



Health and safety in Micro-business – Subsistence quarry workers, Kenya

Institution of Occupational Safety & Health

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This assessment took place in November 2023.

Introduction

This report was commissioned in response to the interest shown by the International Labour Organisation and Investment Banks, in attracting economic investment to improve the safety and health of subsistence workers and enrich local lives. Contrary to local law, workers in Kenya, mostly women, are paid to pick pieces of rock from active waste tips. The conditions of work are highly hazardous and hard. The payment for this work is exceptionally poor meaning these workers remain in poverty.

In November 2023 the Institution of Occupational Safety and Health (IOSH) commissioned its members to visit the industry on location and gather information. The purpose of this report is to highlight the significant risks identified during that visit and offer ideas for investment that will transform the lives of those employed in this industry.

Discussion of issues encountered

- The operation is described in Appendix A.
- There are two key factors to consider. Firstly, quarries are not safe places. This has been illustrated by the reported deaths of some of the people interviewed for this report. This is highly dangerous work which, frankly, should be eliminated. Secondly, signs of exploitation are prominent. While working next to the quarry company, this informal workforce is not allowed to sell directly back to the company but must sell only to middlemen. They are paid a minimum for their efforts and there may be a delay of several days before payment. The middlemen then sell on the limestone at much higher prices. This has the hallmarks of exploitation and modern slavery. The workforce of women and children toil for long hours without a break and with no water provided for their refreshment.
- The limestone stones and powder are sold by the middlemen to local companies making cement and concrete. Some of the limestone powder is also used as an additive in chicken feed.

- The significant hazards associated with this work are outlined in Appendix B.

Possible Control Strategies

1. This is an unsafe environment for people to be working in. The safest controls would be to make it impossible for this informal workforce to enter the quarry by effective fencing, and to provide better alternative working opportunities so they don't need to, or both. Actions could be:
 - a. Lobby government to legislate and enforce quarry owners to make their sites safe and prevent unauthorized access.
 - b. Require quarry owners to prevent unauthorized workers from accessing the site to do this work.
 - c. Invest in farming and cottage industry in the communities these workers come from. By improving their opportunity to earn money in other ways will help to keep them away from this dangerous work.
2. These controls would take time to organise, therefore there would be a need for a transitory period of change. If this income source is suddenly removed, it would place many families further into poverty. They may struggle to feed themselves. Pragmatically, this work may need to continue for a period. How far investment in safer conditions, working practices and equipment is made is an ethical dilemma. To go too far would encourage local women and children to continue in this unsafe environment. Doing too little exposes them to risk, some of which are potentially fatal.
3. Many controls below will be better supported by an initial investment in a cooperative business for these workers to share. Initially this would hopefully open opportunities to sell directly to the cement manufacturers. It could also be used to develop safer cottage industry, finding new products and market for these women to sell into. Specifically for the quarry environment, better digging, sorting, packing equipment, and processes would improve productivity and recompense. Both actions would increase income for these workers and hopefully lift them above a subsistence lifestyle.
4. Note that there is a reason why this material is placed in slag tips. It was not cost effective for industrialised quarrying to further process it. This point limits the cost-effectiveness of control choices. The mechanisation of this work with diggers and sieves would not be cost effective. There is a reason why the quarry company create these waste tips: because it is not economically viable to process the slag any further. Plus, mechanized devices cost money to run and maintain.
5. So, during any transitional period, more specific unmechanised controls could include:
 - a. Quarry workers are educated about the hazards they face and why they are harmful. They must understand why controls are helpful in keeping them safe. Training must include safe manual handling technique.
 - b. Environmental management will help to reduce risk. Requiring quarry owners to shore up unstable walls, develop good drainage systems will help to prevent water ingress into the slopes and sides of the quarry and reduce the likelihood of collapse. Quarry owners must be held accountable for reclaiming the land and reintroducing wildlife.
 - c. Areas of quarry at risk of collapse, or quarry edges must be fenced to prevent access. Quarry owners must be made accountable for managing and enforcing access prevention.
 - d. The provision of pickaxes, shovels, and wheelbarrows. This would mitigate manual handling risk and improve productivity. However, secure

storage facilities will be needed to guard against equipment theft. Note: this may inadvertently encourage people to continue to work in this dangerous environment.

- e. The provision of personal protective clothing and equipment would be beneficial. Masks to prevent inhalation of dust, high visibility vests to improve visibility to vehicle drivers, and protective footwear and gloves to reduce injury to hands, feet. However, the provision of such things brings a need to continue to maintain these items and replace them when needed.
 - f. The building of a ramp and vehicle docking platform designed to be at the same height as the lorry bed will greatly reduce manual handling risk. The ramp would allow the sack barrows or wheelbarrows to be used to wheel up and onto the bed of the vehicle. A designated traffic route to and from the docking platform will help with pedestrian and vehicle segregation.
 - g. Welfare facilities and access to first aid are important. A facility is needed that provides a kitchen, water, shelter, and a toilet. Water presently comes from a distant borehole and needs to be regularly tested for purity. Presently, contrary to local law, this is not the case. First aid dressings and knowledge for safe application will help to avoid infection. Any first aid provision will need replenishment arrangements.
6. It would be difficult to make this work safe through investment. Providing tools, personal protective equipment/clothing, or training in the hazards faced will not materially change things for those that do this work. Falls from quarry edges, landslides and falling material will continue to have life changing or fatal consequences. Any introduction of risk control in this environment would have to be actively managed. It is unlikely that the quarry company would wish to take responsibility for this work.
7. It is sobering and sad to note that during the period of investigation, assessment, and the writing of this report, we understand that further fatalities have occurred in the locations we visited and the people we met.

Conclusions

In the present circumstances, where quarry owners are not being held accountable for making these areas safe and preventing unauthorised access, this environment remains inherently unsafe. It is important that the main aim of any investment intervention would be to give the local population higher paying alternative work to make quarry work unattractive and to improve the prosperity of these communities. Eradicating this informal industry will require better enforcement of local law and enforced requirements for the quarry owners. It will require investigation into alternative farming and crafting industry options to ensure they are viable. It may need investment in cooperatives or small businesses. Partnering with other organisations such as the Commonwealth Business Women Africa - Kenyan Chapter may provide better opportunity to find talent, provide training for skill development, open new trade opportunities, and thereby encourage safer and more rewarding work.

Appendices

Appendix A: Description of the Weaving Process

Appendix B: Hazards

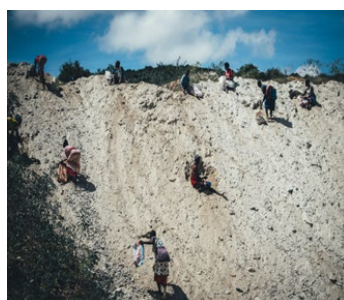
Appendix A: Description of the Operation

The women arrive at the quarry at 8.00 am. Some may have walked for three hours to get there. Some bring their children with them because they have no childcare facilities. On arrival they are assigned roles and proceed to their workstations.



Activities

1. Collecting limestone from the slag tip. There are no tools provided to dig in the slag, they use sticks, pangas (without handles) and bare hands.
2. Once the slag is depleted of limestone stones, it is then sieved to produce terrazzo used to produce a decorative form of concrete.
3. Both stones and sieved limestone are placed in gunny bags provided by the women themselves.
4. The limestone stones and the limestone powder are packed into the gunny bags. When full, these weigh over 50 kilograms.





5. The full gunny sacks are carried to collection points to be sold to middlemen. They assist with the loading of the sacks onto the lorries. The middlemen then sell it to local companies who use it to manufacture cement and concrete.



6. Quarry women leave the site at 6.00pm and return home.

Appendix B: Hazards

Hazard Present	ILO Reference	Existing Controls
Land Slides and Falling Stones Working on steep slopes can give rise to slips and falls. Stones can be dislodged by those working above and may injure those working below. If it struck the head, it may fracture the skull. Steep slopes and quarry sides are unstable and can collapse burying people under the rubble: potential fatalities.	Reference: ILO Code of Practice – Safety and Health in Open Cast Mines: First Aid 8.3 High walls 9.11 Inundation and flooding 9.12 Management of falling hazards 9.15 Competence 10.5	No controls present
Slips, trips, and falls The environment has numerous holes, rocks and vegetation that are trip hazards. When moving around the environment workers can trip and fall. A reasonable injury prediction would be broken bones. A fall from height at the quarry side can be several metres and result in fatality.	Reference: ILO Code of Practice – Safety and Health in Open Cast Mines: First Aid 8.3 Trips and slips 9.10 Falls from height 9.16 Competence 10.5	No controls present
Digging The use of sticks, pangas and bare hands to dig can cause cuts and abrasions to the hands and legs. Open wounds are routes for infection for tetanus. The postures used when digging are stooped and awkward. Strain is put on the lower back, shoulders, and upper limbs. Digging activity is consistent and frequent during the day from 8.00am to 6.00pm. Repeated musculoskeletal injury can lead to chronic conditions and inability to work. Working in this environment exposes workers to cuts on the feet and hands.	Reference: ILO Code of Practice – Safety and Health in Open Cast Mines: First Aid 8.3 Competence 10.5 PPE 10.6 Ergonomics 10.7	No controls present

Hazard Present	ILO Reference	Existing Controls
There only rudimentary cleaning and dressing arrangements. Open wounds are at risk of infection which can cause sepsis.		
Filling and Moving Sacks Gunny sacks are awkward to gras and weigh over 50 kilograms. Lifting them up and on to the back from the floor places muscular strain on the shoulders, arms and lower back. Each worker fills and moves about 10 sacks a day. Repeated musculoskeletal injury can lead to chronic conditions and inability to work.	Reference: ILO Code of Practice – Safety and Health in Open Cast Mines: First Aid 8.3 Fatigue 9.7 Competence 10.5 Ergonomics 10.7	No controls present
Vehicle and Pedestrian Segregation Pedestrians and vehicles are not segregated. No realistic control of the drivers or the workers is in place. When carrying out the investigation, the assessor was told that a worker had been killed by being struck with a lorry door. This had not been reported to the authorities or investigated.	Reference: ILO Code of Practice – Safety and Health in Open Cast Mines: First Aid 8.3 Traffic 9.25 Competence 10.5 PPE 10.6	No controls present
Loading Sacks onto Lorries The workers are required to help load the lorries. This involves heaving the 50-kilogram sacks above head height. This will cause musculoskeletal strains in the shoulders and lower back in the short term. Repeated musculoskeletal injury can lead to chronic conditions and inability to work.	Reference: ILO Code of Practice – Safety and Health in Open Cast Mines: First Aid 8.3 Fatigue 9.7 Competence 10.5 Ergonomics 10.7	No controls present
Dust The inhalation of limestone dust is harmful. It contains crystalline silica. Prolonged or repeated inhalation of respirable crystalline silica can cause silicosis and may cause lung cancer. At the very least it will cause discomfort in the chest, shortness of breath and coughing. Dust exposure to the skin can also cause dermatitis. If this develops to a chronic level, it too can be debilitating.	Reference: ILO Code of Practice – Safety and Health in Open Cast Mines: First Aid 8.3 Dust 9.1.2 Competence 10.5 PPE 10.6	No controls present

Recommended control measures:

See the International Labour Organization (ILO)'s Code of Practice on Safety and Health in Agriculture, 2010, found at:

https://www.ilo.org/safework/info/standards-and-instruments/codes/WCMS_161135/lang--en/index.htm#:~:text=This%20code%20of%20practice%20is,governments%2C%20employers%2C%20workers%20and%20other

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