July 2011, BG Tanzania took up the operatorship of the supply base at Mtwara from Ophir Energy. At this time BG Group formed a Multi-user Facilities Agreement (MUFA) with Statoil, Petrobras and Ophir for the lease and supply of facilities/logistics management services in support of each partner's drilling activities. This took place in addition to the BG Operational Team at the supply base supporting BG Group's own drilling activities and associated logistical requirements.

Running logistics supply bases did not form part of BG Group's 'core' business activities, with only two other countries out of the 25 in which BG operated having supply bases which were under BG's control. Whilst the MUFA was considered by the commercial department architects to offer BG a commercial advantage, the agreement was an unknown and had not been tried and tested before. The combination of these two factors, plus an aggressive delivery programme in relation to running the supply base and effectively preparing for BG's operations represented a unique challenge to the operational team.

The Mtwara Supply Base was a temporary facility with significant asset integrity and HSSE challenges. Between June 2011 and March 2016, it was transformed through an extended construction redevelopment project into a facility which is fit for the future and was operating to international oil and gas safety standards. Monumental physical changes took place after the construction work. At the same time the BG and MUFA partner drilling campaigns were being completed. In addition, transformative organisational changes took place which included the outsourcing and eventual in-sourcing of the integrated logistics contract.

In addition to the general consideration points reviewed there were other influencing factors of significance in relation to the positionality of the drilling campaign in the early and later stages

1. Tanzania has very limited oil and gas industry experience, unlike other African countries such as Nigeria, Angola, DR Congo and Ghana. Moshi (2013) captures the challenges and opportunities which this presents and these are reviewed in the next chapter of this document.

2. Although an occupational health, safety (OHS) and environmental legislative framework is in place in Tanzania (The Occupational Health and Safety Act, 2003) the Regulator in Tanzania is very weak and has had very little exposure to OHS standards outside of Tanzania.

3. It was very unusual for BG personnel to have extended assignments beyond three years as per the BG Group Long Term Assignment Policy. A small number of BG personnel and BG third party personnel had been present in the asset for between three-five years.

4. The worldwide downturn in the oil and gas market has meant in general that projects like Tanzania which involve ultra-deepwater drilling (both costly and technically challenging) have been hit hard by exploration budget cuts. This in turn has also affected the substantial 'upfront' investment costs which would be involved in the next stage of production. The website Market Realist (2016) provides a snapshot into the impacts of this on the global oil and gas market. The fall in value of liquid natural gas within the Asian market is another factor which is adversely affecting the future prospects for Tanzania (Scurfield and Mihalyi, 2017).

5. In 2016 BG Group was taken over by Royal Dutch Shell PLC. This was not only a marriage of company cultures. It also included the downsizing of BG and Shell personnel across the globe, the closure of the BG UK offices, and the alignment of Shell/BG operating processes.

"Changes in Worker Perceptions of Health and Safety during the BG Tanzania Drilling Campaign (2011 -2016)" is primarily concerned with personal perspectives of individuals from the operational Team who worked at the Mtwara Supply Base during this period and takes the form of a small-scale organisational ethnographic case study (Neyland, 2008).

The health and safety statistical improvements which occurred within the Mtwara operations between 2011 and 2016 do provide an indication about the benefits of implementing international health and safety standards but they do not provide an indication of wider impacts arising from the implementation. The underlying research question for this research project was as follows:

What were the impacts (in relation to supply base personnel) of introducing international health and safety standards at the Mtwara Supply Base between 2011 and 2016?

In this context, the 'impacts' referred to the perspectives of individuals from the workforce about:

1. Whether they feel that health and safety improvements occurred during this period;

2. Whether their personal views about health and safety risk management have changed since international health and safety standards were introduced at the supply base;

3. Positive and negative impacts which have occurred as a result of the implementation of international health & safety standards.

The benefits of completing this project are:

(a) It is an opportunity for the Shell organisation to replicate successful elements and avoid or limit repeat negative impacts identified in the research within future projects.

(b) It provides a qualitative ethnographic insight into some of the cultural, political and community influences which are specific to Tanzania and their potential impacts on the implementation of international health and safety standards.

(c) It will allow the sharing of experience of implementing international health and safety standards in a third world setting with other health and safety practitioners to further their understanding of global health and safety management.

(d) It creates the opportunity to test the consistency of results from a previous informal pilot review of a selection of frontline workers with the findings of the research project.

(e) It offers a chance for local and expatriate workers to reflect upon and communicate personal perspectives which relate to the implementation of international health and safety standards at the supply base.

The key stakeholders in relation to this project were as follows:

- The Head of Well Engineering for Shell Tanzania

- The Shell Tanzania Asset Leadership Team
- The Mtwara Supply Base Managers (x 2)
- Directly employed BG/Shell Personnel at the supply base
- Personnel who work for third parties and are employed at the Mtwara Supply Base

The project aims and objectives were as follows:

**The project had three aims:**

1. To critically review changes in safety performance as international safety standards were introduced and embedded at the supply base between 2011 and 2016.

2. To explore if there were any changes in perspectives of the Mtwara Supply Base personnel as the international safety standards were introduced.

3. To research whether there are any other wider impacts arising from the implementation of international safety standards outside of the industry i.e. within the wider community.

**There were four objectives which were intended to achieve the aims listed above:**

1. To analyse Mtwara Supply Base incident data from 2011to 2016 and establish if safety performance improvements were achieved.

2. To seek the views of local and expatriate personnel who worked at the Mtwara Supply Base about whether safety performance improvements were achieved.

3. To seek views from local and expatriate Mtwara Supply Base personnel about whether their perspectives about health and safety have changed since the implementation of international safety standards at the supply base.

4. To obtain feedback from local and expatriate personnel about their observations concerning health and safety improvements in Tanzania outside of the oil and gas industry which are related to HSSE standards which are in place at the supply base.

**The structure of the thesis**

**Chapter 2** of the thesis summary starts with a review of literature which pertains to the implementation of global health and safety standards and goes on to describe contextual topics which shaped the local operating conditions.

**Chapter 3** concerns the design of the research and describes why this was selected. The chapter discusses the data collection methods which were used.

**Chapter 4** outlines the implementation of the project design within the context of the field research which was completed. It also captures researcher reflections and lessons learned from this activity.

**Chapter 5** is concerned with the evaluation and findings from the survey data.

**Chapter 6** contains the evaluation and findings from the semi-structured interview data.

**Chapter 7** draws together the findings within a wider discussion on the themes arising from the data evaluation.

**Chapter 8** captures the conclusions and recommendations for Shell Tanzania to consider for future operations within Tanzania.

The **Reference Listing** follows Chapter 8 and leads on to the Appendices.

### Permission to include Company Details

Although this research was a work-based project, it was not sponsored by the employer, Royal Dutch Shell PLC. The researcher had ceased employment with Royal Dutch Shell PLC at the time the thesis was being developed. The researcher therefore obtained permission from Shell Tanzania to include references to the organisation within the published version of the thesis. A copy of this correspondence has been included in Appendix 7.

Various other contracting companies were referred to within the research outputs. Due to the complexities of obtaining permissions from each of the companies concerned (to refer to them within the published version of the thesis), permissions from the companies were not sought by the researcher.

## 2: LITERATURE REVIEW

This chapter summarises the literature which was reviewed by the researcher in relation to significant generic and country-specific factors which shaped the operating environment during the drilling campaign.

The review starts by considering the context of why and how multi-national organisations implement global health and safety standards across pan-global operations.

### Governance Requirements for Multi-national Companies Operating Overseas

Baker (1993) describes the increasing need for multi-national corporations to develop internal codes of conduct (Private Codes) which will apply across all of their operating environments and to self-regulate these. Such topics include employee conduct, financial controls, ethics and compliance, and community relations. He describes how these have become aligned with those of broader international development organisations such as the Organisation for Economic Cooperation and Development (OECD), International Labour Organisation (ILO) and United Nations. These codes also help to reassure host nations who might otherwise be extremely wary of potential negative consequences arising from the arrival of the multi-national company in country.

The colonial past within Tanzania has left its mark and there is still a degree of suspicion regarding the intent of transnational companies who operate in third world countries. Pearce (1987) touches on this in his book about the Bhopal disaster (pages 6-12) where he talks about the historical picture of transnational companies transferring high risk activities into third world countries in an 'imperialist' way demonstrating 'radical globalism' i.e. without behaving as responsible operators and applying the same level of risk controls as they would do in a more developed setting.

### Increased Need for Robust Internal Governance within New and Emerging Markets

Baram (2009) also explores the impacts of multi-national companies such as the extractive industries who are engaged in hazardous operations within new and emerging markets. He describes the requirements for multi-national companies to implement global standards which will address concerns regarding environmental impacts, health and safety, and local content. He cites several examples of historical scenarios in which serious harm or breaches have occurred where multi-national companies have not implemented such arrangements. One of these involves Shell operations in Nigeria. This was reported on by Smith (2011) in his article on the long-running disputes in Nigeria involving Shell (UK *Guardian*, 3rd October 2011).

Baram concludes that host countries are still highly reliant on the integrity of multi-national companies to implement and self-regulate their internal standards. Therefore, new and emerging markets remain highly vulnerable in terms of potential exploitation.

This vulnerability also extends to some workers within new and emerging markets being forced to work in environments which they know are unsafe. This is a theme which is touched on by

Shrader-Frechette (1991) in her chapter on 'Third-world risks and the isolationist strategy' (chapter 9); she argues that non-third world companies attempt to justify placing workers at risk by using the 'countervailing-benefits argument' and ignore the concept of equal treatment of all persons/recognition of basic human rights. In addition, Shrader-Frechette writes that they use a 'Consent' Argument:

> **K Shrader-Frechette:**
>
> *' In the absence of minimum standards for occupational safety, and without alternative opportunities for employment, one could hardly claim that the worker's occupation and its attendant risks were the result of autonomous or free choice.'*

## BG Group's Approach to Corporate Social Responsibility (CSR)

Research by Husted and Allen (2006) explores the differences between the strategic and international approaches to corporate and social responsibility (CSR) programmes within transnational and global organisations. The paper cites one example where British Petroleum (BP) consults with local stakeholders in order to understand local issues and develop a CSR programme to reflect those issues. This was very much in keeping with the approach taken by BG Group.

The annual sustainability reports for BG summarised performance against the categories of: ethical conduct, people, safety, health and security, society, environmental and climate change. The report included targets and performance data in relation to CSR plus an opening summary of highlights.

The BG Group Sustainability Report for 2011 makes reference to group-wide themes for social investment in: education, skills development and livelihoods enhancement. Whilst health and safety education and skills are not specifically mentioned, they did perhaps form part of a broader implicit commitment towards building local capability.

The report also confirmed that early assessments and consultations were completed in Tanzania to address local concerns as part of the new country entry. The BG Group Sustainability Report for 2012 includes comments from the Chairman of the Sustainability Committee following a visit to Tanzania. The comments include the recognition of the challenges concerning the building of capacity and managing the micro-economic impacts arising from oil and gas operations.

Both aspects were of relevance when considering the wider impacts of the implementation of health and safety standards within the BG Tanzania operations. In addition, a country-specific grievance mechanism was introduced as part of the community relations programme. The 2012 report also confirms that the social investment programme in Tanzania linked training and skills development with employment. It focused on education, vocational training, livelihoods and marine conservation. Examples of ineffective CSR programmes in the Tanzanian mining sector have been captured by Lauwo et al. (2016). The paper reflects the concerns of Baram (2009) about what happens when multi-national companies do not rise to the challenges of implementing international (ethical) operating standards within developing countries.

Anderson and Skjoett-Larsen (2009) explore a case study of IKEA's approach to the inclusion of CSR into their supply chain. This was very much in keeping with the kind of approach which BG Group was adopting as part of its global overall contractor management strategy with company CSR targets relating to such aspects as adhering to the BG Group Principles [for operating responsibly], meeting local content requirements, completing bribery and corruption training, and putting in place arrangements for whistleblowing. These targets were measured as part of the regular Bg Group contractor management plans.

## BG Group's Internal Risk Management Framework

As part of BG Group's internal codes of practice, the BG Group health and safety function was required to have a comprehensive management system and associated arrangements in place not only to comply with the requirements of UK legislation, but also to create global health, safety and environmental performance standards which met International Labour Organisation and Environmental standards.

The BG Group control framework incorporated other risk control disciplines such as security, finance, human resources, policy and corporate affairs and operations. The Health, Safety, Security and Environmental Group standards were benchmarked against the corresponding Organization of Oil and Gas Producers (OGP) health, safety, security and environmental management guidance notes. Thus, a community of practice approach is encouraged by all OGP members in relation to the implementation of consistent health, safety and environmental standards regardless of international location.

In the context of a new country start-up or exploration survey, the initial evaluation of associated operating risks is likely to involve a field visit to the proposed location. Hood et al. (1992) consider the seven areas of debate in relation to anticipation within risk management. The anticipatory challenge is certainly key to the determination of health and safety controls and associated resources, which will be required within any new start-up or project.

As always, there are cost-benefit analysis debates to be had based on considerations of the anticipated risk, impacts of the 'worst case' outcome and risk tolerance of the potential realisation of the risk. These considerations have to be pitted against the lifecycle of the project, lessons learned from the organisation regarding previous incidents, and ultimately the extent to which the operating control framework will apply, particularly in relation to projects of short duration.

As with many organisations, in addition to the topic-specific BG Group operating standards, BG Group utilised the quantitative risk assessment technique Stranks (2000) as a tool to assess risks at a macro and micro level based on a Group-wide risk matrix. Other risk assessment techniques were also used where applicable, in areas such as safety engineering and well engineering activities where applicable such as HAZOPS, Fault Tree Analysis, Failure Mode and Effects Analysis (FEMA), Harms-Ringdahl (2001).

## Safety Culture/Climate

When considering the impacts of the implementation of any health and safety management system the prevailing health and safety culture of an organisation will undoubtedly influence

the nature and effectiveness of the implementation. This research explores various indicators of the prevailing safety culture which existed within BG Group, and the local health and safety culture at the Mtwara Supply Base. However, it is not predominantly concerned with the study of safety culture as such.

The UK Health and Safety Executive describes the difference between health and safety culture and health and safety climate Davies et al., (2001) in terms of the underlying organisational perception, versus localised 'tangible outputs' of the safety culture. The differences between safety culture and safety climate were a cause of some debate within the academic world in the 1990s, as discussed by Guldenmund (2000). He concludes that climate is more considered with the measurement of attitudes rather than the underlying organisational culture.

The HSE's Common Topics Safety Culture guidance note cites the following as elements which contribute to an effective safety culture; management commitment, visible management, good communications between all levels of employee, active employee participation, training and intervention, compliance with procedures and whether or not the organisation is a learning organisation.

As part of its commitment towards improving organisational safety culture, BG Group had invested in the Dupont 'Felt' leadership programme in 2010. The programme was intended to encourage organisational leaders to engage more effectively with their employees and contractors through greater participation in safety discussions, increased visibility in the workplace, and similar tangible indicators of safety leadership.

This style of leadership is very much aligned to the 'authentic leadership' described by George (2004) in relation to effective senior management performance.

Other BG Group focus areas/initiatives which contributed to the overall safety culture included: contractor management improvement initiatives, such as the introduction of the Contractor Management performance standard, improved incident investigation tools (e.g. the REASON root cause analysis software tool), a behavioural safety programme "Step Forward" (focusing on Intervention, observation, compliance and contractor management) and the introduction of an asset integrity/process safety awareness programme.

The prevailing BG Group safety culture formed a solid basis upon which the BG Tanzania Asset safety culture developed. The Head of Well Engineering (who had responsibility for the Mtwara Supply Base) and his deputy (who subsequently took over operational responsibility) both demonstrated the 'Felt' leadership principles in terms of their personal commitment to safety. This included a visible 'commitment' statement which was posted around the site, and invited employees to contact them directly with safety concerns, regular site visits which included safety walkarounds, and an authentic leadership style.

Griffin et al. (2007) discuss the importance of individuals acting in a proactive, adaptive and self-directed way during organisational uncertainty in order to achieve effective work performance. These qualities are a critical success factor during any new start-up. They remained very prevalent within the BG Tanzania Well Engineering Team throughout the duration of the drilling campaign (2011-2016). The high-performance levels achieved from a well engineering and health and safety perspective were tangible indicators of this construct and of the positive safety culture which prevailed within the BG Tanzania well engineering operations offshore and at Mtwara Supply Base.

## Behavioural Safety Programmes within BG Group

One of the BG Group HSSE Standards set out requirements for behavioural safety programmes to be implemented. The maturity model which would apply will be scalable, according to the nature and lifecycle of the project. The benefits of behavioural safety programmes when used in conjunction with implementing safety standards has been widely recognised with the oil and gas sector. Ismail (2009) examines the effectiveness of such a scheme within three companies connected with the oil and gas sector in Malaysia. The research concluded that although the schemes were successful, they were resource-intensive, and required careful stakeholder management and substantial leadership involvement.

In the case of BG Tanzania, a behavioural safety programme was implemented from the onset at the Mtwara Supply Base. Saari (2000) describes the theory of behavioural safety programmes as a safety management technique. The four points which are identified as the key to a successful behavioural safety scheme (pages 59.11 and 59.12) were incorporated into the Mtwara Supply Base scheme in order to improve the prevailing safety culture. Behavioural initiatives included:

- The 'Gold Coin Recognition Scheme' (a monthly award which was presented to frontline personnel for exceptional interventions and observations),
- A continuous programme of site-wide Monthly Safety Stand Down meetings
- Implementation of the HSSE Observation Card system at each Mtwara operational site
- Operational team Behavioural Safety Walkround tours were implemented at each site

Over time, the quality of observation cards received and the level of interventions on site involving frontline operators has increased dramatically. This is in spite of some cultural challenges regarding a natural Tanzanian fear of causing offence by appearing to instruct elders or those in authority about corrective behaviours in relation to unsafe acts or conditions observed.

## The Importance of Contractor Management Within the BG Group Control Framework

As mentioned in the previous sections concerning health and safety culture, and CSR, contractor management was considered to be a critical focus area across BG Group. This is because, like many oil and gas operators, BG Group had recognised that the majority of the medium to high-risk operations which are required to achieve the business objectives are undertaken by third party contractors on behalf of the operator. In most cases, the more serious BG Group incidents had resulted in serious injuries or fatalities suffered by third party personnel.

Perhaps one of the most challenging and resource-intensive areas within the safety management implementation at the Mtwara Supply Base was that of communicating BG HSSE standards to BG Tanzania third party partners; coaching and mentoring representatives from those third parties in the understanding of how the BG Health and Safety Group standards related to their service delivery and completing assurance activities in relation to third party operational compliance with the standards. The standards represented a quantum leap in relation to the performance standards which prevail in most other workplaces within Tanzania.

## Effective Implementation of Global Health and Safety Standards – General Considerations

Pater (2015) identifies 12 factors which are required to achieve global-class safety, many of which relate to proactive safety leadership, communication and engagement with the workforce:

- Companies demonstrate lower incident frequency rates
- Employees are actively engaged in health and safety
- Workers believe that management is sincerely concerned about their personal safety
- Companies adopt innovative approaches and refinements to their existing processes
- There is a focus on work and home safety in meetings and training
- Senior managers regularly communicate their commitment to safety as a core value, and their accountabilities for safety performance
- Safety expectations and training form part of the recruitment and induction process. Safety performance in then included within the objectives and performance reviews
- Credit is given for safety initiatives and innovations
- Open and productive safety conversations take place
- Safety committee meetings are well resourced, effectively run and provide leadership/direction
- Curiosity is valued, with a commitment to 'fix what is not broken'
- The company strives for continuous improvement, seeking out innovations and not resting on past performance

These are common themes which resonate within many of the research projects concerning the application of global standards within multi-national organisations. It is anticipated that the new global standard for health and safety ISO 45001 will assist multi-national companies and suppliers within global supply chains to achieve improved health and safety standards within global operations Cooper (2014). This standard differs from others such as OHSAS18001 as it is international and includes a requirement for the demonstration of a positive safety culture within organisations and an increased focus on proactive management of safety performance within their supply chains.

## Factors Which can Influence the Implementation of Global Standards at a Local Level

Lu and Yang (2009) explore the correlation of positive safety leadership upon both worker behaviour and the effective implementation of the safety management systems within container terminal operations. Such operations are closely aligned with the core activities within the Mtwara Supply Base.

Another factor for consideration when implementing global health and safety standards is that of national culture and associated worker perceptions. Mearns and Yule (2009) explore the importance of such factors as 'masculinity' (where outputs and profit come before relationships) versus 'femininity' (where people are valued above the outputs), power distance (the 'closeness' or 'parity' of the relationship between co-workers and supervisors),

individualism/ collectivism and national overall culture. The research concluded that there are no consistent predictors regarding risk-taking behaviour and safety performance across cultures. However, management commitment and leadership proved to be a far more influential factor in determining the nature of the safety culture than any national nuances.

Gao et al. (2016) found that there were some differences between perceptions of safety climate in different nationalities; that workers who had a religious believe tended to have a more positive perception of safety climate, and that workers who were employed by construction project subcontractors rather than the main contractor had more positive perceptions. However, again, the prevailing influencing factors were around whether there was a positive safety culture in place within the project.

Research by Stergiou-Kita et al. (2015) suggests that gender may also be an influencing factor where males are working within high risk environments there is an increased potential for risk normalisation to occur, with males less inclined to voice concerns about unsafe conditions/behaviours, increased resistance to the concept of asking for assistance regarding health and safety provisions, increased need to provide masculinity whilst working in high risk, high pressure adverse work settings. The high proportion of male workers within the oil and gas sector therefore increases the significance of these research findings.

## Existing Occupational Health and Safety Standards within Tanzania

In terms of the existing occupational health and safety climate ahead of the oil and gas drilling campaign, like most countries Tanzania has committed to meeting the International Labour Organisation (ILO)'s mandate on occupational health and safety. Tanzania endorsed the mandate in 2003. However, Alli (2001) confirms that the ILO has noticed a marked difference in performance between developed and non-developed countries. For example, fatalities amongst transport workers in Kenya are ten times more likely than in Denmark.

Tanzania does have a health and safety regulatory framework in place in the form of the Tanzania Occupational Health and Safety Act (2003), plus various environmental protection regulations and related labour laws. Although the Occupational Safety and Health Authority (OSHA) is responsible for much of the enforcement of the health and safety regulations within the workplace, with the National Environment Management Council (NEMC) being responsible for enforcing environmental legislation, different industries in Tanzania are subject to other enforcement bodies such as government ministries.

Although there are not many specific research articles which have been written on occupational health and safety standards in Tanzania, four studies and one newspaper article highlight the poor levels of awareness which exist among employers and employees in Tanzanian workplaces in relation to effective occupational health and safety management.

In the first article Mrema et al. (2015) conclude that there is an increased potential that occupational health and safety standards may be compromised through the prioritisation of economic expansion in various industries such as manufacturing, agriculture, transport and mining. Their findings also concluded that not all of the Tanzanian health and safety regulations apply to all Tanzanian workplaces. This is because the Occupational Health and Safety Act (2003) does not extend to the self-employed or some of the smaller business enterprises such as agriculture. The article also comments on shortages in staffing levels within

OSHA and potential conflicts of interest where OSHA are providing safety services in addition to their enforcement role.

Eurofound's report "Working Conditions in Tanzania" (2012) confirms that health and safety standards are generally poor, and workers are at risk from hazardous conditions and potential security threats from actors such as thieves and poachers. Workers also commented on poor levels of health and safety training and information.

Boniface et al. (2013) studied injuries arising from the operations of a Tanzanite mine over a three-year period (2009-2012). Of the 248 injuries recorded 41% of those injured died, and 33% suffered multiple injuries. The study highlighted the poor working conditions endured by miners with long hours, a lack of basic safety provisions such as personal protective equipment and minimal monitoring of compliance levels by the mine or safety regulator. Most of the injured personnel were aged between 18 and 30 and had less than five years' experience in their roles. Unlike the oil and gas sector, which is in its embryonic stages, the global mining industry has existed within Tanzania since the 1920s.

Mwombeki (2005) reports on a survey of Tanzanian construction sites by the Construction Registration Board in 2001 and 2002 and describes compliance gaps in personal protective equipment, welfare provisions (drinking water, toilet facilities), site hoarding, under-reporting of accidents and breaches of other safety-related construction registration by-laws. Over 60% of contractors in each year did not provide any PPE to their workers.

## The Tanzanian OHS Regulator

In April 2016 (25th) the *Tanzania Guardian* Newspaper) published a strongly worded article appeared written by Majura, J (2016). The article, entitled '*When will OSHA authorities wake up from their sleepless slumber*' paints a very depressing picture about the reality of health and safety violations and accidents on construction sites and in factories in Tanzania and lack of government enforcement of regulatory requirements.

## Local Content Requirements for Extractive Industries

An aspect which is closely aligned to the success or failure of the implementation of internal risk management control frameworks is that of local content agreements which host countries have with the respective oil and gas operators. Such arrangements vary from country to country and may indeed have industry sector-specific requirements. The ultimate aims of local content agreements which relate to oil and gas (and other extractive industries) are for operators to train and develop the local workforce so that they are able to successfully run oil and gas/extractive operations within their country, and for the optimum utilisation of local suppliers to be able to support such operations.

Hansen et al. (2015) consider how such arrangements have been implemented within Tanzania, Uganda and Mozambique within the extractive industries sector. There are a number of reasons cited for the historical failure of local content agreements. Weak regulation by the host country is a universal theme. In Tanzania, local content agreements are hampered by the poor-quality business environment, the substantial technological and skills gaps between the local

suppliers and the multi-national corporations, poor governance, and a lack of political will to drive the policy forward. These themes are further explored by Kinyondo and Villanger (2016), specifically in relation to the oil and gas sector within Tanzania. Two other areas of concern identified were those of poor stakeholder consultation by the government in relation to draft policy development, and distrust of the various local and international actors who make up the stakeholder group. The report did mention BG Group's success in utilising local suppliers.

## Tanzania – Logistical and Infrastructure Challenges

In commercial 'land advantage' terms Cotula et al. (2009) Tanzania is well positioned in terms of not being land trapped, with the Dar es Salaam and Mtwara Port facilities. However, one big potential disadvantage in relation to land deals which would be required for the future LNG project is that much land is owned by the government and is subject to land treaties etc. In Tanzania the investor deals with multiple government agencies e.g. Tanzania Investment Centre (TIC), Agriculture, Housing & Environment Ministries on an individual basis. Communication and coordination between the various departments is not effective.

The infrastructure challenges in Tanzania have been recognised as having a damaging impact on foreign investment in the OECD Investment Policy Reviews: Tanzania 2013 publication "Overview of Progress and Policy Challenges in Tanzania". The document concludes that Tanzania is lagging behind some of its East African neighbours in this regard.

Arewa (2016) details the bleak picture of infrastructure challenges in the sub-Saharan region in general regarding water resources and sewage infrastructure, the power crisis within the electrical sector and the minimal ratio of road density throughout Africa which also extends to some roads becoming inaccessible during the rainy season. All of these factors impacted upon the logistical and operational and domestic arrangements which were required to be put in place during the BG Tanzania start-up activities, and the post start-up challenges continued throughout the campaign.

## Tanzania - Ethical Issues

A recent Tanzania Human Rights Report (2016) comments on the continued 'Right to Life' ethical dimensions of death sentences, mob violence, extra-judicial violence and killings, witchcraft-related killings [394 people killed between January and June 2016], violence against people with Albinism and road accidents (an average of 3,000 deaths per year since 2014). Some road safety improvements e.g. blacktop roads, the installation of clearer speed limit signage, general road signage, speed bumps and traffic lights were observed within Mtwara between 2011 and 2017. However, this risk area still results in many deaths within the country. A 2018 article by Lugongo, on the AllAfrica.Com website suggests that levels of witchcraft and mob-related killings have seen a reduction over the last five years.

Bribery and corruption are endemic within Tanzania. The GAN Business Anticorruption Portal (Tanzania Corruption Report, October 2016) indicates that the most affected sectors are:

government procurement, land administration, taxation and customs, which also extends to the judiciary and the police. The levels of corruption in Tanzania remain a highly challenging environment for foreign investors or aid agencies as described by McNeish in the *UK Guardian* (29th July 2015). Two years later Hayduk (Dar es Salaam Post online 25th Jan 2017) confirms that corruption is still a big concern and the Tanzania corruption index score had risen from the 2015 ranking of 119 to the 2017 ranking of 116.

Recent political changes, in particular the influence of the new President, John Magafuli, have resulted in some encouraging improvements in this area; the latest corruption ranking in the global Transparency International report for 2018 being 103, well above the scores for Kenya (143), Uganda (151) and Mozambique (153).

Whilst Magafuli's efforts to reduce levels of corruption appear to be successful, other areas have increased the challenges for multi-national extractive companies who wish to do business in Tanzania such as a move towards nationalism in relation to policy within the extractive industries as described by Jacob and Pederson (2018) and local content agreements for extractive industries as captured by Lange and Kinyondo (2016). Both aspects are touched upon further within the evaluation section of the qualitative data review later on in this document.

Over the last few years Tanzania has been attempting to resolve some of the inherent infrastructure challenges through the use of Chinese-funded investment projects. Whilst this has been successful in some respects it has also created new ethical problems. Kaiman, in the *UK Guardian* Newspaper (2017) reports that the Chinese Ambassador for Tanzania had condemned the unethical behaviour of some Chinese business representatives in Tanzania in relation to ivory and rhino horn smuggling, and the supplying of counterfeit goods within Tanzania. The endemic corruption within Tanzania exacerbates the potential for Chinese smuggling activities to thrive.

There have also been ethical challenges associated with Chinese infrastructure projects and local content; Western oil and gas majors such as BG Group and Statoil had robust local content commitments within their operating models to employ local workers and use local suppliers. The same cannot be said for some of the Chinese infrastructure projects. Flores (2017, estimates roughly 10,000 that Chinese workers were placed in Tanzania 2011. Flores also confirms that some Chinese state-owned enterprises bring in staff from China to build accommodation such as living compounds near or next to the construction site they are working on (Mohan et al.).

As a British company BG Group was subject to the UK Bribery Act (2010). The Act has a transnational reach, and therefore applied to all of BG's operations across the globe. The BG Group Sustainability reports for 2011/2012 and 2013 describe in detail the steps which BG Group took to implement a revised whistleblowing process ('Speak Up'), a mandatory training programme on fraud and bribery and a renewed emphasis on the application of the "BG Business Principles" which formed the basis of corporate governance at each location across the Group. This set of principles was first publicised in the BG Group Sustainability Report from 2008. The Group performance for that year was reviewed against each corresponding business principle.

The implementation of this approach from a UK based oil and gas operator within Tanzania created workplaces which contrasted enormously with the poor ethical conduct and corruption which is so often encountered in the state-owned parasitic companies within the private sector in Tanzania. Shell had already implemented a similar set of Principles '10 Shell Principles' some years before, in 1997, Parker (2005) following the bad press which the company had received in relation to its operations in Nigeria and concerns about plans to sink the Brent Spar Platform in 1995.

## Tanzania - The Status of the Oil and Gas Market

From an industry perspective historically, natural gas was considered to be a less worthwhile commodity than oil, but this is changing. A *UK Financial Times* report by Ward (September 2017) summarises the historical picture and the current market predictions. It confirms that the larger energy companies (including BP, Shell and Total) anticipate that Gas will take over from Coal as a primary source of fuel by 2030. They expect that the demand for gas will keep growing whilst other fossil fuels (oil and coal) which are less environmentally friendly will decline.

Tanzania has been identified as having great potential for natural gas reserves. Online information from TanzaniaInvest (2017) suggests that the current level of gas reserves in Tanzania (based on exploration work which pre-dates the Bg Tanzania drilling programme plus finds from it) is a total of 57 trillion cubic feet (TCF). The intent of the oil and gas providers (Statoil, BG Group, Ophir and Exxon Mobile) is to develop plans for an LNG terminal in the future. The finds were in part from the BG Group exploration programme, which took place predominantly between 2011and 2014, with two further commitment wells being drilled in 2016.

Although Tanzania has great potential for the development of a natural gas market, the introduction of this new market and the likely challenges and opportunities associated with it is of great concern to the Tanzanian government.

These aspects are discussed in detail in two papers: 'Opportunities and challenges for the extraction of natural gas in Tanzania – The imperative of adequate preparedness', Moshi (2013) and 'Natural gas and human development', Henstridge (September 2013). Henstridge includes considerations of the costs and complications associated with extracting natural gas and transporting it to an LNG production plant (Page 3). Henstridge sets out well the long journey which will be ahead in relation to realising the recent gas finds (page 4/5).

Moshi (2013) talks about eight areas of concern in relation to the opportunities and challenges which may arise from the natural gas market in Tanzania. He describes the 'resource curse' referred to by Auty (1993) where there is no trickle-down benefit to the community as a whole. The second point concerns the fact that natural resources are not renewable sources of income. The third point concerns the reverse psychology of the 'buyer beware' adage where the oil and gas 'buyer' knows more about the product/commercial value of the product than the seller (the government). Sometimes this has resulted in excessive financial concessions made by

governments who are not commercially astute. In the fourth point, Moshi describes the potential for "Dutch Disease" phenomenon as described by Ebrahim-Zadeh (2003), where industries which are outside of those concerning natural resources suffer as the extractive industries prosper due to knock-on effects concerning export prices and a depletion of the resources from the non-extractive sector into the extractive sector.

The fifth area of concern is the volatility of the oil and gas market. This has of course been highlighted in graphic terms from the time in which Moshi's paper was written until the current day with the global market recession. The sixth point concerns the propensity for governments to spend the money generated from natural resource revenue in anticipation that the revenue is renewable when in reality it is not. The seventh point concerns a trend within resource-rich countries to neglect sufficient investment in education and training which are required to support the macro employment market for the country. Finally, the eighth point highlights the increased risk of potential corruption as the political elite may become more likely to commit theft from the financial gains made in relation to the natural resource extraction profits.

Further observations concerning the natural gas sector in Tanzania are discussed within the evaluation of the qualitative data section (Relationship with the Community) and in the Conclusions section of the research thesis.

## Conclusion

This literature review has attempted to consider the context which formed the basis for the research project, not only in terms of BG Group as a responsible multi-national operating company within a new and emerging market, but in the context of Tanzania as an operating environment. It became clear as the research progressed that more literature was becoming available concerning the impact of the oil and gas sector in Tanzania and lessons learned from the Tanzanian mining sector.

Although health and safety studies have been completed in other industries within Tanzania, no studies of this nature were available for review. A great deal of research has been undertaken in relation to safety culture, safety climate, and national culture and safety culture. Very little research appears to have been completed by internal researchers on their experiences of implementing health and safety standards within new ventures. Moreover, studies which lead towards a qualitative approach in obtaining data on personal perspectives concerning health and safety are not as prevalent within the literature review as those which were employed a more quantitative approach to data collection. By adopting both methods within this research it is anticipated that the outputs may assist in providing an example of how a more qualitative approach to data collection can successfully be applied.

## 3: PROJECT DESIGN AND METHODOLOGY

### Project Design

In considering the design methodology for this case study, there were several factors which influenced the orientation towards an ethnographic approach:

1. The project was intended to be a small-scale case study, which would be completed by an insider researcher who had a longstanding relationship with the supply base workers.

2. The project concerned personal perspectives of individual participants, which supported a dual approach to data collection.

3. The research was intended to provide the BG/Shell Tanzania organisation with a unique case study which would summarise a localised perspective on the impacts of implementing global standards within a third world setting.

Angrosino (2007) lists the primary elements of the ethnographic approach as follows:

- It is field based (it takes place in situ)
- It is personalised (it involves an interactive relationship with the participant)
- It is multifactorial (it would utilise two or more data collection techniques)
- It requires a long-term commitment (in this case the observer/researcher had been involved with the supply base for six years)
- It is inductive (it uses all of the data to form patterns/conclusions)
- It is dialogic (it enables participants to comment on the conclusions/interpretations of the researcher as they 'sense check' this data
- It is holistic (the researcher aims to capture the most comprehensive portrayal of the participant group within the study)

In this regard, it could be said that the aims and objectives of the research were inductive in nature, as the perspectives of participants were unknown prior to the field research, and the research would consider work and non-work-related perspectives on health and safety from the participants.

Stake (1995) describes the concept of applying an ethnographical approach to case studies and the suitability of considering people and systems as case studies. From my perspective as a social researcher and safety practitioner the uniqueness of the context and situation is sufficient justification for classifying the research as an ethnographic case study.

In this research project, the case study was based upon the implementation of global health and safety standards within a third world environment and how this has impacted upon the workforce. The study involved the use of mixed data collection methods: a quantitative survey and qualitative semi-structured interviews rather than observations of the stakeholders. The flexible nature of this design Robson and McCartan (2016) page 147) reflected the ethnographic approach to exploring the research topic with the participants.

Although the ethnographical focus was towards cross-sectional data collection, Robson and McCartan (page 140) involving a broad sample of local employees I decided to include a

sample of the expatriate supervisory team as their reflections on the implementation process would also be useful from an organisational learning perspective. The main ethnographic focus of the study was centred upon capturing the thoughts and opinions of the people who have implemented the standards rather than observing the people implementing the standards.

The reasons for the project design were:

1. I had been able to observe the effects of the implementation already within my day-to-day role as the Health and Safety Supervisor at the Mtwara Supply Base, over a period of four years. However, this did not extend to capturing people's reflections/thoughts on the journey towards implementing the standards during the last six years.

2. Many of the existing literature reviews of health and safety-related research were focused more broadly towards safety culture within the oil and gas sector and globalised workplaces rather than the impacts of that culture upon the workforce.

3. By choosing a mixed method it would be possible to triangulate the findings of the survey data against the perspectives articulated within the interviews and to obtain an impression about whether there was a consistent response from participants in relation to similar lines of inquiry.

**Figure 1** below illustrates the evolution of the project methodology and execution. Figure 2 provides a chronological indication of job role and organisational milestones across the period between 2011 and 2016. Both diagrams are intended to provide an illustrative tool to help the reader visualise the how the methodology evolved within the context of the organisational changes which occurred during that timeline.

**Figure 1. Project Methodology**

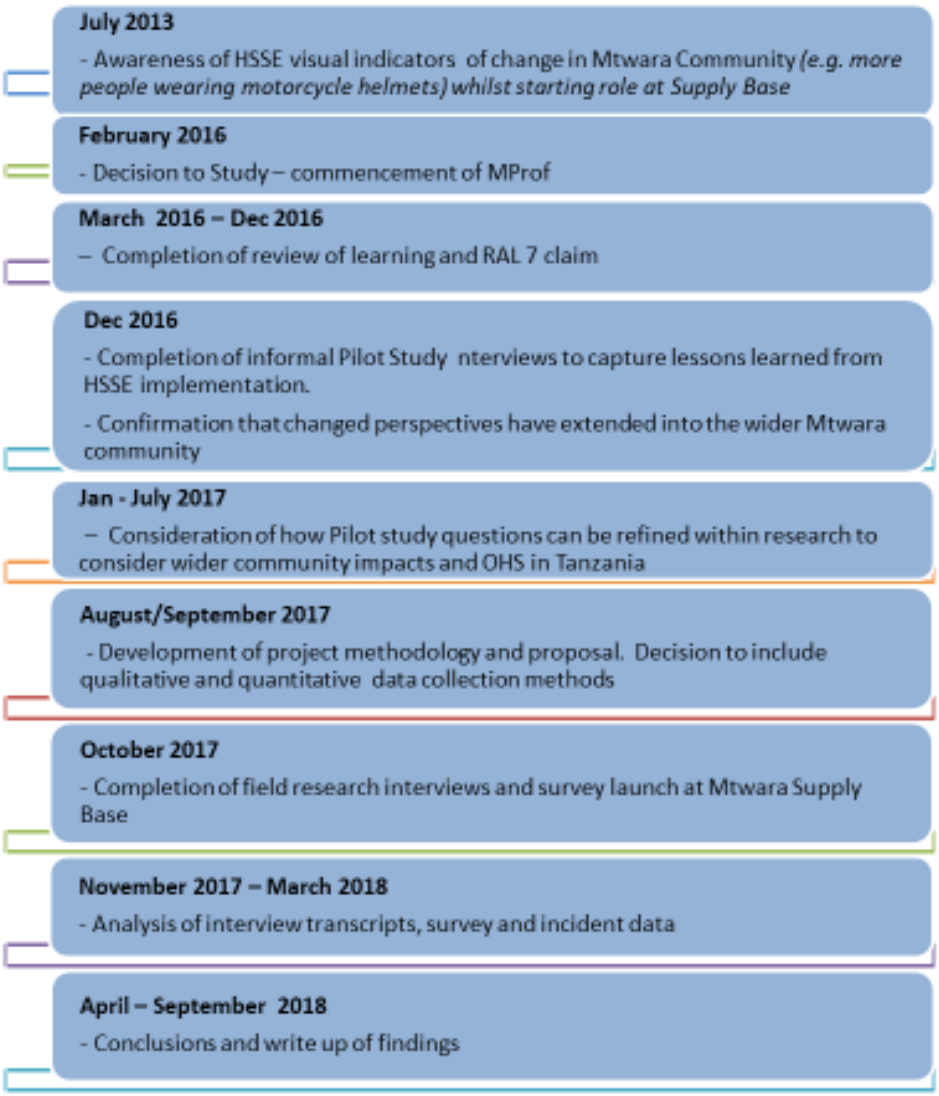
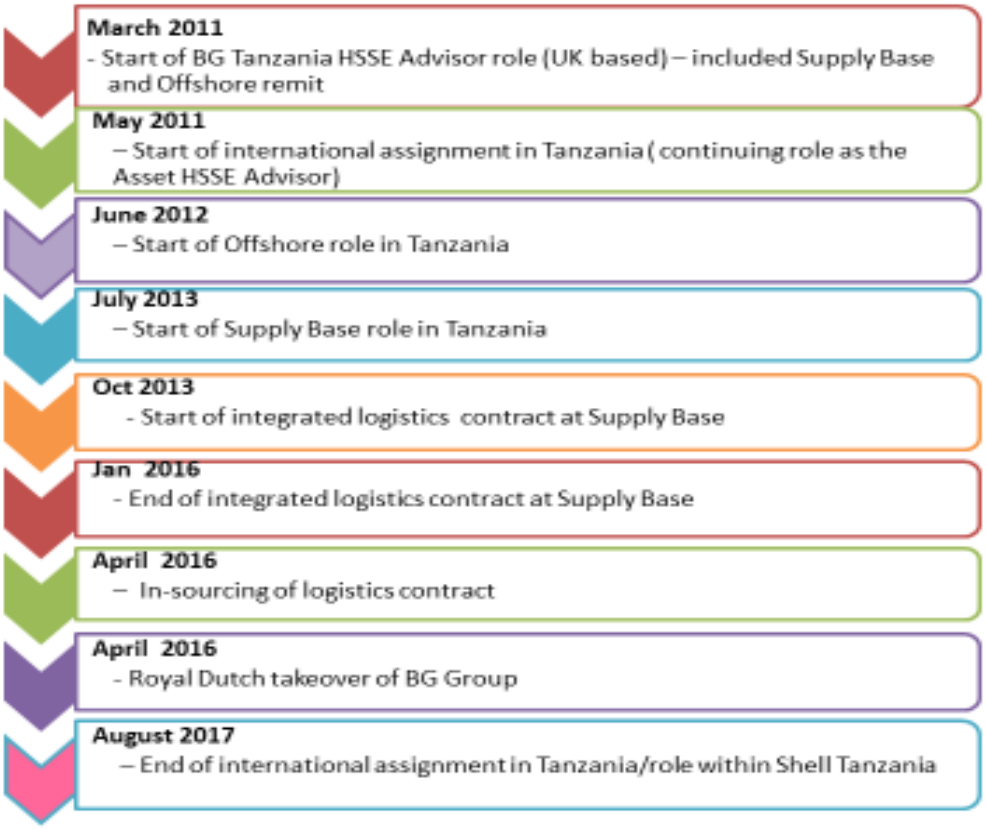


**Figure 2 Job Role and Organisational Milestones**




## The design of the semi-structured interview questions

The interview question sets were designed to test the consistency of results from an initial pilot review which took place in December 2016 and January 2017 (see Appendix 1), specifically in relation to data collected from local personnel. The review consisted of semi-structured questions and was an opportunity to 'road test' the question set which would then be modified and used in the field data collection later on.

The main aim of this research was to evaluate whether the worker perceptions about health and safety changed as a result of implementing international HSSE standards during the BG Group drilling campaign between 2011 and 2016. Therefore, the question set for qualitative interviews was developed in such a way as to create comparative (qualitative) indicators of 'before and after' changes regarding the drilling campaign for example:

- Obtaining an understanding of participants' perceptions/experiences of health and safety in previous workplace settings
- Finding out whether perceptions based on these previous experiences had changed since the individual had worked at the supply base
- Capturing any observations which participants had about any changes to health and safety standards within the local community in the Mtwara region between 2011and 2016.

The BG Tanzania Asset start-up had been a very rare opportunity to implement international standards within what was essentially a 'green field' context (given the very limited oil and gas activities which had gone before in Tanzania). This presented an ideal opportunity within the qualitative interview question sets to obtain some invaluable frontline feedback about lessons learned regarding the approach which had been adopted to implement the BG Group Standards at the Mtwara Supply Base during the drilling campaign.

Immediately prior to the pilot study, I had also been in contact with an individual, Jackson Majura, who written a very scathing newspaper article (2016) about the seemingly ineffective performance of the health and safety regulator (OSHA) within Tanzania. This influenced my desire to increase the scope of the questions within the interview question set to include two questions which went beyond the implementation of the international standards at the supply base. I therefore included two questions within the set regarding participants' thoughts on:

1. The role of the regulator (OSHA)

2. What steps could be taken from a national perspective to improve occupational health and safety within Tanzania

The initial pilot study was limited to Tanzanian participants as there were a number of operational team members who were due to leave the supply base in the first few months of 2016, and I was very keen to capture a cross section of personnel from this cohort ahead of their departure.

After the pilot I was able to reflect on the experience of implementing the question set and the response to it ahead of refining the questions slightly in preparation for the main field research.

I decided to expand the participant target group for interviews in the field research to include expatriate personnel. To omit this group would be to lose out on the potential opportunity to understand how their experiences on other oil and gas projects compared with this project. All expatriate personnel were present in a supervisory capacity at the supply base. However, I tried to capture a cross section of the various roles/disciplines within the expatriate participant grouping.

The two questions regarding the role of the Tanzanian regulator and national safety improvement ideas were not included in the surveys with expatriate personnel as they were not of equal significance to this stakeholder group. Instead, the two questions were replaced with a single question which asked expatriate participants to compare their experience of health and safety implementation on this drilling project with other international oil and gas projects which they had worked on.

The two question sets can be found in Appendix 2.

In retrospect, ideally it would also have been advantageous to have piloted the quantitative survey ahead of the main research taking place.

## The quantitative survey questionnaire design

The design of the quantitative survey was intended to:

1. Create a triangulation reference point for the findings of the face to face interviews.

2. Gain an appreciation from a cross section of personnel about their thoughts/feelings about safety performance, their own health and safety awareness, and potential transfers or good practice from the base to the outside community.

3. Provide an opportunity for participants to utilise free text commentary sections within the questionnaire to capture their views.

The survey was focused towards local employees, and as the numbers on site had reduced to a small team it was determined that the survey would be distributed to all local employees on site.

The survey question set included a combination of questions around:

- The individual's perceptions concerning tangible safety performance indicators e.g. the number of incidents and whether these increased or decreased over the period of the drilling project.
- Whether the individual adopted safety practices outside of work
- What aspects the individual felt could be changed or enhanced in the approach to
  implementing safety standards in order to improve the implementation experience

The questions used a scoring mechanism of 1-4 with categories ranging from 'strongly agree' to 'strongly disagree' and 0 being a 'don't know' category. In order to reduce the potential for participants to select the same scores automatically, the positioning of the scoring categories was reversed in one section i.e. so "Increased Greatly", which would be expected to be a 4 rating was a 1 rating. The survey also contained an (optional) opportunity for participants to include comments after each section of the question set. This would allow for individuals to feel able to express supporting views, or observations in relation to the question set, thereby creating a further triangulation point for comparing views expressed within the surveys to those expressed within linked interview questions.

The survey question set for frontline personnel was translated into Swahili and local translators were used to facilitate the exchange of questions and answers within the interviews in cases where the personnel involved are more comfortable conversing in Swahili. The idea of the question set was to afford a consistent approach to the interviews, whilst encouraging participants to speak freely. This format also incorporates the potential to probe related aspects further dependant on the response from the participant, Robson and McCartan (2016). The technique is not dissimilar to that of completing an interview for a health and safety audit

or incident investigation, which often results in some very useful wider investigation findings and audit observations.

## Ethical Considerations

Warwick (1982, Chapter 3) discusses the pros and cons regarding the ethical dilemma posed by the potential intrusion of the researcher into the private space/sense of dignity of the individual. Discussions regarding the personal views of individuals were conducted with care and sensitivity by the researcher at all times. The experience of the initial pilot interviews also exemplified the positive aspects of social research outlined by Warwick; participants reacted very positively to the opportunity to express their views openly.

A cross section of personnel was invited to contribute to this research, and those whose first language is not English were given the opportunity to contribute in Key Swahili, with the use of translators. All participants were invited to take part on a voluntary basis only. A project information sheet and associated consent form was used for all interview participants ahead of the interviews taking place.

A potential conflict of interest may have been perceived by participants in terms of my previous 'authority' role as the HSE Supervisor, Klienman and Copp (1993) at the supply base and that of the 'insider researcher'. Potential existed for:

- Participants to feel compelled/pressurised to take part in the research
- Participants to feel nervous about raising any concerns/constructive criticism in relation to my previous role or the organisation
- Participants to respond in a more positive manner in order to please the researcher, rather than to be open and honest in their views

I carefully briefed all participants ahead of their involvement in the research that my role in this context was that of a researcher rather than that of the previous HSE Supervisory 'authority' role.

The closure of the Mtwara Supply Base may also have had some potential dimensions which might have affected participant responses in relation to:

- Participants may have been less willing to offer their time to complete surveys/interviews
- The imminent loss of employment may have resulted in an adverse effect on the quality of responses received
- Conversely, some participants may have viewed the opportunity to participate in the research as a positive chance to have their voices heard, and to reflect on their experiences.

I was very mindful of this when completing field research and very aware of the need to be highly sensitive to the needs and feelings of the stakeholders at the supply base during data collection, Kleinman and Copp (1993). In addition, I ensured that I expressed my gratitude for

the support and cooperation of stakeholders in a very public way as well as in one-to-one conversations.

A further aspect of consideration was that of the Tanzanian cultural influences; the Tanzanian propensity towards avoiding conflict, or being seen to be critical of superiors, elders, or the client organisation could have created a 'false positive' in terms of responses. Whilst I stressed the importance of and actively encouraged an honest approach to survey returns of interviews the possibility does exist for this aspect to have influenced some responses.

All participants were assured that their personal details would not be published within the summary of findings, and that the researcher would take steps to avoid recognition of individuals when including individual quotations from interview participants. In addition, that data would be securely stored and destroyed after 12 months.

The Shell/BG Group Code of conduct also applied in relation to the completion of field work i.e. respect for others and transparency in business undertakings. The Shell/BG Tanzania Information Security Standards were also adhered to in respect of the protection of personal data and storage of information.

## 4. PROJECT ACTIVITY - Application of the Design

The field research for interviews and paper surveys was predominantly completed between 17th and 21st October 2017, with some interviews taking place outside of this timescale.

### Questionnaire Survey

65 surveys were issued to each of the Tanzanian workers at the base and a total of 55 were completed, which was a return rate of 85%. At the time the surveys were completed the workforce had reduced by approximately 50% in preparation for the de-mobilisation of personnel from the base.

### Interviews

A total of 16 semi-structured interviews were completed with Mtwara Supply Base personnel. Site-based translators were used to provide translations previously within the context of their normal roles at the supply base, and in this regard, they were all 'known quantities'.

The interview question sets used for local and expatriate interviews were very similar, with minor changes to explore any additional perspectives from expatriate participants regarding their experiences of other oil and gas new projects. Both question sets can be found in Appendix 2.

55% of the interviews with Tanzanian personnel involved the use of a translator.

Both sets of participants constituted a representative cross section of job roles and employing organisations from the operational team which was present at the supply base at the time of the field research. A detailed breakdown of participants can be found in Chapter 6.

### Review of Incident Data

A review of the incident data for the Mtwara Operations (which included the supply base and other Mtwara sites) demonstrated performance improvements. Table 1 below details the numbers of incidents, and by category between 2011 and 2016.

**Table 1– Incident Data for the Mtwara Portfolio Between 2011and 2016**

| Year | Total Incidents | Total Fatalities | LTI | RWD or Medical Treatment Case | FAC | Minor Environmental Incidents, Asset Damage, Fire | Near Misses/ Hazardous Conditions |
|---|---|---|---|---|---|---|---|
| 2016 | 31 (2 NWR) | 0 | 1 (NWR) | 0 | 1 | 15 | 14 |
| 2015 | 21 (2 NWR) | 0 | 0 | 0 | 4 | 15 (1 NWR) | 2 NM (incl 1 HiPo) |
| 2014 | 51 (2 NWR) | 0 | 1 | 0 | 9 (2 NWR) | 27 | 14 |
| 2013 | 59 | 1** | 0 | 1 | 9 | 35 | 13 (incl 1 HiPo) |
| 2012 | 50 | 0 | 1 (HiPo) | 1 | 11 | 20 | 17 (incl 1 HiPo) |
| 2011* | 23 | 0 | 1 | 0 | 3 | 13 | 6 |

**FAC** = First Aid Case [see Glossary for details]
**LTI** = Lost Time Injury [see Glossary for details]
**Hazardous Condition** = A physical situation with a potential to cause harm [see Glossary for details]
**NM** = Near Miss [see Glossary for details]
**NWR** = Non-work-related injury [see Glossary for details]
**HiPo** = High Potential Incident [see Glossary for details]
**RWD or MT Case** = Restricted Workday Case or Medical Treatment Case as per the US OSHA Classification [see Glossary for details]

*The **2011** incident data is between 1st July and 31st December 2011 only. BG Group's role as the supply base 'operator' did not start until this time.

** The **Fatality** incident which occurred in 2013 was not connected with the supply base

The first year of BG Group's operations started from the 1st July 2011. A total of 23 incidents occurred between the 1st July and 31st December, with 1 lost time injury occurring. Given that this period was the initial start-up and therefore arguably one of the most likely periods in which a greater number of incidents, of potentially higher severity would occur, is it not

inconceivable to surmise that the incident rate may have potentially doubled that year had BG Group been starting its operations from the beginning of 2011.

A fatal incident did occur where a driving related event took place in connection with maintenance activities at the accommodation facility in Mtwara in 2013. However, at the supply base, the severity of incidents resulting in injury decreased post October 2013 (the start of the company C logistics contract). Whilst the number of overall incidents is 59 in 2013 and 51 in 2014 it begins to drop in 2015 and 2016 with the reduction of the previous operational drilling campaign-related activities.

There are three noteworthy factors which demonstrate performance improvements during this latter period;

1. It is very significant that the replacement of the Zambia Shed warehouse roof***** which took place in Quarter 4 2015/ Quarter 1 2016 did not result in any serious injuries; when considering the context of completing this work within a remote third world environment this is outstanding in terms of health and safety performance achievement. It is also to be noted that significant construction activity was taking place throughout 2012 - 2015 (office block construction, demolition and road resurfacing) which could have resulted in a significant rise in serious injuries but did not.

2. An 'in-sourcing' of the integrated logistics contract took place in 2016 with the termination of the company C logistics contract. This involved the operational site management being taken back 'in house' by BG Group/Shell, and a reduced logistics contract being awarded to company B Logistics. Again, one might reasonably expect a spike in incidents to accompany such momentous changes. However, this did not happen.

3. An exploratory well was drilled at the end of 2016 which meant that drilling-related operational activities (including the recruitment of supply base personnel to support the operations) occurred. In addition, this also included the re-commencement of marine operations to/from the supply base, and a substantial increase in lifting operations. Again, this meant that the overall risk profile increased during this time along with the increased potential for incidents with serious outcomes to occur.

In summary, given the level and nature of operational and construction activities and organisational changes which took place between 2013 and 2016, the incident data demonstrates that by this time the global health and safety standards had begun to be embedded within supply base operations, thus reducing incident severity and frequency.

*****This project involved the replacement of existing roof sheets with 300 per 40m x 30m section of roofing. Working at height took place at 12.5 metres and an independent scaffold structure was used underneath each section as the sheets were replaced; Over 1200 individual scaffold components needed to be moved every six to seven days as the next section of roofing was replaced.

## Observations on the Practicalities of Completing Interviews in the Field

At the time the interviews took place many of the office areas in the supply base had been cleared of furniture in preparation for the shutdown. These areas had the required level of privacy as they were unoccupied. However, the lack of furniture created an echo effect which adversely impacted upon the quality of the recorded interviews.

There were a couple of unintended interruptions where colleagues had inadvertently walked into the interview areas. This was disruption and something which I would seek to discourage with a practical measure such as an "Interview in Progress, do not disturb" sign on the door in future.

The use of local translators who were known (and trusted) by participants was a positive measure but not without its own challenges; the availability of the translators and participants could not always be assured, as they still needed to complete their operational duties. Although the quality of the translations (when cross-checked) was sufficient, some translators were more effective than others. One translator tended to add their own contribution in terms of thoughts/views in relation to the questions being asked/answered. Such enthusiasm, whilst commendable, was a little challenging to negate.

Scene setting is a very important part of effective dialogue with my Tanzanian colleagues and is very much in keeping with cultural norms. In asking some questions, particularly those around topics such as the role of the regulator and different experiences of working with different international companies, there was a tricky balance to be achieved between sense checking views/information from previous interviews and the potential for undue influence of the participant to occur. In a similar way, the balance between sense checking of views expressed by others in previous interviews, e.g. the regulator visiting the supply base too often and not going to other workplaces, was difficult to offset against the potential to influence the participant.

In some instances, the questions were not fully understood, and it took time for the participant to understand what was being asked of them, even with the translator. I was extremely fortunate to have access to an independent translator in the UK who cross-checked each translated recording for me. In retrospect, it would have been much easier for this to have taken place in-country using an independent translator from the team (had one been available).

## Observations Regarding the Participant Base

The target group for participants within this research project was limited to the core operational team who were present on site at the time of the field data collection. Opportunity does exist to broaden the scope of future research to include stakeholders from third party contractors who were no longer present on site e.g. construction contractors who had worked at the supply base, service contractors who visit the base on a regular basis during drilling operations and the facilities management contractor.

Whilst several interview participants spoke of the positive influences/impacts which they had observed in relation to these organisations adopting international standards/best practice after working with BG/Shell, potential exists to examine this in more detail with the stakeholder contractor partners concerned.

Another factor for consideration in future research would be the inclusion of local community stakeholders (elders, religious representatives, local business owners etc.) who may have been indirectly influenced by the implementation of health and safety standards.

The field research took place in October 2017, two weeks before the Mtwara Supply Base Team was disbanded and the areas in which Shell leased the premises were handed back to the Tanzanian Ports Authority. Arguably this could have potentially affected the data collection within the field research in relation to:

1. Limitations on the availability of participants, resulting in a less comprehensive cross-sectional representation of the drilling campaign workforce:

    - the Security team had halved in size two weeks earlier after a partial handover of port security to the Tanzanian Ports Authority).

    - the offsite accommodation facility had been handed over from the facilities management contractor to the landlord in July resulting in the disbanding of the Shell managed facilities contractor and security contractor teams.

    - there were no offshore operational activities at this time so the additional related service providers e.g. supply vessels, additional logistics contractors etc. were no longer present on site.

    - the lengthy construction project work to upgrade the supply base had finished in March 2016, and therefore no stakeholders were present from this work group.

2. A high potential for a less positive response to participation requests and responses from participants arising from feelings of despondency or anger at the prospect of imminent redundancy.

Point 1 remains an unknown in terms of how the wider stakeholder group might have responded to the questionnaire. In terms of Point 2 it became clear from the survey returns and interviews that although respondents would undoubtedly have been deeply affected by the impending closure of the supply base, their responses were extremely positive.

## Reflections on my role as an Insider Researcher

My role as an insider researcher served predominantly to facilitate good cooperation with research project participants. However, it could also be argued that I may have been less receptive to any subtle/underlying messages which participants were trying to communicate

because of an over-familiarity with the participants. Similarly, that participants may have been eager to please and therefore not as open in their responses to survey or interview questions.

One of the recommendations from the Project Approval Panel was that of recognising my own ethnocentricity in my role as an insider researcher. In this case, I had worked with the majority of stakeholders for the last six years. In addition, there was a strong likelihood that I may not listen closely enough to what was being said or read what was written in surveys without being polarised to preconceptions based on my previous experiences within my role as the HSE Supervisor. Whilst there were no obvious answers in terms of tangible steps to take to avoid this, the recognition ahead of the interviews taking place did increase my awareness of potential bias, which was helpful.

Generic challenges of being an insider researcher included:

- Participants being unable to separate their knowledge of my previous role as the HSE Supervisor from that of my new role as an insider researcher
- A potential for participants to feel under 'duress' to participate in the research for fear of an unfavourable reaction from me or their Line Managers
- The potential for participants to respond in a way which they thought I would find favourable because they wished to please me rather than to respond more openly
- The challenge of being 'too closely involved' in the relationship with the participants to avoid bias leading to potentially influencing participants towards predetermined outcomes

In addition to these aspects there were two context-specific aspects which were particularly testing in relation to my insider researcher role:

1. The uncertainty of personal circumstances in respect of my own role at the supply base was such that there was a long period where I did not know how long regarding the role would last, when I would be repatriated to the UK and whether I would be made redundant after my repatriation.

2. When I completed the field research I had already been repatriated to the UK. I had invested six years working in the BG Tanzania Asset and had developed strong personal ties with the people and the country during that time. To return as an internal researcher during the last two weeks of the supply base operations was both a privilege and an emotional experience.

Even though I had no responsibility for the closure of the supply base or the cessation of operations at Mtwara I was still a company representative, and (in the eyes of the participants) someone who was responsible for receiving feedback concerning the grief and frustration felt by project participants in relation to the closure of the supply base. I felt completely impotent at such moments. In my own way, I, too, was grieving with the people at the closure of the supply base, and cessation of what we (as a collective team) had achieved there. I also needed to recognise my continuing role as a researcher, a leader and someone with responsibility to maintain a managerial perspective when responding to concerns raised by interview

participants. All of the above practicalities of interviewing were useful points of learning for any future research which I will undertake.

## 5: DISCUSSION ABOUT SURVEY DATA EVALUATION AND FINDINGS

### Demographic analysis of survey participant sample

23 different job roles were stipulated within the responses with the most populated roles being those of drivers, security guards, site foremen (supervisors) and housekeepers. The cross section of roles was a good representation of the overall spread of roles across the workforce, including frontline and supervisory roles.

Table 2 illustrates the types of job roles, and the numbers of male/female participants against each role.

### Table 2 - Job roles and gender of participants

| Job Roles | Number of Personnel | Female | Male |
|---|---|---|---|
| **Drivers** | 12 | 0 | 12 |
| **Security Guards** | 10 | 0 | 10 |
| **Site Foreman** | 5 | 0 | 5 |
| **Housekeeper** | 4 | 3 | 1 |
| **Housekeeping Supervisor** | 1 | 1 | 0 |
| **Security Supervisor** | 2 | 1 | 1 |
| **Mechanic** | 1 | 0 | 1 |
| **Cherry picker Operator** | 2 | 0 | 2 |
| **Crane Operator** | 1 | 0 | 1 |
| **Forklift Operator/Driver** | 3 | 0 | 3 |
| **Supply base Operative** | 1 | 0 | 1 |
| **Air Conditioning Technician** | 1 | 0 | 1 |
| **Electrical Engineer** | 1 | 0 | 1 |
| **Plumber** | 1 | 0 | 1 |
| **Welder** | 1 | 0 | 1 |
| **Assistant Fuel Supervisor** | 1 | 0 | 1 |
| **Fuel Truck Driver** | 1 | 0 | 1 |
| **Transport Coordinator** | 2 | 1 | 1 |
| **CCTV Operator** | 1 | 0 | 1 |
| **Health & Safety Coordinator** | 1 | 0 | 1 |
| **Materials Controller** | 1 | 0 | 1 |
| **IT Deskside Support** | 1 | 0 | 1 |
| **Mud Plant Supervisor** | 1 | 0 | 1 |

The low proportion of female workers in comparison to males shows a gender bias which may be a cause for concern had the data related to another industry, such as the Financial sector. However, the data is not atypical for the oil and gas industry, which tends to be a male-dominated work environment. The Boston Consulting Group (2017) comment on the slow transition which is taking place within the industry towards technical roles being gradually filled by females.

Analysis of the 13 supervisory roles within the survey responses revealed that 3 out of the 10 supervisors were female. The lack of diversity within supervisory/senior roles has been acknowledged within the Tanzanian banking sector, and a recent article on the Tanzania Invest website (2018) describes an initiative within Stanbic Bank to promote a women's mentorship programme.

When considering the influence of gender differences Stergiou-Kita et al. (2015) suggest that there is an increased potential for males to be less inclined to voice concerns about unsafe behaviours/conditions. In this regard some differences might be expected between male and female respondents within the survey responses. However, the analysis of the data did not reveal any significant differences in the types of responses from each gender.

## Educational Levels of Participants

The survey included a question which required participants to comment on their educational achievements. Levels of education were allocated a categorisation based on criteria as defined in Table 3 below.

### Table 3 – Educational levels of participants

| Educational Categories | Number of Responses |
|---|---|
| **Did not complete response to question** | 3 |
| **Primary School educated only** | 4 |
| **Educated up to Secondary School level only** | 12 |
| **Attended primary and secondary schools plus Technical College or University** | 36 |
| **Attained primary, secondary, and either Technical College or University plus a Post Graduate Qualification** | 0 |

Gaps exist in educational accountability within the public-school sector in Tanzania in terms of the active evaluation of teachers, the regulatory quality assurance framework, financial accountability in relation to schools plus a lack of engagement with parents in relation to holding schools to account. These gaps were explored by Komba (2017) who concluded that they are contributing to the poor learning outcomes within the country.

A Worldbank blog article by Morisset et Al. (2013) concerning youth unemployment within Tanzania states:

> *'Of the approximately 900,000 youths (15 - 24-years) that entered the labor market in 2010/11: 14 per cent did not complete primary school, 44 per cent finished their primary but did not transition to secondary, an additional 38 per cent went to*

*secondary but did not reach or finish Form IV, and a mere 4 per cent went beyond O-level*'

Given the status of primary, tertiary and university education it is encouraging that over 50% of survey participants did manage to obtain tertiary vocational qualifications. In this respect the educational categories were unexpected in relation to the amount of level 3 category attainments. There was also some evidence of a correlation between the personnel who had job roles which required a technical qualification e.g. forklift truck driver, rigger, and those who had attained a level 3 category qualification.

Gaps between vocational training qualifications and international standards for such qualifications had been reviewed within a benchmarking study completed by the UK Voluntary Service Overseas (VSO) Charity. This will be discussed in more detail in the thematic analysis section of the findings.

## Religious Affiliation of Participants

Table 4 shows the breakdown of religious associations from the survey data

**Table 4 - Religious Orientation of Participants**

| Religion by Categories of Responses Received | Number of Responses |
|---|---|
| **Christian*** | 26 |
| **Muslim** | 29 |

*1 Participant stated that they were Roman Catholic

This data is broadly consistent with religious affiliations in Tanzania as set out in the Global Security.Org website (2018) and Wikipedia (2018). However, both articles also comment on a higher proliferation of Muslims in coastal areas. When considering this in relation to the coastal area of Mtwara it is interesting to note that this is not reflected within the split of religious affiliation from the 55 survey participants.

An analysis of survey data concerning religious affiliation within supervisory roles showed that, of the 13 roles from the participant responses 7 were Christian and 6 were Muslim. Again, this is perhaps a more even distribution of roles than might have been expected given the coastal location.

It has been stated that 93% of Tanzanians believe in witchcraft, and this percentage includes individuals who affiliate themselves with the Muslim and Catholic faiths, BBC World News Africa Article (2010). The article goes on to describe the behavioural tendencies of Tanzanian personnel to utilise the services of local witch doctors in addition to maintaining their Muslim or Christian beliefs.

Gao et al. (2016) comment on the correlation between workers who have a religious belief demonstrated a more positive perception of safety climate than those who do not. This may be a contributing factor to the positive way in which the Tanzanian workforce responded to the introduction of international safety standards. This is a concept which would benefit from further research.

## Ages of Participants

The youngest participant was aged 23 and the eldest was 68. Four of the participants did not include details of their age. Table 5 provides a summary of the age ranges against responses received.

**Table 5 - Ages of Participants**

| Age Ranges | Number of Responses |
|---|---|
| **Did not complete response to question** | 4 |
| **Ages 23-29** | 10 |
| **Ages 30-49** | 27 |
| **Ages 40-59** | 11 |
| **Ages 50-59** | 2 |
| **Ages 60-65** | 0 |
| **Ages 66-70** | 1 |

The age of survey respondents was slightly younger than the industry average as depicted in the Boston Consulting Group report (2017) which stated that the aging industry population of personnel aged 50 or more makes up 75% of the overall oil and gas workforce globally. By contrast Adebola's (2014) recent study of the Pipeline Products and Marketing of the Nigerian Petroleum Corporation in Lagos had a workforce sample which was aged between 41 and 50.

In the supply base sample, the participants were aged between 23 and 68. The World Population Review website (August 2018) describes the results of the last official census in 2012. The breakdown of the data estimated that 44.8% of the population were under 15 years old, 52% of people being aged between 15 and 64, and 3.1% being over the age of 64 at that time. The World Population Review website article concludes that the lower mortality rate is predominantly associated with the HIV epidemic within Tanzania:

> **The World Population Review Website (2018):**
>
> *'It's estimated that there are over 1.6 million Tanzanians currently living with HIV/AIDS, and the epidemic has resulted in an estimated 1.3 million orphans. The overall HIV rate in Tanzania is 5.1%, although this reaches as high as 15.4% among women in some areas.'*

In that regard, the data from the supply base is not uncharacteristic in terms of the national average for proportions of the workforce aged 15 – 64 and over 64 years of age.

## Tribal Association of Participants

There were 26 different tribal associations noted, with 3 participants who did not indicate association with any tribe.

Table 6 shows the tribal association of participants.

| Tribe by Category | Number of Responses |
|---|---|
| **Hehe/German** | 1 |
| **Makonde** | 17 |
| **Makua** | 3 |
| **Manyema** | 1 |
| **Mbena** | 1 |
| **Mchaga** | 2 |
| **Mfipa** | 1 |
| **Mhaya** | 1 |
| **Mhehe** | 2 |
| **Mkelewe** | 1 |
| **Mkuria** | 1 |
| **Mndali** | 1 |
| **Mndingereko** | 1 |
| **Mndonde** | 1 |
| **Mngoni** | 1 |
| **Mpare** | 1 |
| **Mpogoro** | 1 |
| **Msai** | 1 |
| **Msukuma** | 3 |
| **Muyao** | 1 |
| **Mwela** | 1 |
| **Mwua** | 1 |
| **Myao** | 3 |
| **Ngoni** | 1 |
| **Nyakyusa** | 3 |
| **Shirazi** | 1 |
| **Did not respond** | 3 |

There are approximately 120 different ethnic groups in Tanzania, Wikipedia – List of ethnic groups in Tanzania (2016), with the Sukuma being the largest (estimated to be 5.5 million members).

Table 6 shows the breakdown of tribal association of survey participants. The highest proportion of respondents was seventeen, from the Makonde tribe. This is unsurprising as it is the local tribe for the Mtwara region. It should be noted that the Makua tribe is also associated with the region, and this was not as well represented. The total for Makua was three. Four of the other tribes also had a maximum of three personnel associated with them. The remaining participants had mostly singular associations with a tribe.

A government report 'Migration and Urbanisation within Tanzania', (2015) based on the 2002 and 2012 census, suggests that Southern regions, such as Mtwara, Lindi and Ruvuma were experiencing a marked proportion of 'outbound' migration due to a lack of employment opportunities or reduced potential for land settlement within those areas. The report confirmed that Mtwara had the lowest rate of in-migration, with just 5% of in-bound migration.

Given this data it is interesting to note the number of tribes represented from outside of the Mtwara region. However, when considering the data in relation to the increased oil and gas exploration activities and associated employment which took place in the region from 2011 onwards it is likely that this apparent anomaly of tribal diversity relates to an increased number of inbound migrations to Mtwara as a result of increased job opportunities. However, this has yet to be proven, and will no doubt be captured within the next government census.

When considering any correlation between tribal association and survey data the responses from participants did not produce any notable trends regarding tribal association. In some ways this is unsurprising given similar research studies on the effects of nationality, culture and religion on safety perceptions, Gao et al. (2016) plus Mearns and Yule (2008).

In summary, the sample of survey responses proved to be representative of the industry, the country and the local area, with minor variations in respect of religious affiliation and tribal membership.

## Evaluation of Multiple-Choice Survey Responses;

The data which had been completed from each survey were analysed and placed into an Excel tabulation. This was then imported into the Minitab programme which enabled data evaluation to be completed. In this instance there were 65 surveys issued to local participants as this was the total number of local personnel working at the supply base at that time.

Table 7 shows the mean response for each question, plus the P-value against each response. The inclusion of the mean score is useful because it provides a preliminary indication of whether there is a positive or negative response. If the responses were random, a mean close

to 2.5 could be expected. The standard error is very small compared to the mean, which indicates that there was consistency in the way that people voted. In general, the responses were very similar, with a firm indication towards the positive or negative, for example Question 1.c (see figure 5), which is dominated by a positive answer. Rather than including a set of very similar charts, it was felt that a table pf means could best summarise this. This concept is also illustrated in a more visual way in Appendix 4 (page 99) which shows the response to each question as a bar graph.

In order to test whether the apparent results were indeed significantly non-random, a chi-square test of goodness for fit, using a predicted equal proportion in each category was performed for each variable. With the exception of question 3C all P-values were statistically significant, at P = 0.0001 or less.

**Table 7 – Mean responses to each question (see discussion below for interpretation)**

| Variable | N | Mean | SE Mean | P-Value |
|---|---|---|---|---|
| **Section 1, Qa.** Understanding of health and safety standards before I started work at the supply base | 55 | 2.3 | 0.1 | 0.000 |
| **Section 1, Qb.** Understanding of health and safety standards during my first year of working at the supply base | 55 | 3.7 | 0.1 | 0.000 |
| **Section 1, Qc.** Understanding of health and safety standards by the end of the drilling campaign (Dec 2016) | 55 | 3.9 | 0.1 | 0.000 |
| **Section 2, Qa.** Changes in the number of incidents between 2011 and 2016 | 55 | 3.8 | 0.1 | 0.000 |
| **Section 2, Qb.** The numbers of people being injured at work between 2011 and 2016 | 55 | 3.7 | 0.1 | 0.000 |
| **Section 2, Qc.** People working in an unsafe way between 2011 and 2016 | 55 | 3.9 | 0.2 | 0.000 |
| **Section 2, Qd. T**he amount of safety training I received between 2011and 2016 | 55 | 1.6 | 0.2 | 0.000 |
| **Section 2, Qe.** The number of safety observations between 2011and 2016 | 55 | 1.4 | 0.1 | 0.000 |
| **Section 2, Qf.** The amount of safety interventions between 2011and 2016 | 55 | 1.2 | 0.1 | 0.000 |
| **Section 3, Qa.** I don't care about safety standards when I am not at work. | 55 | 1.2 | 0.1 | 0.000 |
| **Section 3, Qb.** I implement some standards outside of work but not many. | 55 | 2.1 | 0.2 | 0.000 |
| **Section 3, Qc**. It is difficult to implement any standards outside of work because people in the community do not understand how to work safely. | 55 | 2.5 | 0.1 | 0.248 |

| | | | | |
|---|---|---|---|---|
| **Section 3, Qd.** I complete non-work activities in a safer way now e.g. wearing a motorbike helmet. | 55 | 3.6 | 0.1 | 0.000 |
| **Section 3, Qe.** I intervene if I see unsafe acts/situations when I am not at work. | 55 | 3.4 | 0.1 | 0.000 |
| **Section 3, Qf.** I share information about health & safety training I have received at work with my friends and family. | 55 | 3.5 | 0.1 | 0.000 |
| **Section 4, Qa.** The Safety standards should be implemented in the same way in future drilling projects. | 55 | 3.7 | 0.1 | 0.001 |
| **Section 4, Qb.** A different approach to implementing safety standards would be more effective in the future [please explain in the 'comments' space below] | 55 | 3.5 | 0.1 | 0.000 |

As can be seen in the table, most of the responses obtained matched well with what would have been hoped for in a well-trained group. The fact that some were close to 4 and some were close to 1 is due to the way that the question was framed (done to avoid people simply ticking the same box each time). The results show that respondents answered the questions individually (and got the correct answers as would be desired by the Mtwara Health and Safety Team).

Kent (2001) suggests that a minimum of 100 usable survey returns is required for the purposes of quantitative analysis to be performed where it is useful to sub-divide the data into groups or categories, since many of the sub units would be too small for significant results to be obtained. Kent thus suggests that the depiction of how two variables are related (Bivariate analysis) when using such small numbers is unlikely to produce good quality results.

This was demonstrated when a chi-square test for association was completed using data based on Section 3, question B and selecting the gender as the second variable. Because of the small number of female workers (6) a warning message was displayed to indicate there was insufficient data to effectively show the chi-square approximation (3 cells had expected counts of less than one, and 7 had expected counts of less than 5).

Kent goes on to suggest that studies which involve returns of between 60 or 70 should focus on reporting on analysing a single set of variables individually (univariate analysis) and to summarise these findings in a way which indicates that they are likely to be indicative rather than conclusive.

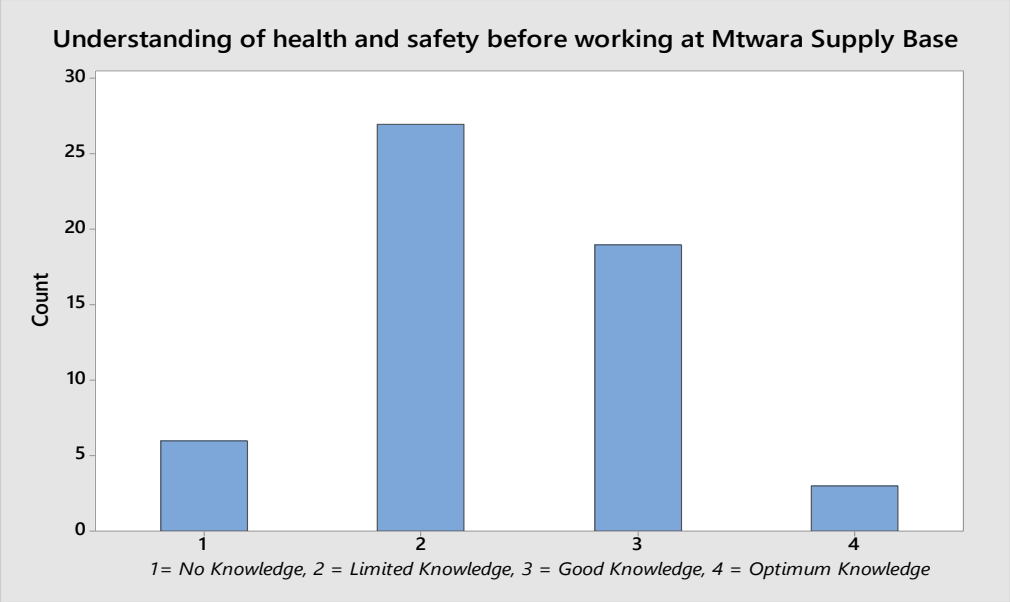



**Figure 3 – Responses to Section 1 Qa**

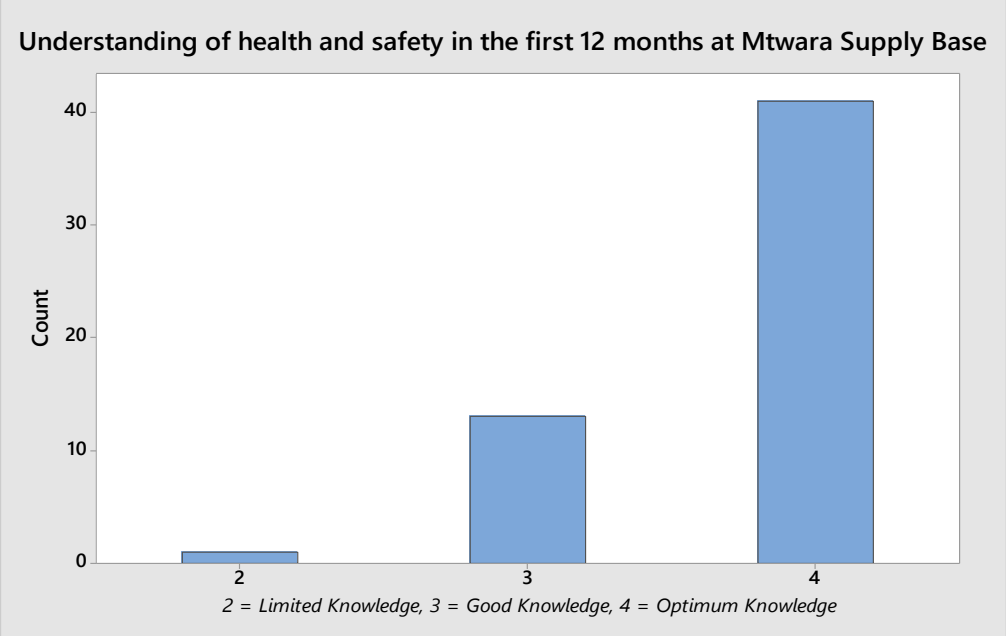



**Figure 4 – Responses to Section 1 Qb**

Figures 3-5 show a sequence over time. Figure 3 shows the responses to Section 1 Question A, which asked participants to rate their pre-existing knowledge of health and safety before they started working at the supply base. The majority of participants indicated a limited understanding when starting at the supply base (see Category 2 in Figure 3). This is not unexpected when considering the prevailing poor standards of occupational health and safety

and training levels which exist within most Tanzanian workplaces. Figure 4 illustrates the responses to the next question, Section 1 Question B, which asked participants to rate their understanding after 1 year of working at the supply base. Participants who selected category 4 responses (indicating optimum levels of knowledge) have increased from 3 in Figure 3 to 41 in Figure 4. The survey went on to ask participants to rate their levels of knowledge by the end of 2016 (Section 1 Question C). The responses, shown in Figure 5 show a further increase in the category 4 responses from 41 in Figure 4 to 52 in Figure 5:

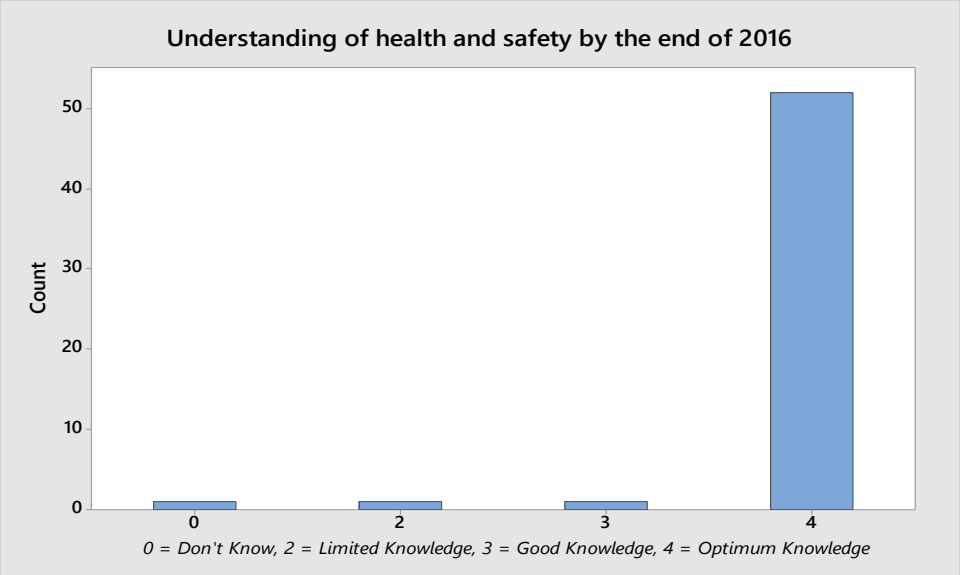



**Figure 5 – Responses to Section 1 Qc**

Arguably, this cohesive illustration of increased understanding could be viewed as being of limited validity as it is a purely subjective measure. However, methodological triangulation using the data from local and expatriate interviews indicated an overwhelming acknowledgment from individuals that they had developed greater health and safety awareness as a result of working on the drilling project. When considering other substantial findings which might contribute to a greater level of health and safety awareness such as an increased amount of training received between 2011and 2016, a decrease in the amount of people working in an unsafe way and increased numbers of safety observations taking place, it is perhaps unsurprising that participants indicated increased safety awareness over time.

In all other cases the results were strongly associated with 'correct' responses (in the sense of showing an interpretation of the question that reflected the response that a trained health and safety person would give (and towards which the training had been developed). Where the 'correct' response was 'strongly agree', the mean score was close to 4 (Table 7) and where the question had been phrased such that 'strongly disagree' was the 'correct' interpretation, mean scores were close to 1. This shows that most participants voted that way (Figure 5, where the mean response was 3.9, is a good illustration of this).

## Observations on the implementation of the survey form

I had wrongly assumed that all of the questions would have been clearly understood by participants. This erroneous assumption manifested itself within the answers received in the surveys:

1. Some questions had not been completed by all participants.

2. In reviewing the consistency of responses to the questions about education and levels of training it became clear that not all participants understood what was required; participants who had received training in areas such as the permit to work system did not include this within their returns.

3. The design of some questions, in retrospect, was not effective.

A small number of participants had not filled out one or more of the demographic information sections or had missed out answers to multiple-choice questions. Kent (2001) states that in all surveys there will be questions which are not answered by respondents and suggests that this is less likely to be as a result of deliberate refusal to answer as it is about broader factors, including accidental omission of information.

Zeglovista and Schwarzer (2016) attribute gender and educational levels as potential influencing factors for non-responsiveness. In addition, that questionnaires containing a 'don't know' option are more likely to encourage a 'don't know' response than those which do not explicitly include this option. Holbrook et al. (2006) conclude that resources available to assist participants in comprehending questions, and the amount of cognitive effort which is required to complete a survey are also influencing factors. For example, longer questions may affect short-term memory cognition, and questions with higher reading levels can affect the degree of comprehension.

It is not known why the respondents in the questionnaire who did not respond to the questions did not complete the various fields. As the surveys were anonymous, it would not be possible to review these with participants to understand the reasons for the nil response.

Some participants had clearly studied beyond primary school but had not included confirmation of the secondary school education (which would have been required ahead of them being accepted at the local technical college). The reason for the limited information is unknown.

Participants had not listed many of the certificated job-related training which they had received such as lifting and rigging qualifications and forklift driving proficiency training. Although I know from my role as the HSE Supervisor on site that the training had taken place (and that records were available on site to verify this), this was not reflected in the answers received. In addition, the participants did not mention in-house courses which they had attended (for which I had records) for site induction or permit to work training. The analysis of this data confirmed that the survey had not provided sufficient explanation to the participants as to what types of training should be included when responding to this question.

Some of the questions in the survey would have benefitted from clearer wording, as the existing wording was not sufficiently clear to elicit the most accurate response;

For example, Section 3 Question C "It is difficult to implement any standards outside of work because people in the community do not understand how to work safely."
Ideally this should have been split into 2 parts:

1. The first being the confirmation (or not) that it was difficult to implement health and safety standards when not at work.

2. The second being a confirmation (or not) that members of the outside community did not adopt health and safety standards in general.

Holbrook et al. (2006) refer to ambiguities such as those demonstrated by Section 3 Question C as the 'level of abstraction'. Such aspects are likely to cause difficulties in comprehension, thereby affecting the nature of the participant responses which relate to them.
In this regard it is perhaps unsurprising that this question did not fall within the P>0.001 score when the chi-square goodness for fit test was applied to the response data. Figure 6 shows a visual representation of the chi-square results, comparing the expected (average) responses with the actual (observed) response rates.

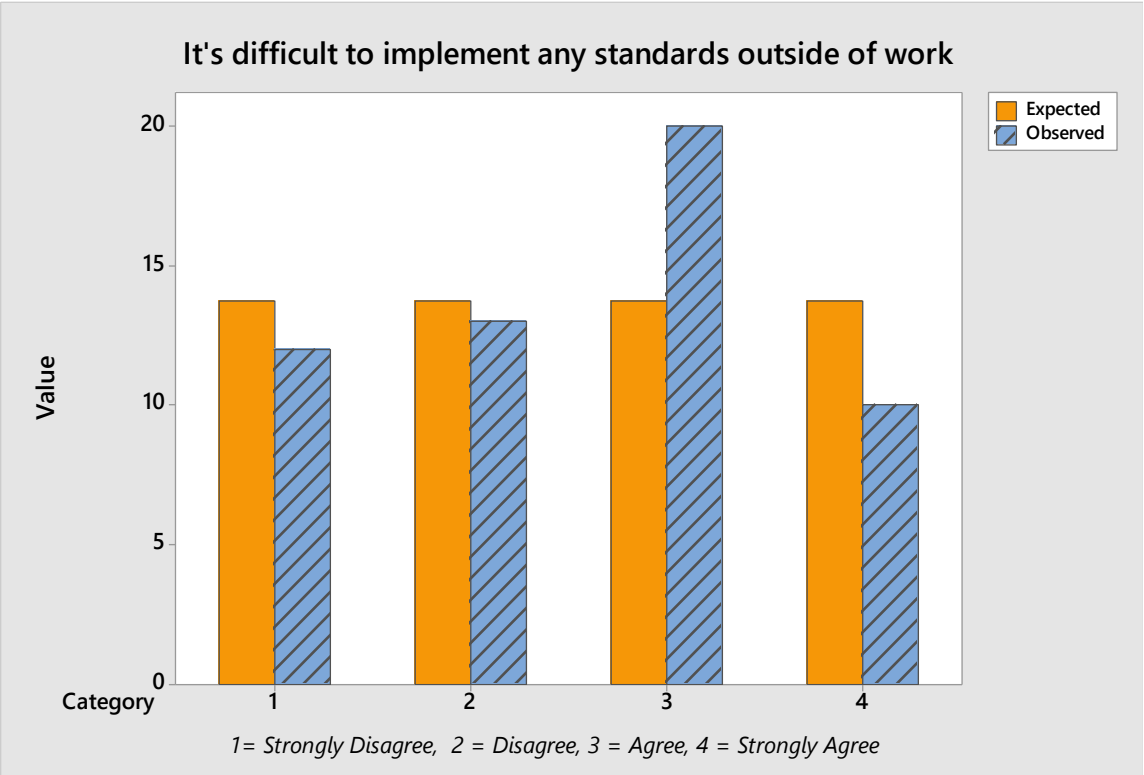



**Figure 6 – Responses to Section 3 Qc**

In the context to the wider responses, the impact of this was not of great significance. However, were I to repeat the experience I would try and 'sense check' the understanding of the questions with a sample group ahead of issuing the survey.

In general, the responses to the multiple-choice questions proved to be significant, even when the order of the scoring mechanism was reversed. This could be interpreted in a number of ways:

1. It could indicate an overwhelming agreement amongst participants in relation to the questions. In this regard it could potentially reflect that the training/awareness levels of health and safety rendered the kind of answers which one might expect in relation to questions which concerned health and safety indicators. For example, the incident frequency, numbers of safety observations etc.

2. Alternatively, candidates might have been answering in a similar way in order to please the researcher, which is one of the potential pitfalls of using an insider researcher to gather data within the research process.

3. Thirdly, there is also a possibility that participants who may not have had strong views had sought guidance from peers in relation to the answers which they had submitted and allowed those answers to influence their own responses.

When compared to the responses from the initial informal review and field research interviews there is a consistency of outputs. This, coupled with the responses from the expatriate participants also indicates the same consistency. Given the triangulation of similar viewpoints it seems more likely that participants were demonstrating overwhelming agreement when responding rather than fabricating a response in order to please the researcher.

In summary, significant responses within the multiple-choice survey reflect changes in personal perceptions about safety, an increase in safety awareness and an increased community awareness regarding safety which relates to the transfer of best practice by supply base workers. As the survey group is small, these findings should be treated with caution.

When reflecting on the experience of the survey data analysis, Bright (1991) captures the angst which many students feel in relation to the organisation and writing up of findings. The fear of failure, the constant inner questioning around the validity of the research project and my ability to make sense of the data was certainly ever-present during my data analysis and documentation of the findings.

## 6: DISCUSSION ABOUT QUALITATIVE DATA EVALUATION AND FINDINGS

### Profile of Job Roles and Gender of Interview Participants

The interview participants had 13 different job roles with the most populated roles being those of drivers, security team members, and lifting and rigging supervisors. The cross section of roles was a good representation of the overall spread of roles across the local and expatriate workforce, including frontline and supervisory roles.

Table 8 illustrates the types of job roles, and the numbers of male/female participants against each role.

### Table 8 – Details for interview participants

| Nationality | Job Role | Gender | Age | Religion |
|---|---|---|---|---|
| **Tanzanian** | Security Team Member | Male | 42 | Christian |
| **Tanzanian** | Housekeeping Supervisor | Female | 36 | Christian |
| **Tanzanian** | Operational Supervisor | Male | 38 | Muslim |
| **Tanzanian** | Driver | Male | 49 | Christian |
| **Tanzanian** | Driver | Male | 38 | Christian |
| **Tanzanian** | Mud Plant Supervisor | Male | 31 | Christian |
| **Tanzanian** | Machine Operator | Male | Not disclosed | Muslim |
| **Tanzanian** | Maintenance Team Member | Male | 31 | Muslim |
| **Tanzanian** | Security Team Member | Male | 36 | Christian |
| **British** | Base Manager | Male | 50 | Christian |
| **British** | Lifting and Rigging Supervisor | Male | 41 | None |
| **Australian** | Lifting and Rigging Supervisor | Male | 49 | None |
| **Tunisian** | Logistics Coordinator | Male | 49 | Muslim |
| **New Zealander** | HSE Supervisor | Male | 45 | None |
| **British** | Maintenance Supervisor | Male | 34 | Christian |
| **British** | Security Coordinator | Male | 55 | None |

There were 12 males and 1 female within the interview sample. Chapter 5 talks about the industry trends regarding gender and average ages for the oil and gas workforce. The demographic data in this regard is in keeping with what would be expected. The main differences concern the ages of expatriate participants (which is more in keeping with the industry norm) and the prevalence of no religious affiliations within the expatriate participant groups.

Once the transcripts for the interviews were completed, I used the services of an independent Swahili translator in the UK to verify the quality of the local Swahili translators who had assisted with the interviews, and to translate comments which had been documented in survey responses.

## Coding Methodology

The evaluation of the qualitative data took the form of thematic analysis. The starting point for this was to analyse each transcript, plus any comments within the questionnaires and to complete a coding analysis for each data set. Two manual methods were applied to the coding of the data from interviews and survey comments:

The first technique involved extracting repeat themes from the transcripts, which were predominantly based on the questions asked. I then reviewed each transcript and extracted sentences, or phrases which related to the themes and grouped these together (see the attached Excel sheet in Appendix 5).

The second involved picking out repeat words or topics, allocating an individual felt tip pen colour to the code and marking up each transcript where occurrences of the code appeared. The information associated with each code was collated and listed in the excel Coding Master sheet. (see the attached Excel sheet in Appendix 5) This is a similar technique to that described by Riley (1996).

Arguably the use of a computer programme may have resulted in a different selection of words and subsequent line of inquiry. It could also be argued that the use of the semi-structured format for interviews, coupled with linked commentary sections from the paper-based surveys was such that it was much less likely that random word patterns would occur within the coding process. However, the manual coding of transcripts and comments from surveys proved to be very useful in terms of developing an intimate familiarity with the content of the transcripts.

After picking out the codes associated with each topic area, it was possible to link the codes to a number of sub-themes (refer to the attached excel spreadsheet in Appendix 5). These sub-themes were distilled further into six significant emergent themes. These have been captured in Table 9.

**Table 9 – Six Emergent Themes Arising from Coding Analysis**

| Six Emergent Themes |
| --- |
| **Emergent Theme 1: Impacts of the implementation of HSSE standards on individuals -** this captures individual perspectives regarding the impacts of implementing the HSSE standards on individual participants who participated within the research**.** |
| **Emergent Theme 2: Impacts of the implementation of HSSE standards upon the wider community -** this captures individual perspectives regarding the broader impacts of implementing HSSE standards in relation to the local community within Mtwara (and beyond). |
| **Emergent Theme 3: What worked well and why –** these are aspects which contributed directly to improvements in the HSSE performance and organisational effectiveness within the BG/Shell project**.** |
| **Emergent Theme 4: Lessons learned –** these are observations concerning aspects which hindered or adversely affected HSSE performance and organisational effectiveness within the BG/Shell project. It is intended that these should be reviewed by Shell when considering further projects of this nature. |
| **Emergent Theme 5: Ideas for Shell to consider for future projects –** these are ideas from participants about initiatives which could be implemented by Shell to improve the effectiveness of future projects of this nature. |
| **Emergent Theme 6: Ideas for achieving improvements to Occupational Health and Safety within Tanzania –** this theme captures the perspectives and ideas of participants in relation to how occupational health and safety standards could be improved throughout Tanzania. |

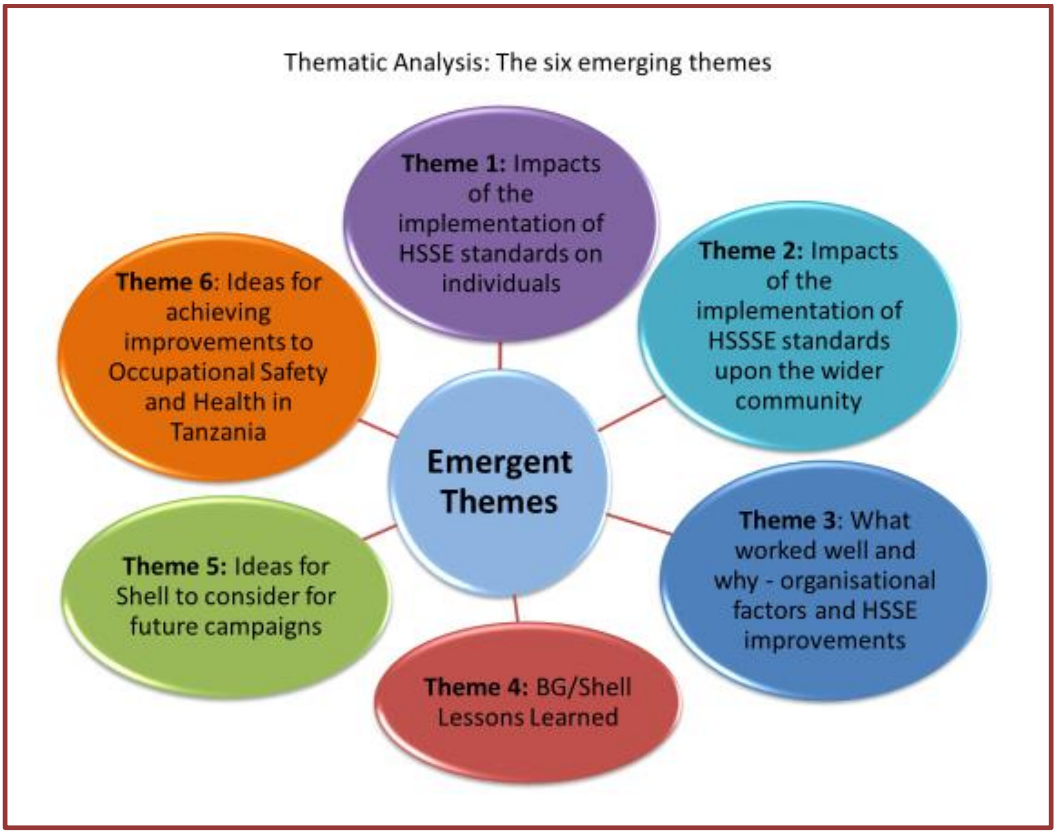



**Figure 6 - Visual representation of Emergent Themes**

The six themes are discussed below in relation to the findings and quotations from the qualitative data review plus associated literature citations.

## Emergent Theme 1 - Impacts of the implementation of HSSE standards on individuals

There were three main areas of discussion in relation to this outside of the organisational factors which were covered in the previous section such as welfare, good working conditions and appreciation for ethical working practices:

1. Job-related competence and training
2. Education
3. Confidence to stop the job

### Job-Related Competence and Training

All Tanzanian participants were highly appreciative of the job-related training which they had received whilst on the project. Many participants commented on how little (or no) training opportunities exist in most Tanzanian workplaces and the life-changing impacts of their own training:

**Juma, Driver, Tanzanian, Male:**

*"... A lot of things have changed since when I joined this project because I found a lot of things impressed me about HSE; a lot of training and then by working with people who understand a lot about HSE it's become like a culture, so you adapt to it, and you prefer it ..."*

**Samuel, Operational Supervisor, Tanzanian, Male:**

..."*Myself, I found the change 100%..now at least 70% of the safety of my life is not only for the operation, it's even in the health, because in the base you get the training concerning health...this means I bring these changes to my family and my neighbours you see, so I've got 100% changes in my life.*"

**Abdallah, Machine Operator, Tanzanian, Male:**

..."*We get training all of the time..for each job we get training ... it's different outside [the base]. Outside there's not anywhere you can get training.*"

Tanzanian and expatriate participants stressed the importance of regular refresher training.

A joint benchmarking with the UK charity Voluntary Services Overseas (VSO) research project Katebalirwe et al. (2014) was completed by the Tanzania Vocational and Education Training Authority (VETA), the Ministry of Education and Vocational Training (MoEVT), Tanzania LNG (BG Group, Statoil, Ophir Energy, Exxon Mobil and Pavilion Energy), and VSO Tanzania, all working collaboratively. The study was intended to research the various stakeholder initiatives which were in place to improve vocational and higher education programmes in order that students would be adequately prepared for work within the energy sector in the future. The study concluded that they were under-exposed to practical experience and 'on the job training' to the extent that most were therefore not considered directly employable for organisations operating to international standards and required a minimum of three to six months of additional training within the workplace prior to becoming able to work at a junior level with supervision.

The study reflected the experiences of BG/Shell at the supply base and substantial investment was required in order to bridge such gaps. In one example an international trainer was provided by BG/Shell to train scaffolders to an internationally certified standard ahead of scaffolding work within the Phase II Mtwara Supply Base Redevelopment construction programme; there were no scaffolders within Tanzania who were certified to international standards.

In comparing the education and development opportunities which were demonstrated through this research, it could be argued that the local content policy adopted by BG Group for the BG Tanzania operations was more successful than those within the same sector within Ghana as described by Darkwah (2013); here young workers paid for their own work-based skills but were unable to secure a job within the industry due to the weak nature of the local

content requirements. In contrast, local content data from BG Group demonstrated a year on year increase in Tanzanian personnel used within the asset: An internal local content benchmarking report confirmed that between 2011 and 2015, with at least 50% of the workforce being Tanzanian. This included personnel who were utilised within the offshore drilling operations in addition to the onshore environment.

## Education

Observations about education were divided into three main areas of focus;

1. The desire to share the training which had been received on the project with the broader community; there were several suggestions about Shell considering further community 'outreach' possibilities within schools, colleges, women's groups and educating government officials such as OSHA, and the government education minister about safety.

2. The majority of Tanzanian participants emphasised the need for the government to introduce safety training into the primary and secondary school curriculums.

3. Many examples were shared about base workers educating their friends and family by cascading HSSE information and training which they had received from the base.

A recent EU-OSHA report (2013) acknowledged the success of various programmes which have been adopted by member states to implement a holistic 'whole-school' approach to the teaching of risk education and safety management, including health-related topics. Sadly, this approach does not exist in Tanzania. The gaps in public health promotion and occupational health services are summarised within Mrema et al.'s research paper on the status of occupational health and safety within Tanzania (2015). That being so, it is little wonder that the occupational health and broader health awareness information which was shared with supply base personnel was met with such positive interest. It could be argued that by so doing, BG/Shell were in effect filling a public health 'void' which existed.

## Confidence to 'Stop the Job'

A number of participants commented on their improved ability and desire to intervene because of the training received or experience which they had developed whilst at the base;

> **Abdallah, Machine Operator, Tanzanian, Male:**
>
> *"I feel happy and proud because I've learned a lot of things since I came on the base. One thing I want to carry outside the base is how to stop the job anywhere I'm going. Because I can stop the job because I've have learned how to stop and how to explain to people who are doing wrong. Before I saw people doing wrong but I didn't know how to ask they why they are doing it."*

And in another example:

**John, Operational Supervisor, Expatriate, Male:**

*"I feel a lot more comfortable and a lot more empowered myself to be able to stand up to senior management and say 'No, we need this, and yes, if it's going to cost that then it's going to cost that!' Whereas before I might have been a little bit more reluctant to push the client or my management."*

During one very interactive interview discussion about interventions, one of the Tanzanian translators also shared a personal example about how they were rewarded when they intervened on the BG Base Manager who was about to undertake some physical work without wearing gloves, and how this set a good example for the rest of the team that everybody has the right to intervene.

And an expatriate supervisor shared an example of an intervention on them:

**William, Operational Supervisor, Expat, Male:**

"*I noticed the crews outside have changed for the better. They went out to the tanks and we did a toolbox talk and they stopped me and said "You're not wearing any gloves". I said 'Righto' and got some gloves.*"

Several people shared examples of interventions which they had made outside of the base.

**Godfrey, Security Team Member, Tanzanian, Male:**

"*Last week I was in Dar es Salaam and I was on the big bus. The driver was on the high speed. So, I was the only person in the entire number of 60 people in the bus to call a police traffic to stop that vehicle.*"

Management leadership and management commitment to safety plus effective consultation and communication have all been identified as factors which affect an individual's perception about safety, O'Toole, (2001). A more positive environment undoubtedly creates a greater likelihood of individuals having the confidence to intervene when they see something which is unsafe. In addition, the interviews confirmed that local participants developed confidence as their health and safety awareness developed. The importance of management support in creating a positive culture for interventions was also confirmed by Weber et al. (2018). Conversely, a lack of management support decreases the likelihood of interventions, and situational and contextual factors will also influence the likelihood of individuals making an intervention when observing unsafe conditions/acts.

This is an area which would benefit from further research as very few studies are as detailed as Weber et al.'s in examining individual perspectives from the workforce regarding the implementation of stop work authority programmes both in the workplace and potentially outside of it.

## Emergent Theme 2 - Impacts of the implementation of HSSE standards upon the wider community

There were three elements which were linked to this theme: tangible HSSE improvements, the relationship with the community and the interface with the Tanzanian Ports Authority (TPA) at the base.

### Tangible HSSE Improvements

Non-project-related HSSE improvements within Mtwara included the improvements to roads, the installation of road safety signage, the implementation of a waste collection system, increased traffic police enforcement activity and the installation of the first set of traffic lights in Mtwara.

There were many anecdotal examples of personnel from the base sharing best practice which then influenced the wider community. One of the main indicators was that of PPE:

> **Freddie, Driver, Tanzanian, Male:**
> *…"Even local people nowadays, when they are working in the local industries, they listen to me. For example, Aziz, the man who is dealing with the brick factory, even those casual labours are using hard hats and reflectors, so people are trying to copy from what we had for safety, which we had from the oil and gas companies, from the base to outside, so even local people know how safety is now. Some people they saw us as we were going back home with reflectors [high visibility vests] so even others started to imitate, to be like us. Even though they don't have the same level of understanding about safety like us they try and copy us."*

The increased wearing of motorcycle helmets as a result of the oil and gas presence in Mtwara influenced both the personnel at the base and the wider community. This was mentioned by the majority of interview participants. One participant also linked this to the success of the BG community investment road safety programme to train local motorcycle drivers (in 2013).

One participant suggested that the impacts of the implantation of HSSE standards within the Phase 1, 2 & 3 construction programme at the base has had a positive impact on construction contractors who are working in Dar es Salaam:

> **Tom, Operational Supervisor, Expatriate, Male:**
> *…"Even the company F CEO goes to a government job and says 'I'm going to do health and safety' and the government starts going 'Okay, this guy is better than the other guys who aren't doing it', and it is growing … six years ago you'd drive past a building site and it was wooden scaffolding and guys in flip flops … but the big jobs in the city, everyone has got full PPE and proper scaffolding … and I think it's down to oil and gas being here … the main building contractors who have done work here, they are the main contractors in Dar es Salaam … and you can see the knock-on effect."*

## The Relationship with the Community

Participants confirmed that the relationship with the community was (on the whole) was very positive, with the oil and gas sector having a tangible impact on improved HSSE standards in Mtwara and beyond.

Many community members were curious to learn more about why supply base personnel were acting in a safer way:

> **Juma, Driver, Tanzanian, Male:**
> *"Sometimes I used to drive with my entire family and people said 'Why do you drive like you have a client on the other side?' I say that I am an ambassador on safe driving due to the courses which I had from BG."*

Some participants spoke of the suspicion which exists amongst some members of the community because of their working for a western company, often referring to Western Companies as "White Man's Ways" or "Mzungu.";

> **Richard, Security Team Member, Tanzanian, Male:**
> "*Many people have asked me 'Why are you wearing a reflector?' I said, 'I am wearing a reflector if I am working in a dark place so that the machine operator coming into the location can see someone is there' They say, 'It is a mzungu [practice], in Swahili it's not like this, this is for mzungu.'*

The same participant also gave an example where they had tried to intervene with the TPA motorcycle rider who was driving unsafely at the supply base:

> **Richard, Security Team Member, Tanzanian, Male:**
> *"That is the mzungu [way]. This is our Port, I am TPA, not working for mzungu, driving."*

Several of the Tanzanian interviewees shared observations on the devastating impacts of the closure of the base on the community:

> **Mohammed, Maintenance Team Member, Tanzanian, Male:**
> *..."We are actually moving on with our lives because of oil and gas ... when we heard this project was ending, we who are working here and the community are very frustrated ... it is the talk of the town ... It was very stable money, it was flowing. So now life will drop and people won't have a good life anymore, so life won't be the same ... the biggest employer here was oil and gas ... all of those companies [subcontractors] depended upon this project ... between 200 and 1000 people don't have a job. That is a community problem."*

Although this situation is not something which Shell can alter in retrospect, it should certainly be a consideration in terms of future community re-engagement as and when operations re-commence in Mtwara.

Gaps in stakeholder consultation with residents of Tanzania regarding the natural gas sector are reviewed in Nkolo's research "Developing a Socially Inclusive and Sustainable Natural Gas Sector in Tanzania" (2018). Nkolo also refers to the Mtwara riots of 2013, which were protesting against a new natural gas pipeline which was being constructed between Dar es Salaam and Mtwara. Ndimbwa describes the reasons behind the riots in detail within his 2014 report "Natural Gas Conflict in Tanzania and the Impacts to the Population in Mtwara Municipality". Nkolo's research confirmed that whilst stakeholders were in favour of the pending natural gas sector developments, there were strong feelings from participants regarding great expectations for future prosperity and community investment which had not been fulfilled. This latter sentiment was also a feature of Ndimbwa's report.

A further study considered whether more violence may follow in the future. The REPOA/CMI brief, by Stolan et al. (2017), involved research with participants from Dar es Salaam and Mtwara. Although the study recognised differences in responses based on demographic features such as education levels, the overall conclusion was that participants were not inclined towards future violence. However, discontent levels were noted in terms of expectations not having been met.

The negative historical experiences associated with local content and low revenues associated with the mining sector remain a strong influencer of the local content policies and new legislative requirements for the Petroleum Act (2015), the Oil and Gas Revenues Management Act (2015) and the Non-Citizens Act (2014) which the government has recently put in place as described by Lange and Kinyodo (2016).

When considering the findings of the broader Tanzania research regarding stakeholder consultations, there are some obvious challenges for Shell to consider:

1. There is little or no distinction within any of the research reports studied concerning the natural gas sector in Tanzania between the overall sector and any of the individual actors within it such as the Songo power generation Project, and the Mtwara/Dar Gas Pipeline Project versus the recent offshore gas exploration activities in the Mtwara Region.

2. The negative historical picture regarding the extractive industries within Tanzania are influencing public perception regarding the natural gas sector.

3. Gaps within the government's consultation and stakeholder management regarding the sector have resulted in a need for oil and gas companies to consider a more intensive level of community engagement in the future.

4. The three studies by Nkolo, Ndimbwa and the REPA/CMI which were reviewed concerning the Mtwara did not include inputs from any oil and gas companies; it would appear that the authors have a very limited technical understanding of the oil and gas lifecycle or the impacts of the global downturn in oil and gas upon the recent or future oil and gas exploration activities.

5. Scurfield and Mihalyi's 2017 briefing 'Uncertain Potential: Managing Tanzania's Gas Revenues' indicates that in the unlikely event of the new LNG plant build going ahead,

the returns from future LNG production will be slight in terms of government revenue. This being so it seems likely that greater potential will exist for further discontent and possible disquiet amongst stakeholders who feel that expectations for future wealth/community investment have not been met.

### Interface with the Tanzanian Ports Authority

Many Tanzanian and expatriate participants commented on the gradual improvements in safety standards which the TPA were applying, particularly with the use of PPE. Two participants also commented on the increased levels of unsafe driving of trucks/trailers during the cashew nut season, and the difficulties of influencing this. Three observations were received from survey comments and interviews suggesting that Shell should train the TPA on safety generally, and safe lifting operations.

## Emergent Theme 3 – What Worked Well, and Why

Detailed observations concerning the organisational factors which worked well can be found in Table 1 of Appendix 6. Key factors included:

**Factor 1:** Appreciation for the opportunities which the project presented to Tanzanian personnel in relation to education and training, ethical practice, exceptional working conditions, the influence of BG including welfare and terms/conditions stipulations within contracts:

**Godfrey, Security Team Member, Tanzanian, Male:**

*"I am very happy with BG … Even the way you apply for a job, though we work as contractors … when you just look at something like bribery coming in, so many people lose their lives. Women might be forced to be abused to get employment. People might be forced into paying some money to get employment. But not with BG. If I apply for company J, they interview me but they cannot ask me for money."*

**Factor 2:** The way in which BG treated casual workers with parity in relation to welfare and workers' rights. One participant noted that this is not the same in construction projects, where workers often have no contracts, work on a 'zero hours' type basis and there are no provisions for HSSE. These differences are also confirmed in a study of Nigerian construction workers by Okeye et al. (2014).

**Factor 3:** The importance of selecting the right personnel and roles, and maintaining those personnel during the transition period:

**Bob, Operational Supervisor, Expatriate, Male:**

"*Human resources is by far the biggest thing we can have to make it a successful operation. Togetherness has made us succeed - it has been a critical factor in our success.*"

**Factor 5:** The positive influence which BG/Shell has had as a client on setting HSSE standards, actively monitoring their implementation and continuing to implement HSSE system improvements.

**Factor 6:** Demonstrable/active leadership by site management:

> **Steve, Operational Supervisor, Expatriate, Male:**
> "*I think the model of where we're at right now is visibility. As I say, to communicate and treat everyone as an equal, right from the very off … we engage with everybody on the ground, you know. We are visible at the frontline, and it's our ability to understand what the guys are going through on a day-to-day basis, and I think that's critically important … it's the small things that make the difference, certainly for HSSE, because if we can't get the small things right, everything else it's just going to be a waste of time.*"

The significance of safety leadership and leader engagement with the workforce and its' relationship to positive safety climate has been the subject of many research articles. Casey etc al. (2017) describe how leadership, teamwork form 'social capital', one part of a triad of enabling building blocks along with 'organisational capital' and 'human capital', which directly influence safety performance.

**Observations about the Company C/Company B (logistics provider contracts) Transition Periods:**

Acknowledgement of continuous improvements/innovations resulting from both logistics company C and logistics company B transitions.

The benefits of continuity regarding BG/Shell as a client (with consistent standards and leadership) and retaining key personnel on the client or contractor side during and after the transitions.

> **Bob, Operational Supervisor, Expatriate, Male:**
> *"I think we've been very lucky in regards we've kept key personnel in the key areas throughout all transitions. That's the winning formula, throughout every transition that we've done.*"

The application of a similar approach to the company C transition within the latter in-sourcing was identified as a further factor in maintaining performance standards:

**John, Operational Supervisor, Expatriate, Male:**

> "*Because of what we've learned and the way we planned these transitions we've used the same template each time, and because of the detail I just see it getting stronger. The MoC [Management of Change Assessment], and the way that we've tailored that to our operations … the risk register … regular meetings, planning meetings, execution meetings that we have throughout the process with key stakeholders … because we have all that in place, we didn't see a drop in performance.*"

There were big advantages of streamlining the logistics contractors into just one; consistent performance standards and less fights over berth and yard space.

When considering the sphere of influence which supply chains have to positively contribute to health and safety performance, Walters and James (2009) acknowledge that this is more likely where:

1. Active client performance management of the contract takes place
2. A collaborative relationship exists between the client and the supplier, which is trust-based

The success of both logistical contracting supplier arrangements between 2011-2016 were good examples of how a 'one team' approach contributed to health and safety improvements on site. A research project which examined whether local suppliers for oil and gas in Tanzania were motivated to improve (in order to be utilised by the oil and gas industry) did confirm that suppliers who were prepared to invest in joint training and improvement initiatives with the oil and gas companies did create successful collaborations, Calignano and Vaaland (2018) and blamed the government for the gaps which existed between local companies and oil and gas companies.

These gaps have rendered many companies uncompetitive in terms of being motivated to close the gaps and be successful in their bids for work within the oil and gas sector. Smaller companies who were motivated blamed themselves for their lack of competitiveness. The amount of 'give and take' concerning the level of investment required on both sides to bridge the gap remains an enduring challenge to potentially improving the success of local content performance on the part of the oil and gas companies.

## Observations Concerning Project Related HSSE Improvements

Improvements were observed within HSSE documentation (streamlined risk assessments/ method statements and lift plans):

**Tom, Operational Supervisor, Expatriate, Male:**

> "*… the method statement/risk assessment which is complete in one that we do for BG, they are a lot better than the paperwork we had to produce for company C in my opinion. I can get those documents and I can spend 20 minutes on them and my guys can read it. They know what the method is, and they know what the risks are*."

Similarly, more pre-job toolbox talks, increased overall supervision, improvements to working environment, safety innovations, increased levels of training & competency, increased HSSE awareness, sharing information at safety meetings, learning from incidents, and people following procedures were all cited as improvement measures.

The importance of having achievable targets for all the workforce was emphasised:

**Steve, Operational Supervisor, Expatriate, Male:**

*"They [the workforce] don't see it themselves but they are actually applying HSSE standards ... it may sound like small stuff but it's a great achievement."*

The level of expat supervision levelled out as the project progressed with the lifting/rigging crews operating to international standards. Periodic supervision could then be introduced which allowed the lifting and rigging supervisors time to work on procedural refinements.

**Charlie, Operational Supervisor, Expatriate, Male:**

*... "I would put a good [lifting] team here against any team in the world and I think they'd be safer. I think they'd go about their business more effectively and I don't think you'd even need to supervise them as heavily as a lot of other teams I've worked with* [*globally*]."

There was a focus on incident reporting and investigation; even small incidents were taken very seriously in terms of investigation and the sharing of findings.

The achievement of a safe roof replacement programme during the Phase 3 construction was potentially a 'one off' in safety performance excellence within such work scopes in East Africa.

There was a change in focus from the early days of 'just getting the job done' to making HSE the primary consideration.

It was confirmed that the quality and availability of PPE at the supply base had increased, with new innovations like the introduction of the Kong safety gloves being appreciated as a tangible improvement measure. In one example a participant noted that his safety boots had lasted over one year instead of the usual norm of six months.

The number of incidents has decreased over the years: There have been no incidents in the last four months (June-Oct) and performance had increased since company C transition and BG operational team taking over; leaders have been at the forefront in activities.

Bringing back people who were at the base before for the last drilling campaign was acknowledged as an aspect which worked well in terms of maintaining HSSE performance.
Whilst there is much literature which captures research around safety culture, safety climate, perceptions of safety, behavioural safety and the effects of globalisation on workplace safety, there was no research which was focused on a single case study of an oil and gas project in a new and emerging market. With this in mind, the above observations provide a useful 'snapshot' of the types of positive changes which contributed to improved health and safety performance.

## Related HSSE Improvements - Project Contractors

Several examples were discussed of project contractors who had adopted best practice from working with BG/Shell and had implemented those standards on other sites in Tanzania, or in

some cases other locations. Examples included; company G, company A, company F, company B and company D. Exceptional safety leadership by the CEO of company F and the CEO of company D were acknowledged in interviews with expatriates and local participants.

This is another area which would be very useful to study in more detail in future research projects concerning Shell Tanzania, especially given the dearth of such studies in relation to supply chains.

## Emergent Theme 4 – Lessons Learned

The lessons learned observations, which were predominantly generated from the expat interview discussions have been captured in Table 2 of Appendix 6. I have also included a further tabulation (Table 3) regarding lessons learned from contractor management, as these observations tend to be linked to the wider lessons learned.

There were Tanzanian participants who commended the terms and conditions which had been included in the company J security contract (this was positively endorsed by two participants), but the bulk of contract management lessons learned were generated by the interviews with expatriate participants.

### Lessons Learned (General)

Some challenges in relation to the interface with the wider Asset Team, particularly the HSSE Team:

> **Bob, Operational Supervisor, Expatriate, Male:**
> "*One thing I've learnt here versus the other start-up project I had is the selection of those key personnel, and if they're not the right people, change them.*"

Concerns were expressed about succession planning for the future and current gaps in competence where expatriates have left and their replacements are not ready/experienced enough to fulfil the role effectively.

Challenges with the importation of equipment:

> **Bob, Operational Supervisor, Expatriate, Male:**
> *… "every company that's been here is trying to leave, you know, and they can't leave because they don't have the proper import and export documentation … that needs to be resolved before anybody comes to Tanzania [in the future] the laws of import and export and what is required, and what has to be paid must be clear and controlled."*

Observations concerning the company B/company C logistics contract transitions:

1. Differences in drivers between contractor and client service delivery:

**Matt, Operational Supervisor, Expatriate, Male:**
"*When BG was running the show it's much better than when it's run by contractors – they [contractors] don't have the same rules, they don't have the same culture … at the end of the day they are a service provider, they are not an operator…their business is to save money, so to be honest I found the people were far away from BG HSSE Standards.*"

This point was echoed by several expatriate participants.

2. Teething problems during the transition;

**William, Operational Supervisor, Expatriate, Male:**
"*With the company C/company B transitions…it was a mess. I guess you could say we were in a hurry…[in the future] I'd do the start-up audit first, and then make sure all the correct docs are in place well before the start because it was a month or two after we started that things were in place and all that. For the place to have been running this many years… well, it was from one company to the other, whatever, you'd think it'd be a lot easier. It kind of wasn't.*"

## Contractor Management Lessons Learned

Lessons learned from the HSSE exhibits (client HSSE requirements) contained in the early contracts included:

1. Not adequately taking account of local conditions
2. Not being prescriptive enough
3. Not being sufficiently clear for contractors to understand ahead of signing the contract

**John, Operational Supervisor, Expatriate, Male:**

*…"the HSE sections [in the contract] possibly being a little bit loose in several of them, and therefore if you can get away with it, a company doesn't have to spend x amount of dollars on something, and it's not clear in the contract, then they're not going to pay for it … the headaches we went through to get contracts reworded or to have variations done … that was a big one."*

The challenges of attracting good-quality contractors to remote locations such as Mtwara were acknowledged.

An anecdotal observation concerned contractors from international oil and gas companies who try to reject the high standards at the Mtwara Supply Base: This indicated some disparity between international standards which would be expected, and their implementation at a local level.

An observation was made about a lack of empowerment at a site-level in terms of some historical contract awards which were made at the Dar es Salaam asset-level but without due consultation at a local level:

> **Charlie, Operational Supervisor, Expatriate, Male:**
> "*You just get left with whatever they tell you or choose.*"

Some of these themes are related closely to the local content challenges already explored within this report concerning in-country capability. Others are more focused towards the internal contracting process and improvements which could be implemented within future contracts.

## Emergent Theme 5 – Ideas for Shell to Consider for Future Projects

The ideas which were generated from interviews and survey responses have been captured in Table 4 of Appendix 6. One very practical suggestion was for Shell to consider creating a 'starter pack' for new assets:

> **John, Operational Supervisor, Expatriate, Male:**
> *"I would encourage them [Shell] to take our lessons learnt…to consolidate everything into like a starter pack, if you will. File-wise and records-wise we've got everything there for someone to pick up and learn from, but it would be nice to re-catalogue it into a chronological order, almost a diary type thing of all of our lessons learnt from all our campaigns"*

Other points raised were as follows:

1. The majority of the Tanzanian survey and interview participants and many of the expatriate participants commented on the advantages of utilising the same local personnel in future operations.

2. It was also stressed that not all of the people may be available, and that those who were would need a great deal of refresher training.

3. The need for the Shell Tanzania asset to start preparing now for future project work in terms of training/mentoring local personnel was mentioned by one participant.

4. Three participants commented on the need to ensure that remuneration, welfare standards, insurance card schemes and succession planning requirements should be included in the new contract for the Shell third party providers.

5. The majority of Tanzanian and expat participants advised that the current HSSE standards and procedures should be maintained and improved as necessary during future operations.

6. The expatriate participants also focused on the importance of getting the right level of supervision and appropriate calibre of expatriate personnel in place.

**Bob, Operational Supervisor, Expatriate, Male:**
*"The key for any start-up in Tanzania, or anywhere else for that matter, for me, would be to look heavily at HR [human resources]. Human resources is by far the biggest thing we can have to make it a successful operation. If we get that right, then we won't have some of the sufferings that we had in the very beginning…get the right people, you know, you can't just have a company fly in, and land, and take people from everywhere. They've got to have an idea of the training…they've got to know Tanzanian labour law; you've got to know all these things before you start operating. That's key."*

Again, many of these themes are inter-linked with previous commentary regarding local content considerations, safety leadership, and the Oxford Research/Eurofound (2011) report on the links between quality of work and performance. It is interesting to note the expatriate and Tanzanian participants were in agreement about the future use of similar standards in future project work.

## Emergent Theme 6 – Ideas for Achieving Improvements to Occupational Health and Safety within Tanzania

There is some cross-fertilisation here with the ideas expressed about education elsewhere in this document.

In addition to primary and secondary school education on safety, a number of participants commented on the potential benefits to Tanzania of having a health and safety institution to train safety personnel to international standards.

Other influencing factors which were explored in interviews with Tanzanian participants included:

- Unsafe workplaces/work practices in Tanzania
- International company culture and its impact on Tanzanian workplaces
- The role of OSHA (the Tanzanian health and safety regulatory body)
- The role of the government.

### Unsafe Work Places/Work Practices

There were many disturbing and upsetting accounts from Tanzanian participants about their experiences of working in very unsafe environments. The construction environment and local External company 1 site were singled out as worst-case scenarios in a number of interviews.

When asked whether Tanzanian personnel were aware of unsafe environments participants confirmed that many personnel are aware but are faced with a stark choice between earning to live and having to endure unsafe conditions or not working at all.

One participant illustrated the very stark choice which individual construction workers face when instructed to work at height (15 storeys up) without any fall protection devices:

> **Mohammed, Maintenance Team Member, Tanzanian, Male:**
> "*if I go to work with the Chinese, a Chinese man will tell me "Do this and that and I will pay you 10,000 TZS a day. They never give inductions like, 'this building has 15 floors, the escape route is … "So it's up to you now to look at your money. Is it enough? If you think it is enough, without safety, you start working.*"

Concerning workers being aware of unsafe practices:

> **Samuel, Operational Supervisor, Tanzanian, Male:**
> "*People don't feel good, especially some who know about safety, they did not feel good, but you can't ask about this system [safety] because it can make you outside of that work. And you really need money, so you have to keep working continuously … if you complain, if you try to say 'this is not safe' that means the site manager is going to say 'this guy wants to make our job harder so he [the guy] has to keep out of here'. "*

This aspect of people who express concern about safety being at risk of losing their jobs was echoed by a number of participants.

In another example a participant expressed fear about the prospect of going back into unsafe working environments after working at the base:

> **Abdallah, Machine Operator, Tanzanian, Male:**
> "*I've had a lot of training. If I go and work outside the base for people there is not any training and I'll feel scared about doing that job because if I ask for safety glasses there's not any system to get safety glasses and I'll be thinking 'Oh, no glasses, I might lose my eye!'*

All Tanzanian participants who described other workplaces spoke about training not being provided and PPE also not being provided, or being of poor quality:

> **Mohammed, Maintenance Team Member, Tanzanian, Male:**
> "*My last job was working on the 16th floor. I just learnt about safety harnesses at school. When I was working on that site, I never saw it … when you enter the construction site you may see a signboard saying 'All PPE must be worn' but when you get inside the job, nothing.*"

> **Freddie, Driver, Tanzanian, Male:**
> "*We worked with company E on the External company 1 project, when it was being constructed. There was no safety at all. It is a very nasty area and there was no mask,*

*no safety boots and no caring for water … there were so so many incidents. Some people had their legs broken, some people had their eyes operated on because they're full of nasty dust … some of the engineers were welding even without wearing safety glasses*."

**Samuel, Operational Supervisor, Tanzanian, Male:**

"*In construction it's very different from this base. There are no processes for safety, there's no training. When you're over there you only know to work. You are directed to do something without any information on safety or training so you have to do it*."

These poor standards were reflected within a paper about construction health and safety standards in Tanzania by Mwombeki (2005). The report includes several references to PPE not being provided to construction workers. Such observations are not limited to Tanzania; Adebola's 2014 study of health and safety compliance within the Nigerian Pipeline Products and Marketing Company (PPMC) operations in Lagos also contains a specific recommendation about management providing 'appropriate and modern PPE' for staff members to improve compliance.

Other industries in Tanzania also reflect these poor workplace safety standards; Boniface et al. (2013) paints a similar bleak picture of injuries and fatalities occurring within the mining industry. Mrema et al. (2015) provide an overview of occupational health and safety challenges within multiple industries.

## International Company Cultures

Another linked factor was that of differences in international company cultures in relation to their influence on working conditions. Six of the nine Tanzanian participants shared experiences about working for Chinese companies; each participant had a similar perspective around the lack of health and safety provisions within Chinese-run workplaces:

**Samuel, Operational Supervisor, Tanzanian, Male:**
"*If you work for Chinese, they don't care what you wear – either slippers or barefoot, but compare that to here, they give you PPE 100% so unless you don't want to use it, that is your problem.*"

**Mohammed, Maintenance Team Member, Tanzanian, Male:**
"*There is a big, big difference between Chinese companies, European companies and other different nations companies. But most of these companies, English companies, they have a very big safety system. The difference is within the safety system. For example, Chinese companies, they are not insistent about PPE which is a very important thing during an operation … instead of having the safety boots, you'll find they have rubber, just simple shoes, some sandal, not gloves, no helmet, and no [safety] advisor to assist you*."

**Godfrey, Security Team Member, Tanzanian, Male:**

*"… the External company 1 factory has been supervised by Indians and Chinese, and these people by nature are maximum profit first so they may not take a lot of money to buy safety equipment like BG/Shell … I don't know if there's any company in Tanzania that has a higher safety standard like BG and Shell."*

The poor standards outlined are consistent with the poor standards in Chinese construction sites described within the research paper by Tam et al. (2003). These standards appear to be reflected in the Chinese-run construction projects within Tanzania.

Other nationalities mentioned in the interviews with Tanzanian participants were French, Japanese, Israeli, South African, and American. Participants stated that European companies demonstrated the highest standards, with Chinese companies having little or no safety systems in place.

There was an overwhelming sense of appreciation for the HSSE standards which were in place at the supply base in comparison to other Tanzanian workplaces which did not have such standards in place.

The conclusions of the Tanzanian participants were consistent with those expressed by expatriate participants in terms of their experiences of working in oil and gas projects in other locations; the European operators/clients tended to have the highest standards of health and safety. Although existing research material recognises the potential of large multi-national companies to avoid implementing their home country regulatory standards of performance within host countries Baram (2008), comparisons in the approaches taken by different nationalities in host countries appears to be an under-researched area.

Three observations of note concerned:

1. The strength of influence of a client in raising health and safety standards within environments which did not have pre-existing high standards, for example sites in Asia.

2. The potential for international operators' standards to decrease in situations where the local operating standards were poor and there was no strong impetus from the client to achieve the same operating standards as those found in countries with high health and safety standards.

3. One participant commented that it was easier to train Tanzanian personnel from a starting point of zero standards than it was to try and re-train/influence performance improvements in more mature projects/countries which were not new to oil and gas projects.

## OSHA

Many Tanzanian participants expressed the view that the health and safety regulator for Tanzania, OSHA, could and should be doing more in the community to assist in improving

HSSE standards in local business and spend less time visiting the supply base. Three participants also spoke about challenges where workers are paid to keep quiet and not to report accidents to visiting OSHA personnel:

**Godfrey, Security Team Member, Tanzanian, Male:**

*"OSHA are coming here [to the base] because they know these people, they are the white men, they're coming from abroad and they have money, unlike the local people … on the street, with the local people, they don't care because they don't have money [to pay fines] … while the [supply] base was running External company 1 set up as a cement industry. So many people are injured and crippled due to poor safety awareness but not any member from OSHA when they are checking the scaffold [will ask] why people are injured, killed daily, no-one cares … the owner of the factory is a rich man so whenever you've got anything he gives you money to stay quiet."*

Two participants also shared observations around ethics and compliance breaches associated with OSHA potentially taking money which is not a fine from a business. In this example the researcher probed further to establish if this example related to a fine or a bribe and the participant confirmed that it was a bribe:

**Godfrey, Security Team Member, Tanzanian, Male:**
*"As I have said before, poverty is something very bad. You see I have experiences with OSHA, if there's anything wrong, for example here, and OSHA comes in, instead of advising you they will ask for a bribe, and when you bribe them, they will go away."*

Bribery and corruption remain a substantial threat for UK and US multi-national companies when operating in Tanzania. The example above (whilst unsubstantiated) provides an indication of the type of endemic corruption which proliferates through the business operating environment within Tanzania.

Two observations concerned the lack of follow-up checks by OSHA in relation to workplaces where gaps had been identified.

One participant was critical of OSHA inspectors who had arrived at the supply base without the required PPE and who when challenged did not react well and had suggested that the PPE requirements were limited to the Dar es Salaam operations.

Resource gaps were also suggested as a potential improvement measure in relation to OSHA's effectiveness; participants confirmed that OSHA tend to work out of Dar es Salaam, which results in travel time and costs, and that resource levels do not appear to be proportionate to the risk profile of the various regions within Tanzania.

Three participants also discussed differences in quality between the OSHA training for safety advisors and the NEBOSH international certificate location. OSHA trained advisors are not trained to the same quality and are cheaper to employ.

Matiko (2013) outlines many of the shortfalls of the existing regulatory framework, including a lack of coordination/collaborations between government enforcement bodies, no industry standard/ benchmark for occupational health and safety practitioners, an ineffective framework for reporting workplace incidents/accidents, and no legal responsibilities against clients within construction projects (which is the opposite of our UK construction regulatory requirements). His findings go some way to explaining some of the challenges.

## The Government of Tanzania

Observations concerning the government were limited to Tanzanian participants and tended to be focused towards;

1. A requirement for increased monitoring and active management of OSHA's performance.

2. The government having a greater involvement in holding international companies to account in terms of their responsibilities to meet legal requirements concerning health and safety standards.

3. The government insisting that education should be provided on safety within the Tanzanian educational system.

Mrema et al. (2015) voice very similar observations to Matiko (2013) about shortcomings within the existing legal framework for occupational health and safety.

In a separate observation one participant also expressed concern about the government's recent renegotiation of contracts within the extractive industries and the ramifications regarding investors potentially choosing to invest elsewhere.

This observation refers to the intense scrutiny which the Tanzanian President applied to the mining sector, accusing mining companies of plundering the country's wealth and introducing three new pieces of legislation in 2017 to resolve such concerns. The impacts of this are reviewed in detail by Jacob and Pederson (2018) who also conclude that without more effective stakeholder management of investor relations Tanzania is likely to miss out on some foreign investments which would be greatly beneficial to the country.

## 7: OVERALL DISCUSSION BASED ON SURVEY AND INTERVIEW FINDINGS

After review, the initial themes and sub-themes which appear within section 6 were reconsidered in the context of the three key objectives for the overall MProf programme:

1. Primary considerations for implementation of global safety standards.
2. Post start-up organisational changes which improved risk management.
3. Feedback on perceptions of change following the implementation of the standards.

Table 10 lists the themes and sub-themes, which appear as subgroups against each of the three overall programme objectives above:

**Table 10 - Thematic Analysis Grouped by Alignment with Programme Objectives**

| **Themes Relating to Programme Objective 1: The Primary Considerations for Implementation of Global Safety Standards [within the context of the Shell Tanzania Asset]** | |
|---|---|
| **LINKED THEME:** | **DESCRIPTION OF THEME** |
| **OSHA** | References to the health and safety regulator in Tanzania. |
| **Managing Contractors** | Observations on the general day-to-day management of contractors who worked on the BG/Shell Project. |
| **Project Contractors** | Company-specific observations from participants. |
| **Unsafe Workplaces** | Examples of/observations about unsafe workplaces which are outside of the BG/Shell project. |
| **BG/Shell Lessons Learned** | Examples of what went well/what could be improved upon provided by the research participants. |
| **BG/Shell Ideas for the Future** | Ideas for consideration when BG/Shell are planning future projects of this nature provided by the research participants. |
| **Ethics & Compliance** | Observations on the implementation of the BG/Shell ethics and compliance frameworks. |
| **Community Relations** | Observations on how the local community have been influenced by health and safety standards being implemented within the BG/Shell project. |
| **The Government** | Observations regarding the government's influence on health and safety standards. |
| **International Company Culture** | Observations from participants regarding the implementation of global health and safety standards by international companies. |
| **Themes Relating to Programme Objective 2: Capturing the Post Start-up Organisational Changes to Improve Risk Management** | |

| LINKED THEME | DESCRIPTION |
|---|---|
| **Job-related Training & Competence** | Observations from participants regarding job-related training and competence in relation to their role or the roles of others. |
| **Project Improvements** | Observations of participants regarding post start-up health and safety improvements within the BG/Shell project. |
| **PPE (Personal Protective Equipment)** | Observations regarding changes to the PPE provisions throughout the lifecycle of the BG/Shell project. |
| **Themes Relating to Programme Objective 3: Capturing Feedback on Perceptions of Change** | |
| **LINKED THEME** | **DESCRIPTION** |
| **Confidence to Intervene** | Changes to feelings of empowerment to stop the job/share concerns regarding safety-related decision making. |
| **Tanzanian Ports Authority** | Observations regarding the changing nature of the interface between BG/Shell project personnel and representatives from the Tanzanian Ports Authority at the supply base. |
| **Education** | Observations of participants about the changing impacts on safety education levels outside of the BG/Shell project (within Mtwara). |
| **Health and Safety Improvements in the Community** | Observations from participants on tangible indicators of health and safety improvements within the local community during the lifecycle of the BG/Shell project. |

This process is not an exact science and many of the codes could be placed in more than one of the three groupings. However, on balance these seemed to be logical groupings.

When considering the overall findings within the qualitative review there were no comparative research projects which were identified in the subsequent literature review in respect of case studies of this nature. In terms of the findings of the research there are, however, many parallels which can be made between this research and other studies, particularly those in other African countries.

For example, Umeokafo et al. (2014) identify determinants concerning health and safety compliance within the Nigerian construction industry as being linked to culture, client influence, inadequate legislation, activities of the informal construction sector, beliefs, enforcement of health and safety regulations, bribery and corruption, skills/training gaps in the workforce, the costs associated with implementing health and safety and reduced numbers of health and safety representatives. This is consistent with the anecdotal information arising from the semi-structured interviews within this research concerning participants' experiences of other workplaces in Tanzania.

Okolie and Okoye (2012) note similar findings in their research into the influence of cultural dimensions on safety performance; they conclude that collectivism and proliferation of femininity (feminine traits) are synonymous with positive safety behaviours on site. This is very much in keeping with the positive 'One Team" culture of intervention which was a strong feature of the 2011-2016 drilling campaign approach to achieving continuous safety improvements.

Local content, and the impact upon the education and development of the local workforce is a significant success factor within the BG Tanzania/Shell project: Darkwah (2013) describes the impacts of not having a strong local content policy in place within Ghana; here individuals had funded industry training within various schemes provided within Ghana. However, a lack of mandated local content requirements had resulted in minimal opportunities for the young workers who had been trained to be taken on by the oil and gas companies or their supplier base.

Kinyondo and Villanger (2016) describe a very mixed outlook, with few positive outcomes when describing the current regulatory framework for local content, and its application, within Tanzania. The mistrust amongst key stakeholders, and ineffective consultation by the government of Tanzania are cited as the primary reasons for a lack of success in the application of local content requirements. In addition, previous negative experiences arising from the mining industry have resulted in further distrust of foreign companies who wish to expand their enterprises to Tanzania. However, the paper does single out BG's approach in successfully procuring local products from local suppliers. Lange and Kinyondo (2016) describe the links between historical lessons learned from the mining industry and the current emerging policies for oil and gas-related legislation.

Hansen (2013) also stresses the importance of positive community links, through local content and corporate social responsibility programs; poor relations with the community represent a significant threat within the context of foreign companies who are operating within Tanzania. He also confirms that Tanzania is one of the worst business environments for foreign investors within East Africa, and that such a poor business environment is likely to adversely affect the chances of achieving successful local content contracts.

Whilst there is further scope to review BG/Shell's interaction with the local community in more detail, the research findings indicate that the level of investment thus far in relation to local content and community relations has produced positive results in the Mtwara community and beyond. In this context, investment in the development of the workforce through training and its relationship to enhanced performance has been an overwhelmingly positive outcome as expressed by local participants. Studies such as Oxford Research/Eurofound (2011) and Falola et al. (2014) have endorsed the value of training and development in terms of the empowerment of the workforce, and improved performance. Lippin et al.'s (2000) research "Empowerment-based health and safety training: Evidence of workplace change from four industrial sectors" is consistent with the findings of this research study.

This research found that the empowerment which had been developed by individuals through the work-based training often extended to participants attempting to improve health and safety standards outside of work/in the wider community. This latter finding is not an area

which has been well documented, and scope exists to research this in more detail. Whilst the BG CSR targets did not perhaps explicitly include targets to increase the health and safety awareness of the wider community, an opportunity exists to reflect upon the possibility of encouraging similar peer-to-peer sharing of best practice outside of the workplace in the future.

A limitation of this research is the lack of comparison with other projects which are similar in nature but of shorter duration; this research indicates that there is a correlation between the increased awareness and accumulated safety knowledge which participants obtained during the drilling campaign and the increased safety performance. This is in keeping with the opposite correlation observed within a recent study which has linked the use of casual/short-term workers in construction projects in Nigeria with increased instances of unsafe working behaviour Okoye and Aderibigbe (2014).

Mearns et al. (2003) found that respondents in offshore safety research who had worked for one to five years within an installation were more willing to report incidents than those who had worked on installations for less than one year. In addition, that involvement in health and safety appeared to increase over the tenure of their time at the installation. However, those with six to ten years' experience had less favourable opinions about the Offshore Installation Manager's competence in health and safety and in the effectiveness of health and safety communication within the installation.

The same study revealed a correlation between high levels of management commitment, high levels of involvement of the workforce in health and safety decision making, positive operator and contractor coordination and lower frequencies of accidents.

Scope exists to explore whether perceptions around the factors which make up a health and safety climate have changed over time amongst individuals from the original Mtwara Supply Base workforce who then return to work on the proposed LNG plant construction project.

Given the prevailing 'feminine' culture of community care which already exists in Tanzania it could be argued that the positive embracing of the international health and safety standards and prevailing company culture of BG/Shell towards encouraging positive safety behaviour is unsurprising, as those standards reflect similar values. This argument about the compatibility of local culture in relation to global culture is explored by Arnett (2002) who observes that many aspects of global culture have a multi-national appeal.

This research also captures the important influence which safety leadership has in relation to improved safety performance and worker motivation. This is consistent with other findings such as Lu and Yang (2010), where leaders who were visible and demonstrated a culture of care had a substantial impact upon worker motivation and safe behaviours within a study of container terminal operations.

Technical limitations of this research project include: challenges arising from the implementation of the research (see section on Project Activity) and the limitations of the project design.

Maxwell (1992) comments on the limitations of qualitative research outputs in terms of the challenges in assuring the validity of the research. He describes the concerns of the qualitative researcher in relation to the 'descriptive validity' of interview accounts. In this instance, such concerns were compounded by the fact that many of the interviews with local participants were conducted with the assistance of a translator. The cross-checking of transcripts by an independent Swahili translator was reassuring in terms of reducing this anxiety. Arguably, the limited time in which to complete the field work and lack of access to participants thereafter hindered the researcher's ability to adopt a transactional approach to 'member checking' described by Cho et al. (2006) in terms of the interview transcripts. It could therefore be argued that this limitation would need to be considered in terms of any potential 'generalisations' (Maxwell) which were made in relation to the research.

McKim (2017) explores the value of using a mixed methodology rather than limiting research to either qualitative or quantitative formats only. The research confirmed that the mixed method approach added value through the additional validity of the secondary data source; in addition, an increased depth and breadth of understanding of the subject matter was achieved through applying both methods. In this regard, it could be argued that the triangulation afforded by both methods within this research serves to counterbalance the potential for 'interpretive validity' challenges. Furthermore, it could be argued that the inclusion of expatriate participants within the qualitative semi-structured interview process also served to strengthen the triangulation of views expressed independently by local interview participants.

Bright (1991) describes ethnographic studies (pages 72/73) and includes the following concepts concerning the nature of ethnographic studies:

1. The studies reflect how people make sense of situations and how these situations affect this kind of research

2. They attempt to capture the perspective of the individuals being observed relative to the situation

3. They take account of considerations regarding social groups within a national culture

The ethnographic aspects outlined by Bright were compatible with the aims and objectives of the research. In terms of health and safety research studied within the literature review, this research is very unusual in terms of both scale (limited to one site only and one project) and the use of the mixed methods to collect the data. In addition, the research questions included references to impacts of the implementation of health and safety standards to non-work situations. Again, this is not something which has been explored in great detail within similar studies. The mixed method collection produced a rich variety of concepts which were too great in number to explore in great detail. This presents both a challenge in terms of the limitations of the scope, and opportunity for further research to take place in the future regarding the concepts raised.

Through the completion of this research, I have been encouraged to learn a great deal about Tanzania as an operating environment, the background to oil and gas operations within Tanzania, and the many papers which have been written in relation to these topics. From a

technical health and safety perspective, the challenge of identifying relevant research and broadening this to consider other industries and countries within Africa has been a very enriching process.

I have discussed the numerous insider researcher and practical research challenges which I encountered within the 'Project Activities' section of this thesis. Suffice to say that my understanding of how to design and implement a research project has increased greatly as a result of conducting this research.

# 8: CONCLUSIONS AND RECOMMENDATIONS

## Conclusions

Mearns and Yule (2008) describe how employees within developing nations are primarily concerned with meeting the basic needs for life (food, shelter and security) as per Maslow's hierarchy of needs, ahead of having the capacity to consider the concept of health and safety. Many anecdotal statements within the 'Findings' section of this report confirm this, particularly in relation to personnel enduring unsafe conditions at work and not being able to speak out, being unable to decline to partake in an unsafe activity until PPE provisions were in place, or being able to leave that workplace (without having any other prospects of paid work elsewhere).

When considering the impact of implementing global health and safety standards within the Mtwara Supply Base, this research has confirmed that the working environment and associated safety climate were a world apart from the normal conditions found in other Tanzanian workplaces. This is also borne out by the various research reports and articles which have been written about working conditions in Tanzania; Mremea et al. (2015), Lee (2012), Boniface et al. (2013), Mwombeki (2005) and Majura (2016). Indeed, even within the supply base itself the research confirmed the substantial contrasts to the unsafe practices and conditions concerning the Tanzanian Ports Authority and those of the BG/Shell operations.

It is unsurprising therefore that the implementation of international operating standards relating to health, safety and other important areas of influence such as ethics and compliance, community engagement, environmental sustainability, financial controls and contracts and procurement by BG/Shell at the supply base helped to create a positive working environment. In addition, the Oxford Research/Eurofound (2011) report on the links between the quality of work and performance indicates that training, development, career advancement plans and employment security all contribute to improved performance. In this regard, it could be stated that the successful implementation of international health and safety standards at the supply base was closely interlinked with the implementation of other factors which improved the working environment.

The initial underlying research question concerning the impacts of implementing international health and safety standards between 2011and 2016 at the supply base was distilled further into the concepts of:

1. Whether individuals felt that health and safety improvements had occurred during this period.

2. Whether participants' views about health and safety risk management have changed since international health and safety standards were introduced at the supply base.

3. Positive and negative impacts which have occurred as a result of the implementation of international health and safety standards.

The research project demonstrated that health and safety performance did improve at the supply base as international health and safety standards were introduced and embedded. This was evidenced by the review of incident statistics and qualitative data collected through completed surveys and interviews.

15 out of 16 interview participants confirmed that their perceptions about health and safety had changed as the international standards were implemented; they had learnt from the experience and developed as a result. All of the Tanzanian participants and two of the expatriate participants commented on how this change in perspective had influenced them to adopt safer practices outside of work as well as in the workplace setting. In the case of the Tanzanian participants this has also extended to sharing HSSE training and information with their friends, family and others in the community.

Tangible examples were shared by participants of HSSE improvements which have taken place within the Mtwara community which can be attributed to the influence of the oil and gas activities. In this regard, there is scope for further research to understand in more detail the perspectives of those within the community who have also been impacted by the sharing of best practice. It should also be noted that studies concerning negative stakeholder perceptions of the gas sector in relation to community engagement '(Ndimba, 2014, Stolan et al.,2017, Nkolo, 2018)' local content (Kinyondo and Villanger, 2016, Calignano and Vaaland,2018) and supplier relationships need to be addressed ahead of future Shell operations.

In addition, there is evidence to suggest that third party contractors who have worked within the Mtwara Supply Base have taken best practice from the oil and gas modus operandi and have integrated this into their own operating systems in Mtwara, Tanzania and beyond. Again, there is scope for further research in this area to understand these changes and the perspectives of those involved in more detail.

The cessation of operations at the supply base has undoubtedly had a devastating effect on the personnel who were employed there and will impact upon their families and extended families. In spite of these circumstances the interview and survey participants showed an overwhelming sense of appreciation and positivity in relation to the experience of having worked at the supply base during and after the drilling campaigns.

## Recommendations

There are many lessons learned which have been captured as a result of the research, and it is advised that the Shell organisation reviews these in relation to future projects. In particular, the following areas are highlighted for review:

1. Review the strengths and weaknesses of the local content policy which was implemented at the supply base and in the broader BG/Shell Tanzania Asset.

2. Consider how the local content implementation lessons learned regarding succession planning and contractor management could be built into the next phase of the proposed LNG plant construction.

3. Update the community engagement plan for future operations based on recent research reports regarding public opinion about the natural gas sector.

4. Review the correlation between effective safety leadership, a positive safety climate, adequate resourcing (personnel, equipment and supervision) and the safety performance improvements which occurred at the supply base between 2011and 2016 when planning for future operations/drilling campaigns.

5. Consider how good-quality, culturally aware and experienced expatriate supervisors will be selected for future operations to ensure that standards are maintained in this critical area.

6. Review the strengths and weaknesses of the contracts and procurement/contractor management approach used previously in the drilling campaign.

7. Consider how new contracts can benefit from lessons learned so that HSSE expectations are clearly understood ahead of contract awards being made.

8. Renew the community engagement plan for Mtwara ahead of any operations re-starting at the supply base.

9. Provide a comprehensive refresher training programme for personnel who have previously worked at the supply base as and when they are re-engaged for future supply base or LNG related activities.

## 9: REFERENCES


Adebola, J O, (2014) 'Knowledge, Attitude and Compliance within Occupational Health and Safety Practices among Pipeline Products and Marketing Company (PPMC) in Lagos', published by the *Merit Research Journal of Medicine and Medical Sciences*.

Alli, B (2001), *Sustaining Fundamental Principles of Occupational Health and Safety,* published by the International Labour Office Geneva

Anderson, M and Skjoett-Larsen, T (2009) *Corporate Social Responsibility in Global Supply Chains:* An International Journal, Emerald Group Publishing

Arewa, O (2016) 'Constructing Africa: Chinese Investment, Infrastructure Deficits, and Development', published by *Cornell International Law Journal*. 101

Arnett, J J (2002) 'The psychology of Globalization', published by the *American Psychologist Journal*, American Psychological Association.

Auty, R (1993) *Sustaining Development in Mineral Economies: The Resource Curse Thesis*. Routledge.

Baker, M B (1993) 'Private Codes of Corporate Conduct: Should the Fox Guard the Henhouse?' *University of Miami Inter-American Law Review*

Baram, M (2009) 'Globalization and workplace hazards in developing nations', published by *Safety Science*, Elsevier Ltd.

BG Group *Corporate Sustainability Reports*, dated 2011, 2012 & 2013, published by BG Group

BG Group Glossary of Terms (HSSE Management System Framework Section 9.1.23) Version: 2.0 (1 January 2014), BG Group Internal Global Standard

Bodur, M, Alpay, G and Asugman, G (2000) 'Managerial Perceptions on Performance Determinants of Multinational Companies in an Emerging Economy, *Globalization, the Multinational Firm and Emerging Economies'*, JAI

Boniface et al. (2013) 'Occupational injuries and fatalities in a tanzanite mine: Need to improve workers safety in Tanzania', *Pan African Medical Journal*

Boston Consulting Group (2017), *Untapped Reserves, promoting gender balance in oil and gas* (World Petroleum Council and Boston Consulting Group), published July 2017

Bright, B P (1991) *Introduction to Research Methods in Postgraduate Theses and Dissertations*, published by The University of Hull School of Adult and Continuing Education

Calignano, G and Vaaland, T (2018) 'Local content in Tanzania: Are local suppliers motivated to improve?' *Safety Science*, Elsevier Ltd.

Casey, T et al. (2017), 'Safety climate and culture: Integrating psychological and systems perspectives', *Journal of Occupational Health Psychology*, US Educational Publishing Foundation

Cho et al. (2006), 'Validity in qualitative research revisited', *Qualitative Research*, Sage Journals

Cooper, S (2014) 'Improving Worker Safety in Global Supply Chains', *Professional Safety* www.ASSE.org

Cotula, L, Vermeulen, S J and Keeley, J (2009) *Landgrab or Development opportunity – Agricultural investment and international land deals in Africa***,** Published by IEED

Darkwah, A K, (2013) 'Keeping hope alive: an analysis of training opportunities for Ghanaian youth in the emerging oil and gas industry', published by the *International Development Planning Review*, 2013

Davies, F, Spencer, R and Dooley, K (2001) Summary Guide to Safety Culture Tools, HSE Books

European Agency for Safety and Health at Work's Topic Centre OSH (2013), *Occupational Safety and Health and Education: a Whole School Approach*

Eurofound (2011) *Working Conditions in Tanzania*, published by the European Foundation for the Improvement of Living and Working Conditions.

Falol, H O et al. (2014) *Effectiveness of Training and Development on Employees' Performance and Organisation Competitiveness in the Nigerian Banking Industry*, the Transilvania University of Braşov

Flores, I (2017) *Dissecting Chinese Involvement in Road Construction Projects in Tanzania*, the University of Iowa Research Online

GAN Business Anti-Corruption Portal, 'Tanzania Corruption Report' – Updated October 2016 - http://www.business-anti-corruption.com/country-profiles/tanzania, Accessed October 2017

Gao et al. (2016) 'Workers' Perceptions of Safety Climate in International Construction Projects: Effects of Nationality, Religious Belief, and Employment Mode', *Journal of Construction Engineering and Management*

George, B (2004) *Authentic Leadership: Rediscovering the secrets to creating lasting value*, Jossey-Bass Books

The Global Security.org website profile of Tanzania which includes a profile of the religious affiliations in Tanzania - https://www.globalsecurity.org/military/world/tanzania/religion.htm, Accessed August 2018

Griffin, M A, Neal, A, and Parker, S K (2007), 'A New Model of Work Role Performance; Positive Behaviour in Uncertain and Interdependent Contexts', *Academy of Management Journal*

Guldenmund, F (2000), 'The Nature of Safety Culture: A Review of Theory and Research', *Safety Science*, Elsevier.

Hansen, M W (2013) *Reaping the Rewards of Foreign Direct Investment Linkages Between Extractive MNCs and Local Firms in Tanzania*, published by A DIIS ReCom.

Hansen, M W, Buur, L, Kjaer, and A M, Therkildsen, O (2015) 'The Economics and Politics of Local Content in African Extractives: Lessons from Tanzania, Uganda and Mozambique', Forum for Development Studies, Routledge Taylor and Francis Group.

Henstridge, M (2013) *Natural Gas and Human Development, Working Paper*, International Growth Centre

Harms-Ringdahl, L (2001) *Safety Analysis, Principles and Practice in Occupational Safety*, Taylor & Francis

Health and Safety Executive, Common Topics Guidance Note, Topic 4: "Safety Culture" www.hse.gov.uk/human factors/topics.common4 accessed 11/02/2019

Holbrook, A et al. (2006) 'The Impact of Question and Respondent Characteristics on Comprehension and Mapping Difficulties', *Public Opinion Quarterly*

Hood et al (1992), Royal Society Study Group, *Risk; Risk Analysis, Perception and Management*, published by the Royal Society (1992)

Husted, B W, and Allen, D B (2006) 'Corporate Social Responsibility in the Multinational Enterprise: Strategic and Institutional Approaches', *Journal of International Business Studies*

Hyduck, D (2017)'Tanzania "failed to improve" on corruption index', *Dar Post*, http://www.darpost.com/2017/01/tanzania-failed-to-improve-on-corruption-index/. Accessed September 2017

International Labour Organization (ILO) (2004), *Global Strategy on Occupational Safety and Health*

Ismail, F (2009) *Behavioural Base Approach for Quality and Safety Environment Improvement: Malaysian Experience in Oil and Gas Industry*, published by Elsevier Ltd.

Jacob T, and Pedersen R (2018) 'New resource nationalism? Continuity and change in Tanzania's extractive industries', *Safety Science*, Elsevier Ltd.

Kaiman, J (2014) 'China-Africa Relations Hurt by Bad Chinese Behaviour, Says Ambassador, UK Guardian, https://www.theguardian.com/world/2014/jul/17/chinese-ambassador-tanzania-china-africa-relationship-ivory-smuggling-counterfeit Accessed September 2017

Katebalirwe, T et al. (2014) *Pathway to Vocational Employment in the Emerging Tanzanian Gas Sector – A Collaborative Assessment of Vocational and Educational Training Needs*, published by VSO

Kent, R (2001) *Data Construction and Data Analysis for Survey Research*, Palgrave

Kinyondo, A and Villanger E, (2016) *Local Content Requirements in the Petroleum Sector in Tanzania: A Thorny Road from Inception to Implementation?* REPOA/CMI (www.cmi.no/publications)

Kleinman, S and Copp, M (1993), *Emotions and Fieldwork*, published by Sage Publications

Komba, A A (2017) *Educational Accountability Relationships and Students' Learning Outcomes in Tanzania's Public Schools*, Sage.

Kristopher, G (2016) 'How Crude Oil Prices Impact Top Oil Producers and Exporters', Market Realist Website http://marketrealist.com/2016/04/crude-oil-prices-impact-top-oil-producers-exporters/ Accessed October 2016.

Landau, C (2010) 'Africa Goes to Church, the Mosque and the Witch Doctor' BBC News Website - http://news.bbc.co.uk/1/hi/world/africa/8621916.stm,

Lange, S and Kinyondo, A (2016) 'Resource Nationalism and Local Content in Tanzania: Experiences from Mining and Consequences for the Petroleum Sector', *Safety Science*, Elsevier Ltd.

Lauwo, S, Otusanya, J and Bakre, O M (2016), 'Corporate Social Responsibility Reporting in the Mining Sector of Tanzania: (Lack of) Government Regulatory Controls and NGO Activism', *Accounting, Auditing & Accountability Journal*, Emerald Group

Lippin, T M, et al. (2000) and 'Empowerment-based Health and Safety Training: Evidence of Workplace Change from Four Industrial Sectors', *American Journal of Industrial Medicine,* Wiley.

Lugongo, B (2018) 'Tanzania: Witchcraft-Linked Killings Seen Easing https://allafrica.com/stories/201804260536.html, accessed September 2018.

Lu, C-S and Yang, C-S (2009) 'Safety Leadership and Safety Behaviours in Container Terminal Operations', *Safety Science*, Elsevier Ltd.

Majura, J (2016) 'When will OSHA Authorities Wake up From Their Dreamless Slumber?' The Tanzania *Guardian* Newspaper

Matiko, J (2013) 'Health and safety regulatory framework in Tanzania: existing shortfalls and the way forward', *African Newsletter on Occupational Health and Safety*, Finnish Institute of Occupational Health

Maxwell, J A (1992) 'Understanding and Validity in Qualitative Research', *Harvard Educational Review*

McKim, CA (2017) 'The Value of Mixed Methods Research: A Mixed Methods Study', *Journal of Mixed Methods Research*, published by Sage.

McNiesh, H (2015) 'Rampant Corruption in Tanzania Keeps Fruits of the Many in the Hands of the Few' UK *Guardian* https://www.theguardian.com/global-development/2015/jul/29/tanzania-corruption-aid-poster-sellers Accessed September 2017

Mearns et al. (2003) 'Safety Climate, Safety Management Practice and Safety Performance in Offshore Environments', *Safety Science*, Elsevier

Mearns, K and Yule, S (2008) 'The role of national culture in determining safety performance: Challenges for the global oil and gas industry', *Safety Science*, Elsevier Ltd.

Mohan, G et.al., eds. (2014). *Chinese Migrants and Africa's Development: New Imperialists or Agents of Change?* Zed Books

Morisset, J et al. (2013) 'Youth in Tanzania: a growing uneducated labor force', World Bank Group http://blogs.worldbank.org/africacan/youth-in-tanzania-a-growing-uneducated-labor-force Accessed June 2018

Moshi, H (2013) *Opportunities and Challenges for the Extraction of Natural Gas in Tanzania: the Imperative of Adequate Preparedness*, Economic and Social Research Foundation

Mrema, Ezra et al. (2015), *Status of Occupational Health and Safety and Related Challenges in Expanding Economy of Tanzania*, Annals of Global Health, Elsevier Inc

Mwombeki, F (2005) *Occupational Health & Safety Challenges in Construction Sites in Tanzania*, 4thTriennial International Conference Rethinking and Revitalizing Construction Safety, Health, Environment and Quality Port Elizabeth – South Africa

Ndimbwa, M (2014) *Natural Gas Conflict in Tanzania and the Impacts to the Population in Mtwara Municipality*, Master's Thesis published by Norwegian University of Life Sciences Faculty of Social Sciences, Department of International Environment and Development Studies

Neyland, D (2008) *Organizational Ethnography*, Sage Publications

Nkolo, J C (2018), 'Developing a socially inclusive and sustainable natural gas sector in Tanzania', *Safety Science*, Elsevier Ltd.

OECD (2013), *'Overview of progress and policy challenges in Tanzania', in OECD Investment Policy Reviews: Tanzania 2013,* OECD Publishing. http://dx.doi.org/10.1787/9789264204348-6-en

Okolie, K C, and Okoye, P U (2012), 'Assessment of National Culture Dimensions and Construction Health and Safety Climate in Nigeria', *Science Journal of Environmental Engineering Research*

Okoye, P U and Aderibigbe, Y W (2014) *Comparative Assessment of Safety Climate of Casual and Permanent Construction Workers in South-East Nigeria*, European Centre for Research Training and Development UK

O'Toole, M (2001) 'The Relationship Between Employees' Perceptions of Safety and Safety Performance', *Journal of Safety Research*, National Safety Council and Elsevier Science Ltd

Oxford Research/Eurofound (2011) *Links between Quality of Work and Performance*, Eurofound

Parker, B (2005) *Introduction to Globalisation and Business*, SAGE

Pater, R (2015) 'Toward Global-Class Safety', *Professional Safety*, www.ASSE.org

Pearce, F (1987) 'You Bury Our mistakes: Union Carbide, Bhopal and the hubris of the Technocracy', Occasional Paper No.3, Middlesex Polytechnic

Riley, J (1996), *Getting the Most from Your Data*, Technical and Educational Services Ltd

Robson, C and McCartan K (2016) *Real World Research*, Wiley

Saari, J(1998) 'Participatory Workplace Improvement Process', Chapter 59 *Encyclopaedia of Occupational Health and Safety 4th Edition*, Geneva International Labour Organisation

Scurfield, T and Mihalyi, D (2017) *Uncertain Potential: Managing Tanzania's Gas Revenues* briefing, Natural Resource Governance Institute

Shrader-Frechette, K S, (1991), *Risk and Rationality*, *philosophical foundations for populist reforms*, University of California Press

Smith D (2011) 'Shell Accused of Fuelling Violence in Nigeria by Paying Rival Militant Gangs', UK *Guardian* https://www.theguardian.com/world/2011/oct/03/shell-accused-of-fuelling-nigeria-conflict - Accessed September 2017.

Stake, R (1995) – *The Art of Case Study Research*, Sage publications.

Stergiou-Kita, M, et al. (2015) 'Danger Zone: Men, Masculinity and Occupational Health and Safety in High Risk Operations', *Safety Science*, Elsevier Ltd.

Stolan, A, et al. (2017) *Prospects for Peace in a Petro-state: Gas Extraction and Participation in Violence in Tanzania*, Published by REPOA/CMI (www.cmi.no/publications)

Stranks, J, (2000) *The Handbook of Health and Safety Practice 5th Edition*, Prentice Hall

Tam, C M et al. (2004) 'Identifying elements of poor safety management in Chinese Construction', *Safety Science*, Elsevier.

*Tanzanian Human Rights Report*, 2016 (2017 publication), Legal and Human Rights Centre & Zanzibar Legal Services Centre

Tanzania Invest (2018) – 'Stanbic Bank to Promote Participation of Women in Senior Leadership Roles in Tanzania https://www.tanzaniainvest.com/finance/banking/stanbic-promote-participation-of-women-in-senior-leadership-roles. Accessed August 2018.

Tanzania Invest (2017) http://www.tanzaniainvest.com/gas Information about current gas reserves. Accessed September 2017

Transparency International.Org (2018) *Corruption Perceptions Index Report 2017*

UK Bribery Act (2010) https://www.gov.uk/anti-bribery-policy - Accessed September 2017

United Republic of Tanzania*, The Occupational Health and Safety Act* (2003) -

Umeokafor, N et al. (2014), 'Determinants of Compliance with Health and Safety Regulations in Nigeria's Construction Industry', *Journal of Construction Project Management and Innovation*

United Republic of Tanzania, *2015 Migration and Urbanization Report, 2012 Population and Housing Census, volume 4,* National Bureau of Statistics, Ministry of Finance

Walters, D and James, P (2009) *Understanding the Role of Supply Chains in Influencing Health and Safety at Work*, published by IOSH

Ward A (2017) 'Big Oil Bets on a Dash for Gas' *Financial Times* https://www.ft.com/content/f23e35e0-92b5-11e7-bdfa-eda243196c2c Accessed September 2017.

Warwick, D P (1982), 'Teaspoon Trade means and ends in social research', Chapter 3 of *Social Research Ethics*, Macmillan

Weber, D et al. (2018), "We can stop work, but then nothing gets done: Factors that support and Hinder a Workforce to Discontinue Work for Safety', *Safety Science*, Elsevier Ltd.

Wikipedia (2017) 'BG Group' - https://en.wikipedia.org/wiki/BG_Group Accessed September 2017

Wikipedia (2017) 'List of ethnic groups in Tanzania' https://en.wikipedia.org/wiki/List_of_ethnic_groups_in_Tanzania Accessed October 2017

Wikipedia (2018) 'Religion in Tanzania' https://en.wikipedia.org/wiki/Religion_in_Tanzania - Information about religious affiliations in Tanzania. Accessed August 2018

World Population Review, article on Tanzania population census from 2012

http://worldpopulationreview.com/countries/tanzania-population/ Accessed August 2018

Zeglovits, E and Schwarzer, S (2016) 'Presentation matters: how mode effects in item non-response depend on the presentation of response options', *International Journal of Social Research Methodology*

## *APPENDIX 1*

***Summary of informal pilot research of health and safety perspectives which was completed in December 2016 and January 2017.***

The informal pilot research was commissioned by the Shell Tanzania Head of Well Engineering. The driver for this research was a desire to obtain feedback from frontline local and expatriate personnel about their experiences concerning the implementation of global health and safety standards at the supply base during the drilling campaign. This was because the drilling exploration programme was coming to an end and there had been no attempts to capture lessons learned in this way before this time.

The review consisted of semi-structured interviews with 15 frontline personnel who worked at the supply base. 14 of the personnel worked for the logistics contractor and one worked for the driving contract company. Most of the interviews took place in Swahili, with the assistance of a couple of Swahili translators, both of whom provided safety support services at the supply base.

The interviews with the frontline personnel at Mtwara were based around the following questions;

- The length of employment at the supply base during the drilling campaign (including companies worked for during this time)
- A snapshot of the interviewee's employment prior to the drilling campaign (including recollections of HSSE standards)
- An opportunity to share personal reflections on any changes to their personal views about HSSE since the start of the drilling campaign (including their experiences during the various organisational changes which have taken place at the supply base)
- Observations concerning HSSE in the wider community, and any recent changes which they have noticed in terms of health and safety improvements (e.g. road safety measures)
- Views on what is required to improve HSSE in Tanzanian workplaces as a whole
- An opportunity to share personal reflections on their proudest moment within the drilling campaign
- An opportunity to communicate lessons learned about the implementation of HSSE standards for future operators to consider in future campaigns

Out of those interviewed all of the participants remarked that health and safety performance improvements were evident since the start of the drilling campaign to the current time. It was evident that in the majority of cases participants had experienced poor health and safety cultures within previous workplaces. 100% of the participants felt that their knowledge of HSSE had improved during their time on the project. 100% of participants also acknowledged that the level of training and personal skill sets improved after the integrated logistics contract had commenced. In addition, that the training extended to broader training topics such as health & hygiene. Most participants also commented on improved HSSE management system controls since that time.

Unsurprisingly 100% of participants acknowledged that HSSE standards and HSSE awareness were generally poor within the local community. An unexpected outcome was confirmation that each of the individuals interviewed has taken the training and knowledge gained from their work at the supply base into the wider community and their homes in various ways.

Several examples were provided; one person now has a formal waste collection and uses a bin instead of throwing their household waste out onto the street as is customary in the neighbourhood. Another was building a house and was coaching their building crew about how to work safely and how to use personal protective equipment. Two people shared successful examples of interventions with friends regarding unsafe road safety behaviour and unsafe conditions in an external workplace. Two people shared examples of how they had disseminated safety training (particularly on health-related topics) to their family. In one case this extended to changes to the storage and use of hazardous cleaning chemicals in the person's home.

In general, most of the HSSE improvements in the wider community which had been observed concerned traffic safety improvements within the local vicinity.

When asked about what improvements could be made to achieve health and safety improvements in Tanzanian workplaces training and education on HSSE were considered to be the most important areas for improvement. 33% of people felt that a health and safety college should be opened in Tanzania. In addition, that more community safety training was required in schools from an early age. Most participants remarked that more public health advertising, especially on social media is required. All participants felt that OSHA (the Tanzanian OHS Regulator) had a big role to play in achieving improvements, especially within the wider community. Over 50% of participants thought that OSHA could do more to educate and advise broader businesses; some participants challenged the number of time/visits which OSHA spent at the supply base rather than out in the wider community businesses. One participant had not been aware of OSHA's existence before joining the project. Two participants were unaware that there were health and safety regulations in Tanzania.

In terms of lessons learned for the future, aspects which were identified as being a success were:

- The current HSSE standards
- The existing levels of training (job-specific and wider topics)
- Continue the system of reminding everyone to work as one team i.e. to be friendly, have respect for one another and intervene if observing unsafe acts/conditions
- Good-quality expatriate supervisors and HSSE personnel
- The use of experienced [local] crew members from the start-up of the new project, bringing on less experienced personnel as the project develops
- Employer/employee consultation and engagement opportunities such as meetings, stand downs etc.

Aspects for suggested change included:

- Some changes to the existing supply base facilities (laundry facilities etc.)
- Increased long-term career progression and opportunities to diversify between positions e.g. Rigger and Materials etc
- As a Client, BG Tanzania should increase the scrutiny of subcontractors to make sure that the wages were at the going rate and reasonable in terms of the differential from the Client payment to the Subcontractor versus payment form Subcontractor to employees.
- Better enforcement of BG Tanzania Standards within off site BG Tanzania service company yards
- An appreciation by all expatriate supervisors that they should have respect for everyone regardless of role etc when they [the supervisors] are being intervened on i.e. negative responses received by a small number of the expatriates

## APPENDIX 2

***Question Sets for Semi-Structured Interviews***
*NB: A participation consent form was used ahead of any participation*

**Questions for frontline personnel**

1. Name/Role

2. How long have you been on the Project? Which company did you work for in 2011-2012?

3. What were your experiences of health and safety in other workplaces before the Project?

4. Has anything changed about your approach to implementing health and safety since you have worked on the Project (for example, have you changed the way you work, or have you implemented safety improvements from work which you have used outside of work)?

5. Do you think health and safety performance improved during the exploration project? If so/not, why?

6. Have you noticed any health and safety performance improvements or decreased performance during or after the key transition points within this exploration project (e.g. with BG as the Operator and all the MUFA partners operating at the Base, during the company C Transition, during the company B Transition)?

7. Have you noticed any new health and safety improvements which have taken place in the community over recent years (e.g. Bins in Dala Dala's, traffic lights in Mtwara)?

8. What do you feel needs to be done to improve the management of occupational health and safety in Tanzania?

9. What has been your proudest moment on the Project in relation to safety performance?

10. If BG or Shell was to start again in Tanzania, what advice would you give them about what to do and what not to do in order to achieve good health and safety performance on the Project?

**Questions for expatriate supervisory personnel**

1. How long have you been working on this exploration Project?

2. Have you worked in new start-ups in other countries prior to this exploration Project?

3. What were your experiences of the implementation of health and safety standards (in general) in the workplace before the exploration Project?

4. Do you feel that health and safety performance improved during the exploration Project?

5. If so, how did it improve? If not, why do you feel that it did not improve?

6. Has anything changed in terms of the way you approach health and safety/the implementation of it since you have worked on the exploration Project? [In your workplace or Outside of Work]

7. Have you noticed any health and safety performance improvements or decreased performance during or after the key transition points within this exploration project (e.g. with BG as the Operator and all the MUFA partners operating at the Base, during the logistics company C Transition, and during the company B Transition)?

8. Have you noticed any new and emerging trends about health and safety improvements within the Asset or in Tanzania in general, based on your experience, or those of your peers?

9. If BG or Shell was to start again in Tanzania, what advice would you give them about what to do and what not to do about achieving health and safety improvements within the exploration Project?

10. What has been your proudest moment on the exploration Project in relation to HSSE performance improvements?

## *APPENDIX 3*

***Paper Based Survey Form for Frontline Personnel***

## Paper based research survey for Mtwara personnel - Safety Performance at the Mtwara Supply Base between 2011-2016

| | | | |
|---|---|---|---|
| Thank you for agreeing to take part in this research survey. Completion of this anonymous survey is deemed to constitute your agreement to take part in this research study. | | | |
| Gender: Male/Female | | | |
| Age | | Job Role/title | |
| Nationality | | Religion | |
| Length of time at the supply base | | Tribal membership | |
| Please give brief details of your education | | Length of Time working in the oil and gas industry | |
| Please provide details of your training e.g. in-house company training such as topics from your company's health and safety policies, vocational qualifications etc | | | |

**Mtwara Supply Base Frontline Staff Questionnaire**

The purpose of this questionnaire is to collect your views on health and safety performance at the supply base between 2011-2016. Your views will form an important part of the research project and will not be shared with your employing organisation. Please be as honest as possible – there are no 'right' or 'wrong' answers to each question. Any information from surveys if used in the summary of research data will be anonymous.

Please score the following aspects of the safety performance questionnaire using the scale and adding any comments which you wish to express in relation to each section. *Please continue to write comments on the back of the questionnaire sheet if you need more space to capture your views.*

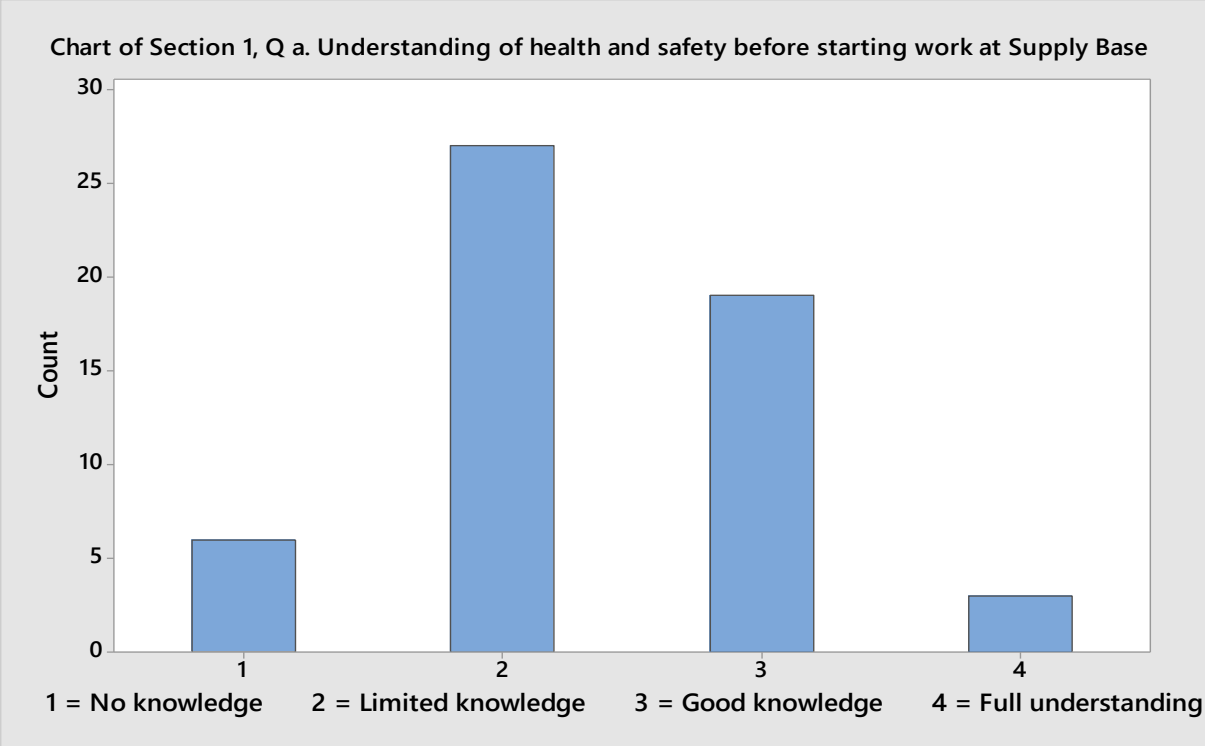
| 1. My understanding of health and safety standards *please circle* | no knowledge | limited understanding | I understand how to stay safe but I do not under-stand all of the rules | I know how to keep myself and others safe | don't know |
|---|---|---|---|---|---|
| • before I started work at the supply base | 1 | 2 | 3 | 4 | 0 |

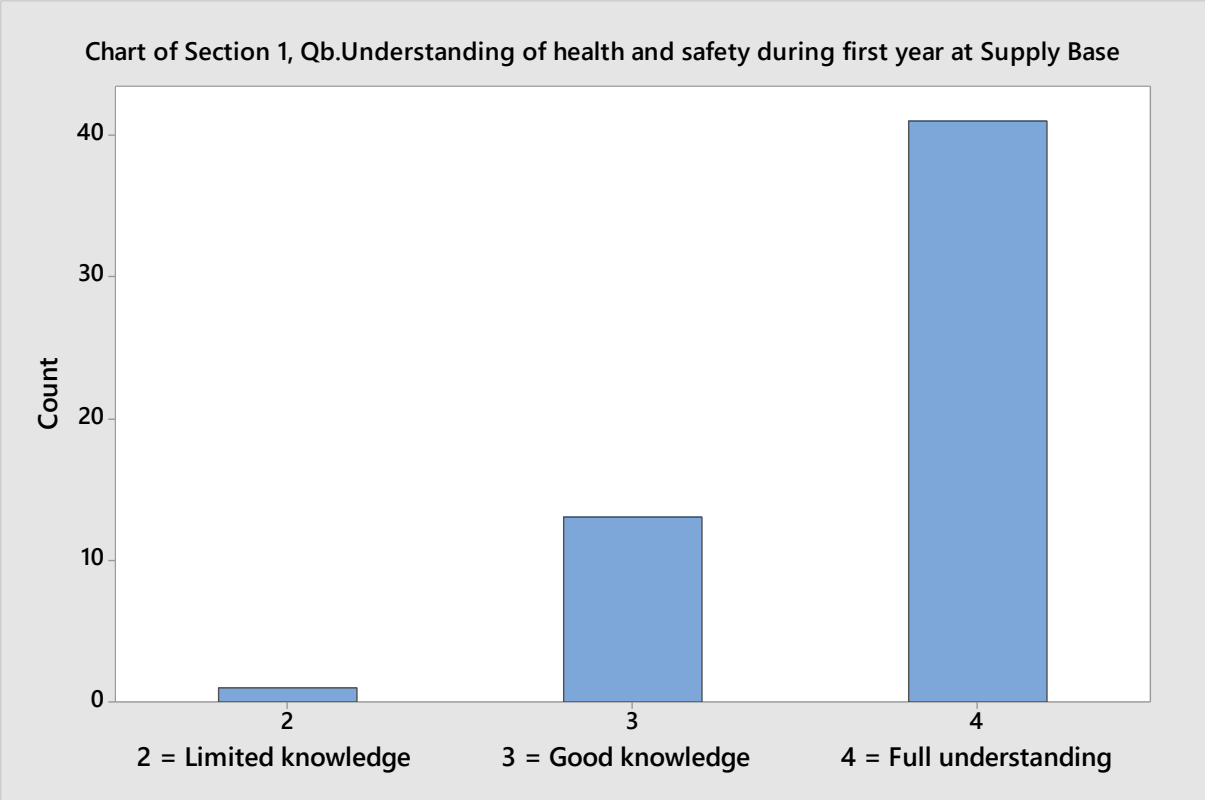
| | | | | | |
|---|---|---|---|---|---|
| • during my first year of working at the supply base | 1 | 2 | 3 | 4 | 0 |
| • by the end of the drilling campaign (Dec 2016) | 1 | 2 | 3 | 4 | 0 |
| 2. Did safety performance change between 2011-2016? *please circle* | Increased greatly | Increased a little | Decreased a little | Decreased greatly | Don't know |
| • The number of incidents | 1 | 2 | 3 | 4 | 0 |
| • The number of people being injured at work | 1 | 2 | 3 | 4 | 0 |
| • People working in an unsafe way | 1 | 2 | 3 | 4 | 0 |
| • The amount of safety training I received | 1 | 2 | 3 | 4 | 0 |
| • The number of safety observations | 1 | 2 | 3 | 4 | 0 |
| • The amount of interventions during unsafe acts/situations | 1 | 2 | 3 | 4 | 0 |
| **Optional Comments:** Please use this space to provide any additional feedback/comments on the questions in section 2 | | | | | |
| 3. Implementation of safety standards outside of work *please circle* | strongly disagree | disagree | agree | strongly agree | don't know |
| • I don't care about safety standards when I am not at work | 1 | 2 | 3 | 4 | 0 |
| • I implement some standards but not many. | 1 | 2 | 3 | 4 | 0 |
| • It is difficult to implement any standards outside of work because people in the community do not understand how to work safely. | 1 | 2 | 3 | 4 | 0 |
| • I complete non-work activities in a safer way now e.g. wearing a motorbike helmet | 1 | 2 | 3 | 4 | 0 |
| • I intervene if I see unsafe acts/situations when I am not at work | 1 | 2 | 3 | 4 | 0 |
| • I share information about health & safety training I have received at work | 1 | 2 | 3 | 4 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| with my friends and family | | | | | |
| **Optional Comments:** Please use this space to provide any additional feedback/comments on the questions in section 3 | | | | | |
| 4. **Lessons for the future** *please circle* | strongly disagree | disagree | agree | strongly agree | don't know |
| • The Safety standards should be implemented in the same way in future drilling projects | 1 | 2 | 3 | 4 | 0 |
| • A different approach to implementing safety standards would be more effective [please explain in the 'comments' space below] | 1 | 2 | 3 | 4 | 0 |
| **Optional Comments:** Please use this space to provide any additional feedback/comments on the questions in section 4 and/or any other additional comments which relate to the survey | | | | | |
| Please **confirm** if you would consent to being **interviewed** as part of the research | | **Yes** | **No** | **Maybe** | |
| **Thank you for taking time to complete this survey.** Please return completed forms to the HSSE Administrator | | | | | |

## *APPENDIX 4*

***Tally charts which depict the results of the multiple-choice question responses***



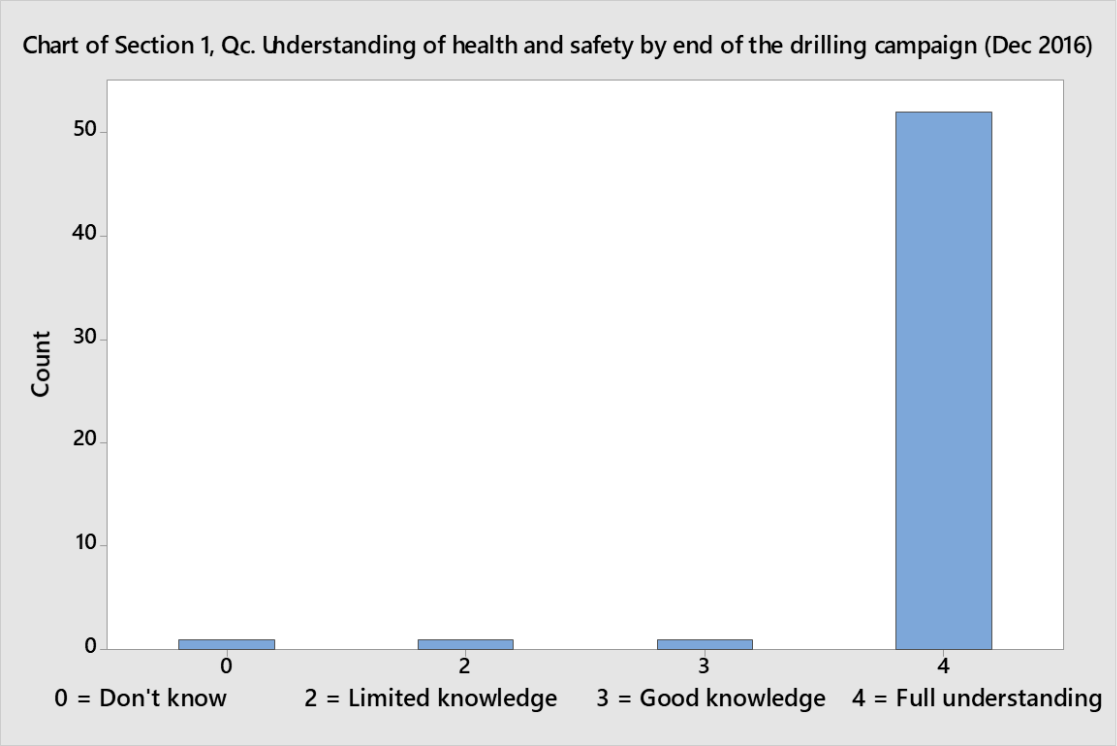


Chart of Section 1, Qc. Understanding of health and safety by end of the drilling campaign (Dec 2016)
Count
50
40
30
20
10
0
0
2
3
4
0 = Don't know
2 = Limited knowledge
3 = Good knowledge
4 = Full understanding

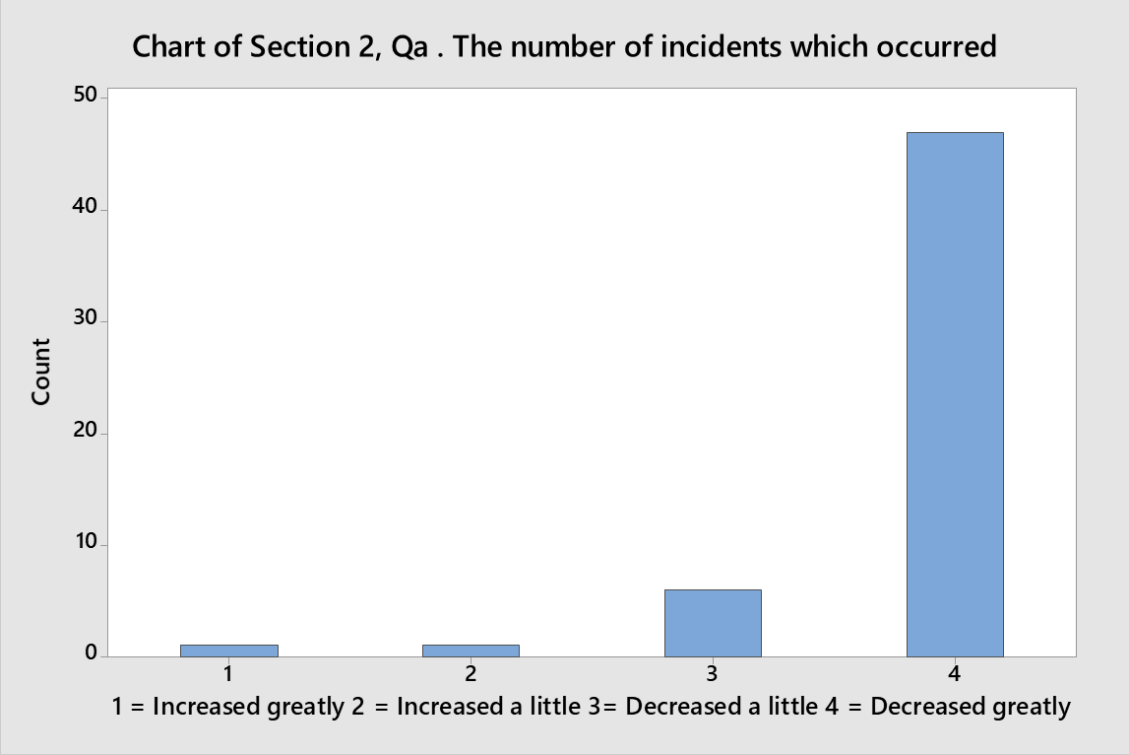


Chart of Section 2, Qa . The number of incidents which occurred
Count
50
40
30
20
10
0
1
2
3
4
1 = Increased greatly 2 = Increased a little 3= Decreased a little 4 = Decreased greatly

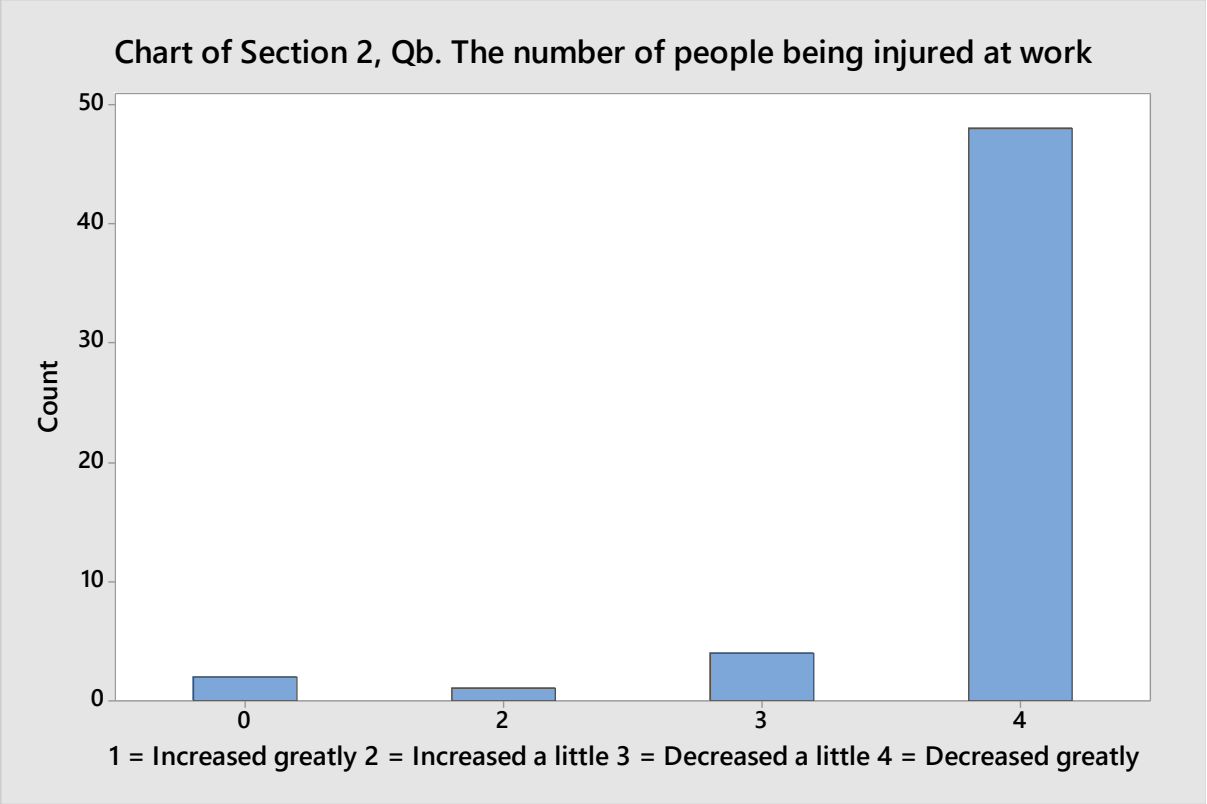


Chart of Section 2, Qb. The number of people being injured at work
Count
50
40
30
20
10
0
0
2
3
4
1 = Increased greatly 2 = Increased a little 3 = Decreased a little 4 = Decreased greatly

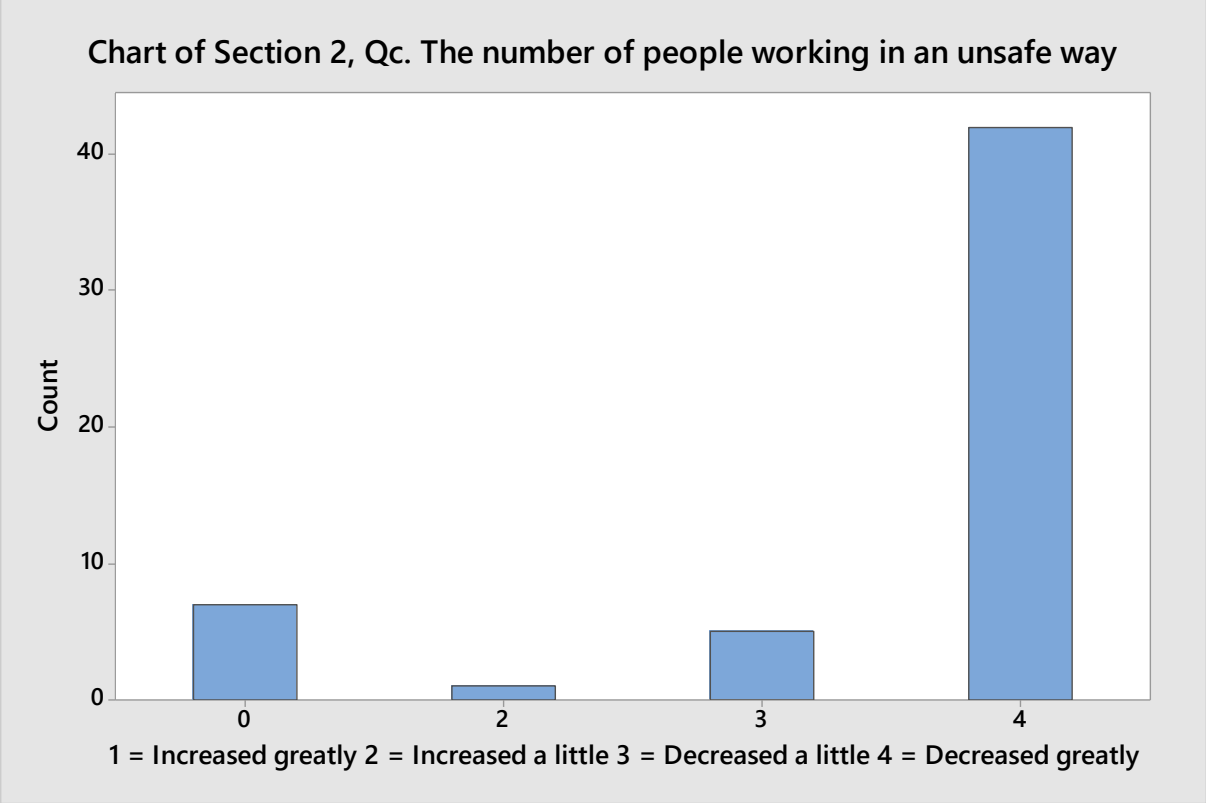


Chart of Section 2, Qc. The number of people working in an unsafe way
Count
40
30
20
10
0
0
2
3
4
1 = Increased greatly 2 = Increased a little 3 = Decreased a little 4 = Decreased greatly

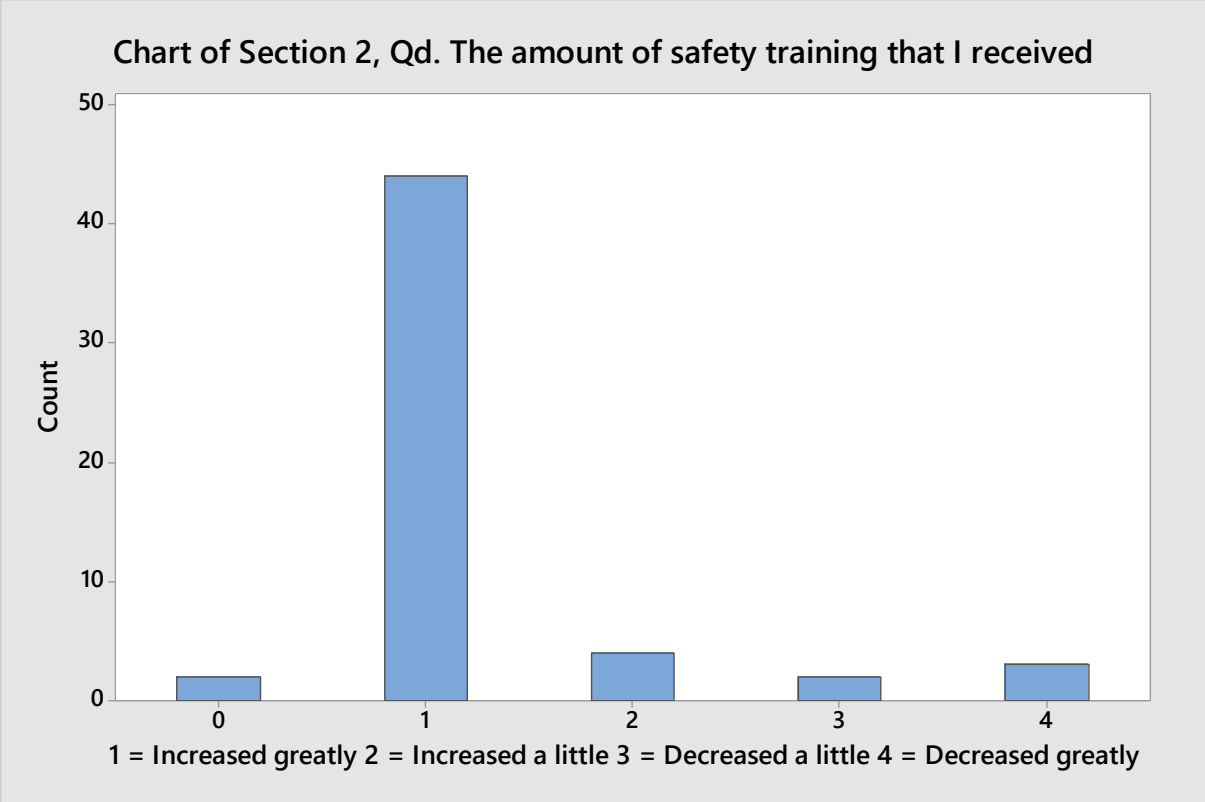


Chart of Section 2, Qd. The amount of safety training that I received
Count
50
40
30
20
10
0
0
1
2
3
4
1 = Increased greatly 2 = Increased a little 3 = Decreased a little 4 = Decreased greatly

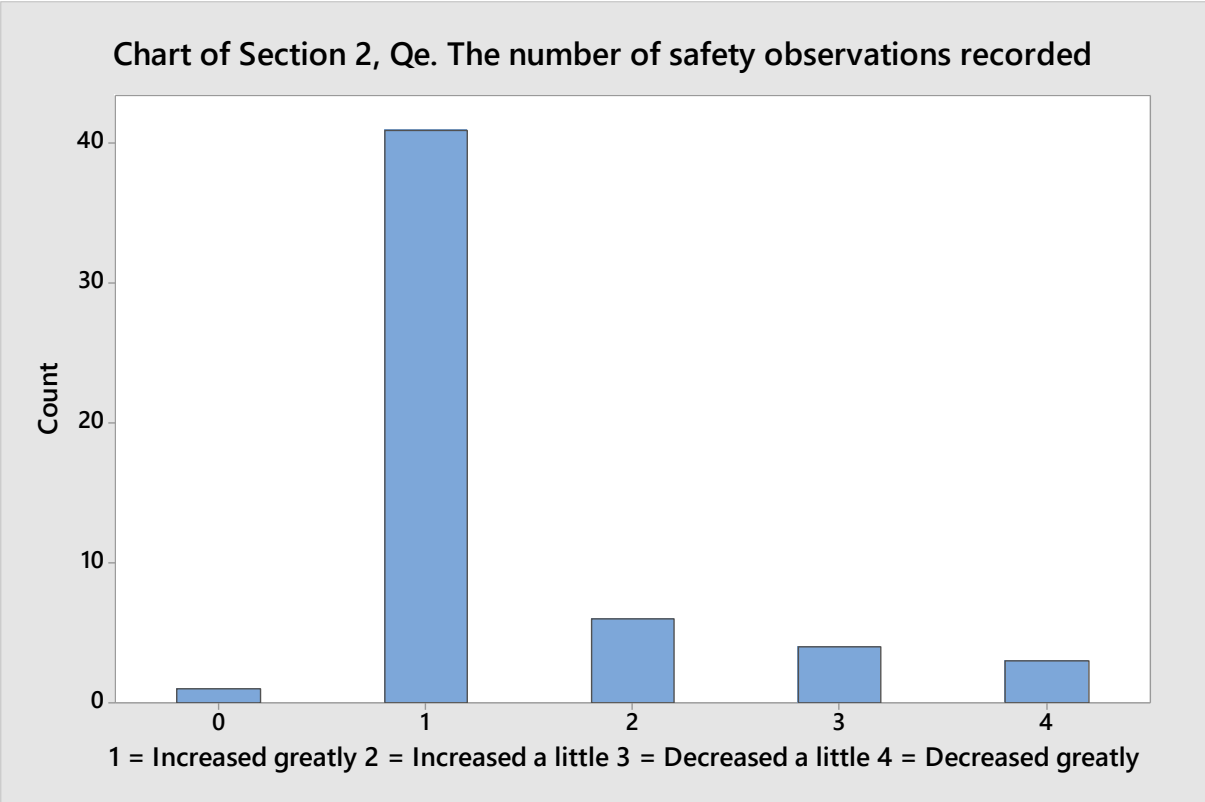


Chart of Section 2, Qe. The number of safety observations recorded
Count
40
30
20
10
0
0
1
2
3
4
1 = Increased greatly 2 = Increased a little 3 = Decreased a little 4 = Decreased greatly

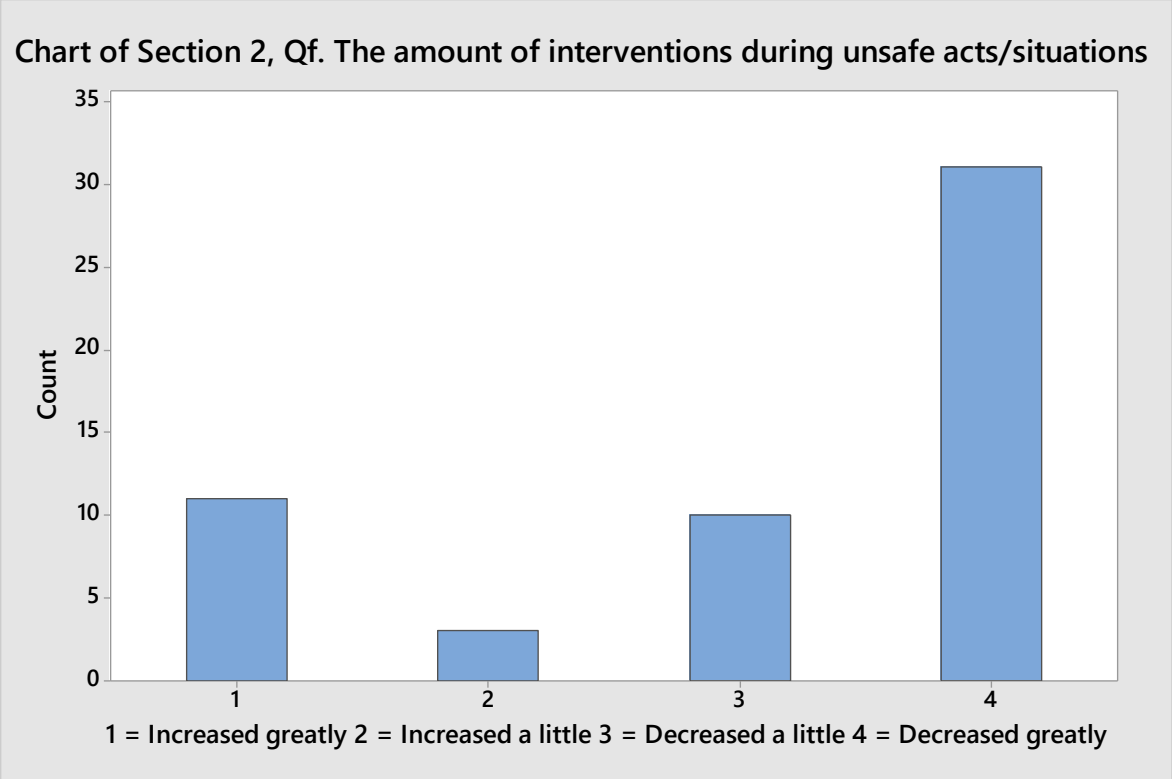


Chart of Section 2, Qf. The amount of interventions during unsafe acts/situations
Count
35
30
25
20
15
10
5
0
1
2
3
4
1 = Increased greatly 2 = Increased a little 3 = Decreased a little 4 = Decreased greatly

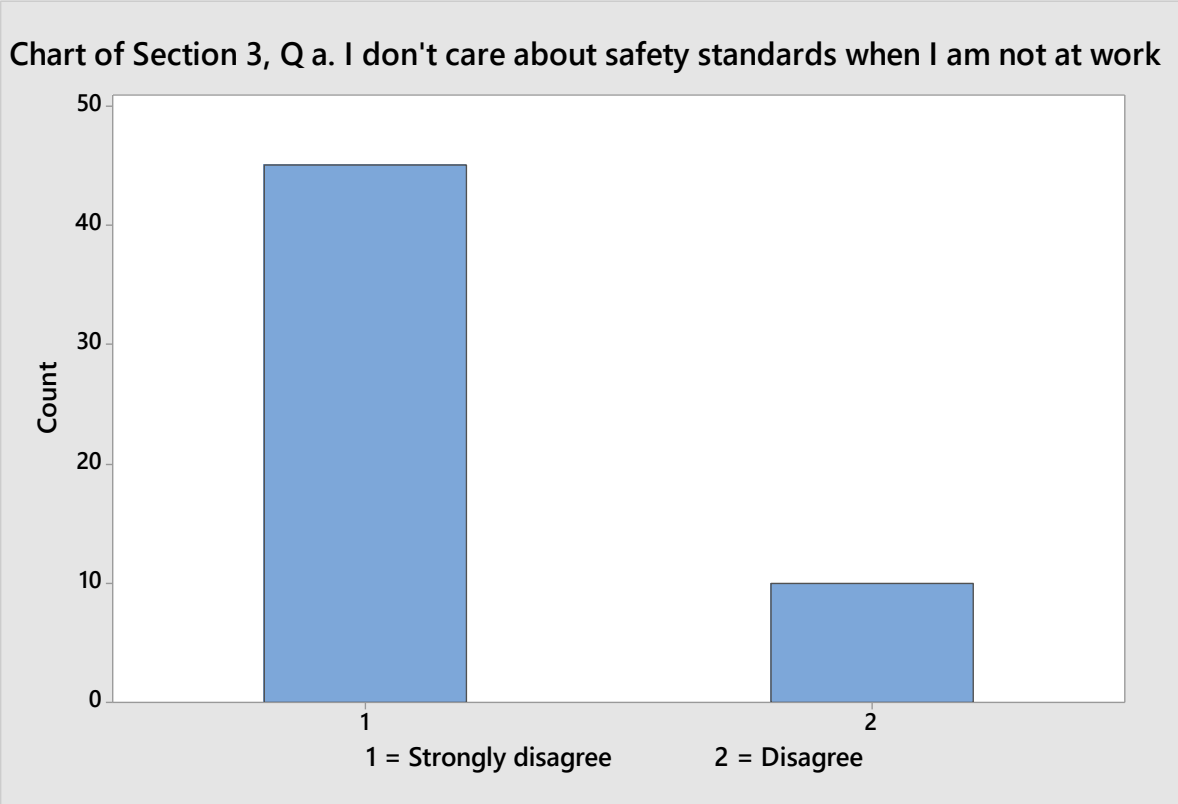


Chart of Section 3, Q a. I don't care about safety standards when I am not at work
Count
50
40
30
20
10
0
1
2
1 = Strongly disagree
2 = Disagree

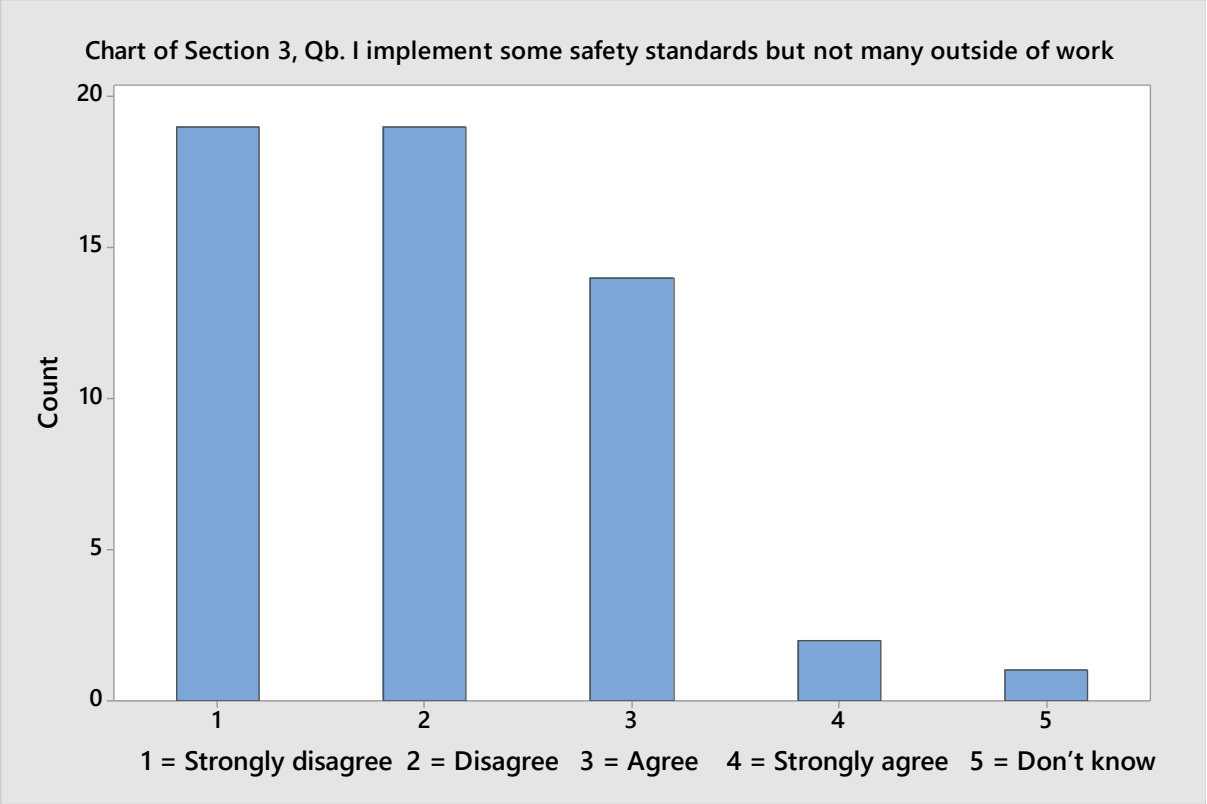


Chart of Section 3, Qb. I implement some safety standards but not many outside of work
Count
20
15
10
5
0
1
2
3
4
5
1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree 5 = Don't know

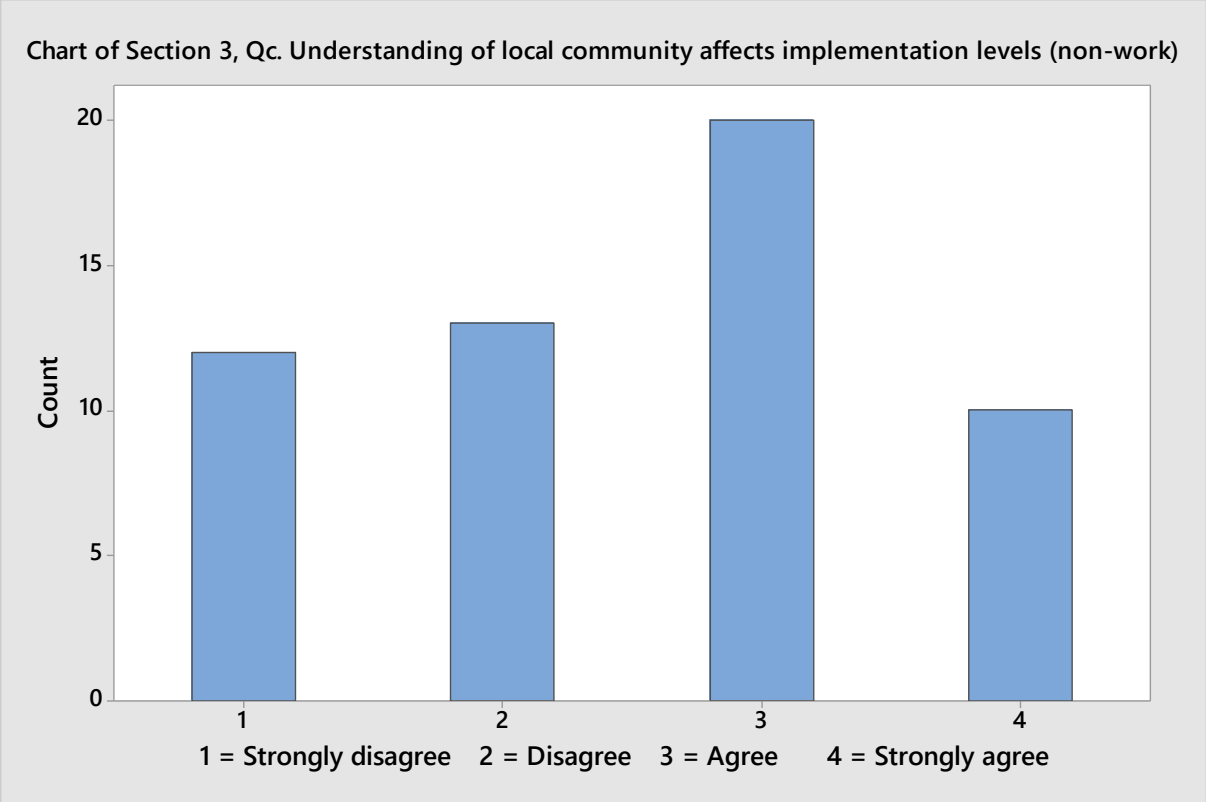


Chart of Section 3, Qc. Understanding of local community affects implementation levels (non-work)
Count
20
15
10
5
0
1
2
3
4
1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree


Chart of Section 3, Qd. I complete non-work activities in a safer way now
Count
35
30
25
20
15
10
5
0
1
3
4
1 = Strongly disagree
3 = Agree
4 = Strongly agree

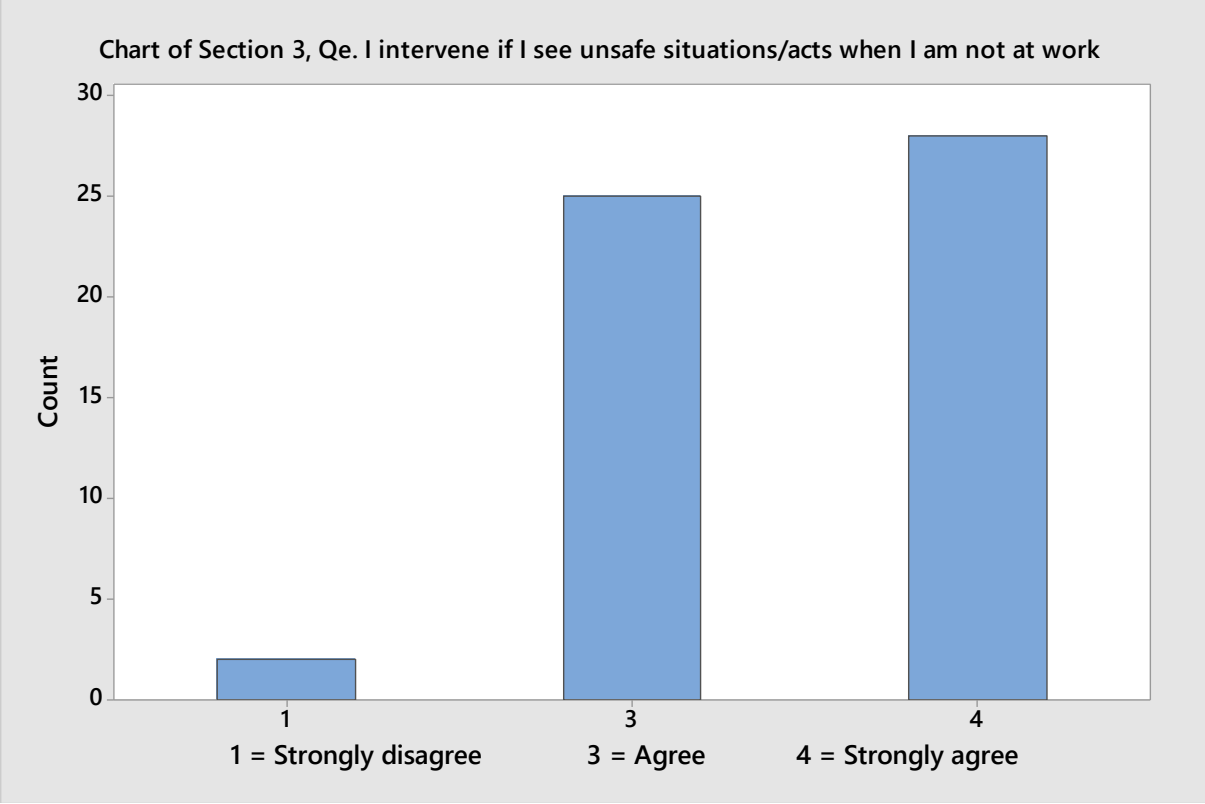


Chart of Section 3, Qe. I intervene if I see unsafe situations/acts when I am not at work
Count
30
25
20
15
10
5
0
1
3
4
1 = Strongly disagree
3 = Agree
4 = Strongly agree

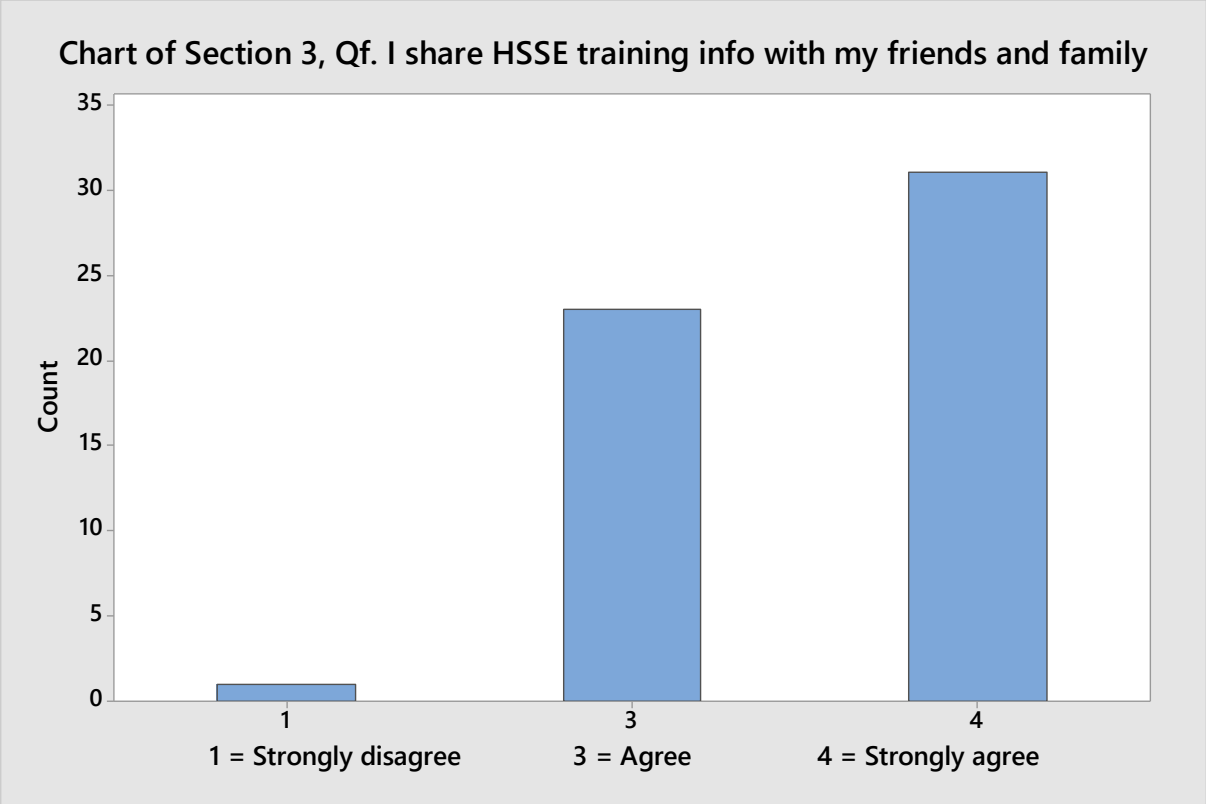


Chart of Section 3, Qf. I share HSSE training info with my friends and family
Count
35
30
25
20
15
10
5
0
1
3
4
1 = Strongly disagree
3 = Agree
4 = Strongly agree

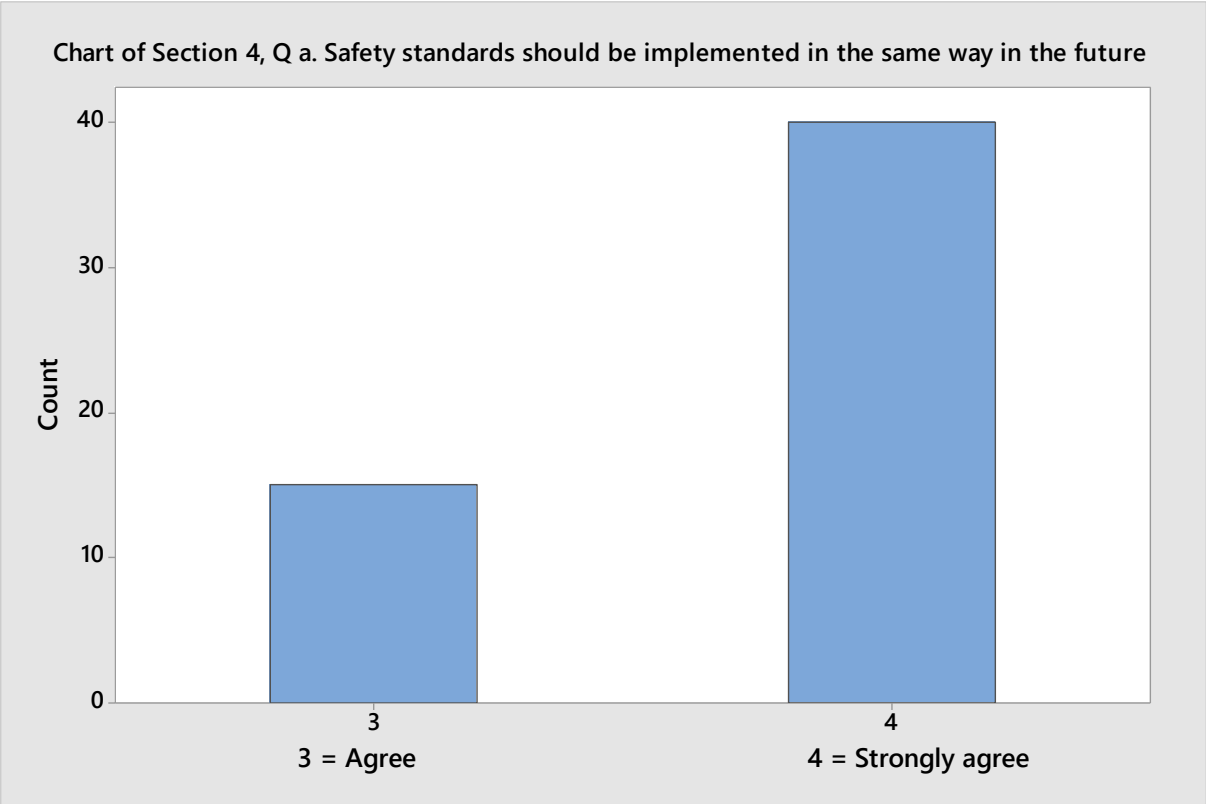
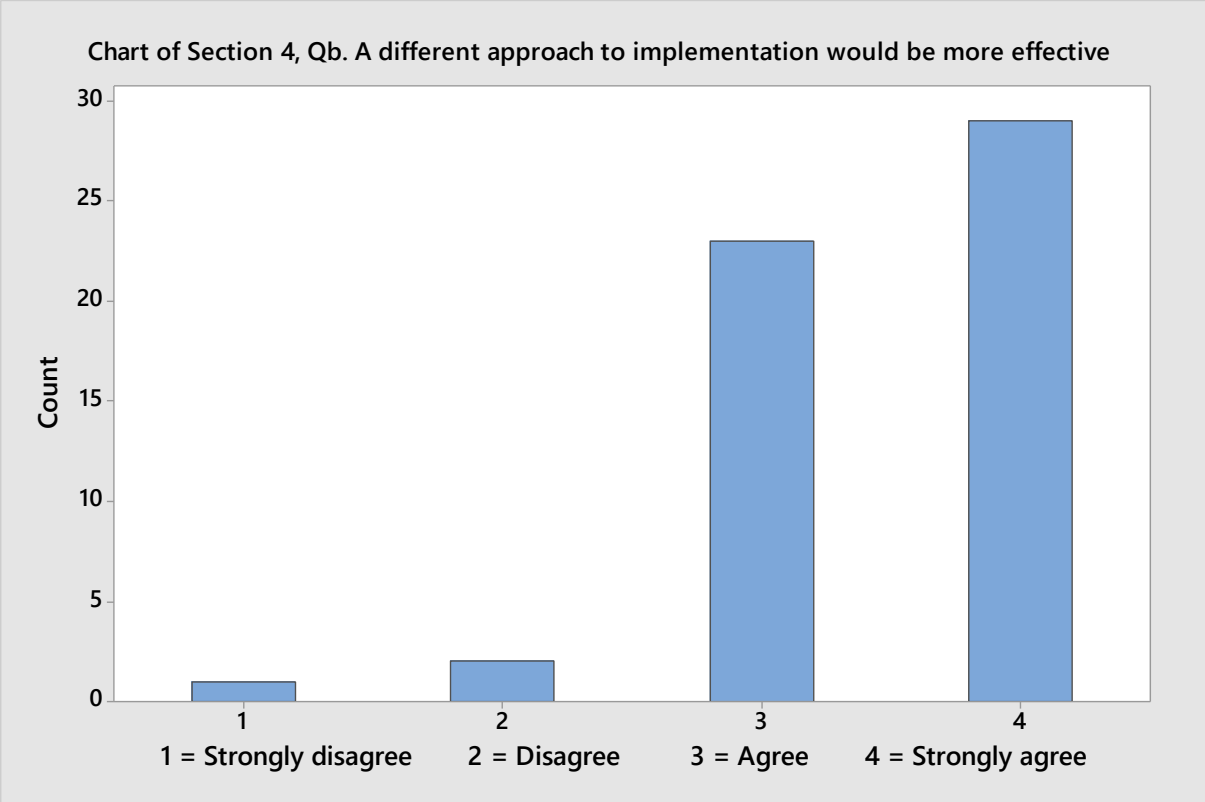


Chart of Section 4, Q a. Safety standards should be implemented in the same way in the future
Count
40
30
20
10
0
3
4
3 = Agree
4 = Strongly agree




## APPENDIX 5

### *The Coding Master Sheet containing both sets of coding*

Coding Master Sheet V4 2019.xlsx

Attached is a copy of the Excel spreadsheet which was used to capture the coding analysis from interview transcripts and survey comments.

## APPENDIX 6

***A Summary of Lessons Learned***

Comments in black font are from interviews with Tanzanian participants. Comments in red font are from interviews with expatriate participants.

**Table 1. What Worked Well**

| **What Worked Well - Organisation** |
|---|
| Good Pre-planning - someone recognised that the lifting and rigging role was required from the start. This meant that training could start at the earliest stage (less incidents as a result of early training and supervision during lifting operations). |
| Because BG was there from an early stage it was able to introduce the right safety culture from the start. |
| Appreciation for the BG HSE Supervisor Role [as an improvement measure] regarding active monitoring of work and bringing in new updates to the safety systems.<br><br>An observation about the change in understanding about the role (from a frontline perspective) from initial fear of the role to understanding that it is there to help and protect; Trust/relationships have developed over time in relation to the role, and the appreciation of the value of the role. |
| The Mtwara HSE department (BG) were very approachable - much easier to work with than those where the HSE person does not share the same goals as the Operational Team - different to some other Oil & Gas sites; here people come to the HSE Advisor to ask for advice. |
| Appreciation for BG retaining the resources/working conditions during the suspension period and that sick pay is paid. |
| Observation that BG treat all of the workforce well, regardless of their contractual status. This is not true of other workplaces who do not treat casual workers well.<br>'Acknowledgment' that people are not allowed to be treated unfairly/oppressed. |
| 'Acknowledgment' of BG's business principles (and whistleblowing framework) in relation to people being able to apply for jobs without any bribery affecting the application and the devastating consequences of bribery - in some companies women may be forced to be abused to get a job or people might have to pay to get a job. BG third parties know that they will be reported if they try and ask for a bribe. |
| BG Oman is a good case study for reviewing what happened when BG was the operator from the start (no precursor like Ophir) - adequate time to prepare for drilling etc. |
| 'Human resources is by far the biggest thing we can have to make it a successful operation. Togetherness has made us succeed - it has been a critical factor in our success.' |
| |
| **The logistics Company C/Company B Transition Phases** |
| There was more ownership and accountability with the client operating model than with the company C model and more transparency than occurs in a contractual situation (contractors wanting to save costs and not give the client 'bad news' etc.). |

| |
|---|
| company C brought in new systems which improved things. The same of company B. After some time (with the company B transition) things became clearer with people working together and developing more of an understanding of what is going on. |
| Because BG has high standards and was the client all the way through the safety standards did not drop during transition periods. |
| 'There were big advantages of streamlining the logistics contractors into just one - consistent standards, less fights over berth and yard space etc.' |
| 'Because of what we learnt and the way we planned these transitions we've used the same template every time, and because of the detail I just see it getting stronger.' |
| There was no drop in the HSSE performance because the client standards did not change during transition periods. |
| There have been ups and downs but keeping key personnel in the key areas throughout all of the transitions has been the key to success - continuity on the client and contractor side has been the winning formula. |
| The was better HSSE supervision of outside/yard activities in the client model than in the company C model. When BG's running the show it's much better than when it is run by the contractors. |
| |
| **Systems** |
| It was unusual to have a series of drilling campaigns which last for so long – this created a better chance to track trends etc. |
| |
| **Training:** |
| Training the local crews about offshore operations was a big help as they then understood what the equipment was for and the rough sequencing of delivery. |
| |
| **General Operational Comments/Other Observations** |
| Appreciation for the opportunity to work with BG/Shell/Oil & Gas, and for the education received [several participants expressed this] - One person commented on how this had a positive impact on wider society as well. |
| A strong bond formed between expatriates and the Mtwara local crews. Expatriates have learnt about the local culture, work ethic and the way in which the workforce maintain their professionalism in the face of personal problems at home. |
| BG requires a supervisor to supervise the unloading of trucks which is a higher standard than most other companies. |
| Consistency of HSSE standards existed between BG Tunisia and BG Tanzania – both had high standards. |
| |

**Table 2 Lessons Learned**

| |
|---|
| NB *The majority of lessons learned were generated within the interviews with expatriate participants* |
| **Lessons Learned – Organisational & Operational** |
| We should capture the lessons learned from the project and develop these into a starter pack which could be used in other new start-ups. It could also be shared with TPDC (Tanzania Petroleum Development Corporation). |
| One of the biggest challenges we faced and still face is the importation and exporting of equipment - this needs to be fully understood in the future |
| These were unusual circumstances - going from a silent partner to becoming the operator with having multiple operators on site who had different standards and differing levels of implementation was very testing - a lack of buy-in at a management level from some of the MUFA partners for our standards made things very challenging. |
| The company B transition was messy in terms of documentation after the switch out from company C– it should have been easier. The start-up audit was later than it should have been. |
| The post company C Transition period took a lot of time to get right – given the length of the Base operations, things should not have been so drawn out. |
| After the company C transition driving standards slipped slightly regarding company E drivers working on the company C contract as drivers were not monitored with the IVMS and would slip back into old driving behaviours. |
| Lessons were learned by BG about the need for greater oversight of the company C contract - originally there was no plan for the HSE Supervisor role to continue; although the plan was to let company C run everything, the client still needs oversight to ensure the contractor is working to the client standards - they won't do that on their own. |
| Company C's paperwork was too long and complex for the guys to understand perhaps being too overcautious and not recognising the need to simplify for local conditions - some of the local guys would sign it but not understand it. Since the company B transition everything is there but is more precise and easier to use like the integrated MS/RA form. |
| A missed opportunity to train up local HSE personnel from the start - this was originally initiated at a site level rather than being pre-planned. |
| Challenges experienced with competency and attitude of Asset HSSE Team – the response was not helpful and there were competence gaps which were evident; the Asset team were lacking in strong leadership. These gaps have now increased with the departure of more experienced expats which is a risk for the Asset; there will still be operational and non-operational risks to be managed after the Base is handed over. |
| The segregation of the Asset HSSE Team reporting lines from the Well Engineering HSE people did not always help; the support for the Well Engineering HSSE personnel came from the Well Engineering side. |
| The selection of HSSE Managers has been a problem - concern for the future (recognising and managing risks effectively). |
| There were lost opportunities to train up local personnel in key roles within the Dar es Salaam Office - this is now becoming apparent as the expatriate roles are leaving; people are struggling because they do not have the experience and have not received a suitable amount of coaching. |

| |
|---|
| The BG Graduate program was great in terms of initial training and placement but the follow-on support was poor so many graduates have left the company. Also, the remuneration did not always reflect the technical skills as they progressed through the program.<br><br>There is a parallel between the remuneration challenge for graduates and that of remuneration for Tanzanian personnel in the asset – now that the local personnel are experienced the pay needs to be reviewed to reflect the increased experience/effectiveness of the individuals. |
| BG's model of separating out the LNG and Well Engineering functions in the asset is unusual and not necessarily helpful as there is less cross-fertilisation. |
| There are challenges with any new start-ups attracting strong characters who want to make a name for themselves and are often not interested in learning lessons from past projects – they let pride get in the way of asking for help or utilising material from the past because they worry about losing face. There have been occasions where this has contributed to incidents and people getting hurt. |
| Whoever comes in next should be looking ahead and starting to train up local people now, taking them abroad to get experience of other oil and gas operations; Potentially there is a risk now that the Asset will start operating again in five years and people will not know what to do if the Asset is not making use of the time to train people up now. |
| |

**Table 3 Contractor Management Lessons Learned**

| |
|---|
| NB There were no comments arising from the interviews with Tanzanian participants regarding contractor management. |
| **What Worked Well - Organisation/Contract Set Up/Management** |
| There were some big performance improvements noted with HSSE standards in partner companies and their subcontractors; target setting is a critical factor in achieving this. |
| With the Phase 3 company A contract the pre-audit and commitment from CEO were a big element of success. The company A CEO commented on how much is client driven regarding the level of investment for safety (or not). |
| Because the pool of larger construction contractors is small in Tanzania, contractors who have worked for us and been influenced by us are now reflecting that influence with improved compliance in Dar es Salaam. |
| |
| **Lessons Learned** |
| In the early contracts the HSE sections were too loose. There were some real headaches involved in re-wording contracts after the contract had started. Getting T's and C's right ahead of the award is a critical factor for success. |
| There were missed opportunities to really make sure that contractors fully understood contractual requirements before they signed the contract – company G/company I/company H etc were good examples of this. |
| A lack of empowerment was felt by the Mtwara based team to influence contractor selection. 'You just get left with whatever they tell you or choose'. |

| |
|---|
| Contracting organisations are looking to maximise profit and this will affect their decision making/willingness to spend in order to comply with client requirements. |
| Failure of the Asset Management Team to act upon mistakes regarding historical contractor selection; examples where the same poor-quality contractor was then brought back e.g. company H |
| There were many confrontations with international oil and gas contracting company representatives who had worked in other parts of Africa or offshore with lower HSSE standards than we had at the Base. A strong commitment was therefore required of the BG Team to enforce the site standards and not to back down. |
| There are some big challenges in attracting quality contractors to remote locational settings. |
| Local content requirements from the government posed a substantial challenge when appointing local contractors. |
| |
| **General Comments/Other Observations** |
| There are future opportunities to improve the selection of contractor personnel so that people with experience of Africa are selected; there were far too many personnel changes in the early days of the company C contract and many of the people had no experience of working in Africa. |
| There is a great potential for contractors to hide things from the client. The client model is much more transparent. Contractors can 'play the system'. |
| In the industry there is a lack of loyalty between oil and gas contracting companies and their staff because of years of layoffs; guys now go for the dollar. |
| |

**Table 4. Suggestions for the Future**

| **Suggestions for the Future - Organisation** |
|---|
| New companies/future projects should consider improvements to the environment, good relationships with the community and good benefits for staff. |
| Make sure a decent medical insurance provision is included in the third-party contracts. |
| Train up/develop more local personnel to be safety advisors. |
| Make sure the main third-party contractor can offer opportunities for people to change roles and to receive advanced health and safety training. |
| Provide more financial incentives, make sure there is trickle down if bonuses are paid to management. |
| Everyone should be responsible for health and safety in the future and should participate in health and safety. |
| In the future; use people who have worked on a new start-up like this one. Make sure there is sufficient expatriate supervision. |
| Review benefits/remuneration so that they remain competitive. |
| The client should not be afraid to change out key people if they are not the right fit/right match for the role. |

| |
|---|
| Make sure people who are coming into the operation understand Tanzanian labour law, culture, religious festivals such as Eid. Ensure that there is a good Community Liaison Advisor to help with that. |
| |
| **Systems** |
| Consider making improvements to the permit to work systems- it would be better to roll all of the various permit types into one permit. |
| Use the same systems that we have now in the future and refine them as necessary |
| Recognise that training is required on pictograms for Life Savers/Life Saving Rules as people do not understand them without training. It was confirmed that some of the drivers did not understand the pictograms relating to the driving Lifesaver until they had received the training. |
| |
| **Training:** |
| In the future the same people should be used as they have the experience, but they will need refresher training - don't assume that everyone will still be there/available in the future.<br><br>Three participants also requested training to be to a higher level for safety. |
| A suggestion that future training should also include non-work safety such as motorbike training<br><br>BG should train the TPA (Tanzanian Ports Authority) personnel particularly in safe lifting so that joint lifting operations can be improved. |
| Expand on the pilot programme for people from the base to provide some training to the students at VETA (Vocational Educational and Training Authority). |
| Consider providing 'train the trainer' programmes for local personnel for the more specialised areas such as Confined Space Entry, Scaffolding etc. |
| |
| **General Operational Considerations/Other Suggestions** |
| Be stronger as a client at addressing unauthorised absence situations where people are trying to leave the base during the day shift to go to bank, get phone credit etc |
| Acknowledgment of BG's insistence upon high standards of welfare in the company J contract - make sure these are incorporated into any new security contracts. Include provisions for: mosquito repellent for night workers and the supply of rain trousers for guards as well as rain coats. |
| A suggestion that the safety advisors from the base check community workplaces/outside of the base. |
| Distraction awareness is important in the last couple of weeks of the base – this should be emphasised in the daily toolbox talks. |

## APPENDIX 7

***A copy of the email permission from the Shell organisation to include their details within the thesis.***

All personal details concerning the Shell Asset General Manager have been removed from the email.

RE: HSE Research Thesis - Potential for Publication

[redacted]@shell.com

Fri 25/01/2019 11:35

To: Rachael Mary Mayne <RM1340@live.mdx.ac.uk>;

Cc: H.Garelick@mdx.ac.uk <H.Garelick@mdx.ac.uk>;

Dear Rachael,

Congratulations on the successful completion of your examination.

From BG/Shell's perspective, no need to anonymise any information in the report. Any learnings or insights that help to contribute to improve health and safety in sectors of society are for the common good, and as you know to practice in the entire industry is to share widely.

Wishing you much success with your further pursuits, and once again, congratulations

Regards, [redacted]

[redacted]

Shell East Africa
Dar es Salaam [redacted] Mob +[redacted]
[redacted] Tel. +[redacted], Mob. [redacted]

**From:** Rachael Mary Mayne <RM1340@live.mdx.ac.uk>
**Sent:** Friday, January 25, 2019 11:38 AM
**To:** [redacted] BGTZ-IGD/Z <[redacted]@shell.com>
**Cc:** Hemda Garelick <H.Garelick@mdx.ac.uk>
**Subject:** HSE Research Thesis - Potential for Publication

Good Morning [redacted]