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EFFECT OF TRENCHING ON BLAST-INDUCED GROUND VIBRATION IN SRI LANKAN METAL QUARRIES

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EFFECT OF TRENCHING ON BLAST-INDUCED GROUND VIBRATION IN SRI LANKAN METAL QUARRIES

S.A.T.I.Samarakkody

138458c

Thesis submitted in partial fulfillment of the requirements for the degree Master of Science in Mining and Mineral Exploration

Department of Earth Resources Engineering

University of Moratuwa

Sri Lanka

June 2019

DECLARATION

I declare that this is my own work and this research does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university or other institute of higher learning and to the best of my knowledge and belief, It does not contain any material previously published or written by another person except were the acknowledgment is made in the text.

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ACKNOWLEDGEMENTS

Firstly, I would like to express my sincere gratitude to my research project supervisors Prof. P.G.R Dharmaratne, Eng P.V.A. Hemalal Panagoda and Dr. R. Premasiri for their continuous support for my MSc study and related research, for their patience, motivation, and immense knowledge. Their guidance helped me during the time of this research and writing of this thesis. I could not have imagined having better advisors and mentor for my MSc study.

Besides my research project supervisors, I would like to thank my course coordinator: Dr.Abeysinghe for his insightful comments and encouragement, but also for the hard question which incented me to widen my research from various perspectives.

My sincere thanks also goes to Mr. Piyadasa Madarasinhe (Chief executive Director, Maga Engineering (Pvt) Ltd), Mr. Kumarasiri (Director, Maga Engineering (Pvt) Ltd), Mr. Harankahadeniya (AGM, Maga Engineering (Pvt) Ltd), Mr. A.K. Edirisinghe (AGM, Maga Engineering (Pvt) Ltd), Mr. S.Jayarathne (Plant Manager, Maga Engineering (Pvt) Ltd),Eng. Ms. D.N. Ariyasena (Mining Engineer, Maga Engineering (Pvt)), Eng. Suranga (Mining Engineer, Maga Engineering (Pvt)), Eng.Malith (Mining Engineer, Maga Engineering (Pvt) Ltd), Eng. F. Piomathusoothanan (Mining Engineer, Maga Engineering (Pvt) Ltd) and Eng.Mrs.S.M.C.T.Samarakoon (Mining Engineer,Maga Engineering (Pvt) Ltd). Without their precious support it would not be possible to conduct this research.
I thank the staff of Maga Engineering (Pvt) Ltd, Arankalle Quarry site for their immense support in completing the experimental analysis related to research.

Last but not the least; I would like to thank my family: my wife, daughter and sons for tolerating me and supporting me spiritually throughout writing this thesis and my life in general.

ABSTRACT

Problems due to ground vibration are a matter of serious concern for the users of explosives. It is not possible to eliminate vibration completely or to contain them at the source. Effort need to be made in controlling them within safe level, without effecting the production schedules and economic viability of the project. When predicted or monitored vibration exceeded the statutory limit, ground vibrations are generally controlled by modifying the blast design parameters. In critical situation, digging a trench has reduced ground vibration. The extent to which it can reduce ground vibration has been examined by field experiments at a open cast quarry mine located at Arankele in Sri Lanka.

After selecting a suitable quarry site at Arankale off Kurunagala in North-Western province of Sri Lanka. Suitable place for blasting face, digging a trench and observation point have been identified.

Vibration measurement were carried out after single shot hole blasting method prior to digging a trench and after digging the trench with variation of depth of drill holes and depth of the trench, at points located just before the trench(A), just after the trench (B) and approximate observation point away from the trench (C).

Average of ten single shot hole blast carried prior to digging trench show ground vibration reduction percentage are 6.326% ,1.23%, 7.023% and 18.309% at B, and 72.262%, 54.474%, 55.183%, and 45.191% at C.

Results after digging the trench show ground vibration reduction percentages are 57.878%, 53.946%, 40.514% and 36.757% at B and 55.509%, 64.787%, 56.848% and 42.382% at C.

Such results indicate, just after the dug trench, ground vibration reduction level is very much higher compared to the results obtained before digging the trench. However considerable deferences have not been observed at the observation point under same condition. The results also show that the percentage of the reduction depend on the trench depth to blast hole depth ratio.

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