



University of Venda

School of Environmental Sciences

**Development of an integrated approach of dealing with challenges of selected small-scale rock aggregate mines in Vhembe district, Limpopo province, South Africa**

**Name:** Rembuluwani Ndivhudzannyi  
**Student number:** 11571701  
**Supervisor:** Dr F. Amponsah-Dacosta  
**Co-Supervisor:** Mr S.E Mhlongo

A Dissertation Submitted to the Department of Mining and Environmental Geology, University of Venda, in fulfillment of Master of Earth Science in Mining and Environmental Geology

UNIVEN LIBRARY  
Library Item : 20161859



June 2016

## ABSTRACT

The crushed stone sector of the mining industry is a major source of employment for a significant number of people, particularly in remote rural areas, where alternative livelihoods are rare. It contributes to local economy by generating income and producing major and essential materials for the building, construction, and other industries. However, the sector is confronted with many challenges that hamper productivity and growth. Small-scale rock aggregate producing enterprises are considered to have poor health and safety record and cause environmental problems. It is important that the problems faced by small-scale rock aggregate miners are identified and practical solutions applied to improve the situation.

This study investigates the challenges confronting selected small-scale rock aggregate mines in the Vhembe District of Limpopo province of South Africa, assesses the health, safety, and environmental impacts associated with aggregate production and to develop an integrated approach of addressing the multi-faceted challenges. The research approach used involved a combination of desktop study, questionnaire and personal interviews. An appraisal of the mining methods was conducted in order to gain an in-depth understanding of the technical problems faced by the miners and SWOT analysis was carried out to determine the strength, weaknesses, opportunities and threats of each of the mines. Noise and dust levels were determined, exposure of the workers to these hazards was calculated and Job Safety Analysis tool was developed and used to assess workplace health and safety hazards. Finally, legislation and regulatory framework of the mining industry was examined in order to determine the relevance and appropriateness of these pieces of legislation to small-scale rock aggregate miners.

In this study major challenges facing small-scale aggregate miners were identified. These include lack of: finance, appropriate tools and equipment, technical know-how and theoretical knowledge, and appropriate legal and regulatory framework. The results of the SWOT analysis indicated that the weaknesses and the threats of the aggregate mining companies far outweigh the strength and opportunities. In addition, the study showed that small-scale rock aggregate mining is characterized by poor health and safety, environmental devastation, and poor marketing strategies. The measured noise and dust levels at the aggregate mines were higher than the prescribed limits and this can have potential health effects on workers if exposed to these excessive dust and noise levels over a prolonged period of time. The Job Safety Analysis assisted in evaluating and providing a thorough understanding of the site-specific hazards so that effective hazard prevention and control measures could be identified and implemented.

Based on the analysis conducted it was concluded that the challenges facing small-scale rock aggregate producers are overlapping. Hence an integrated approach was developed for dealing with these challenges. This approach involved different stakeholders such as government departments and the miners coming together to resolve the problems. These stakeholders will deal with major issues such as pollution mitigation and minesite rehabilitation, business management, acquisition of mining and mineral rights and finally facilitation of the registration processes and mining and rock processing techniques. The last step of this integration will be the training of the miners by specialist from the different departments and organizations. This should be an ongoing process and it should have a feedback mechanism so that small-scale aggregate miners report back to the various departments.

**Key words:** Small-scale mining, rock aggregate, legislative framework, productivity, health and safety, marketing, integrated approach