

**A STUDY OF THE EFFECTS OF BLASTING VIBRATIONS  
ON THE NEARBY STRUCTURES**



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for the Award of Degree**

*Doctor of Philosophy*

**By**

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## **Chapter 6: CONCLUSION AND RECOMMENDATIONS FOR FUTURE WORK**

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### **6.1 CONCLUSION**

On the basis of the field studies conducted in mines and quarry and their analysis and interpretations, following conclusion may be drawn:

- In the opencast coal mine, the stress-energy was rapidly absorbed, attenuated, and propagate with slower rate than stone quarry at same maximum charge per delay.
- In stone quarry, the stress-energy was gradually absorbed, attenuated, and propagate with faster rate than coal mine at at same maximum charge per delay.
- The zone within the 200 m from the blast site is considered as severely destructive region upon blasting.
- The ranges are 250-400 m, 450-600 m, 650-800 m, and 850-1000 m, and beyond 1000m from the blast site is considered as moderately destructive, semi-moderate destructive, minor destructive, threshold destructive, and non-destructive region respectively.

Safe charge weight per delay as assessed through at different distances.

- For the crucial distances of 300m & 500m from the blast site, various models predict different safe charges.
- For 300m it ranges from 203kg to 436kg for IS/L-K/D-P/GP/A-H models.
- For 500m it ranges from 701kg to 1554kg for IS/L-K/D-P/GP/A-H models.

Use of lower value of safe charge would produce conservative design and the highest values would be preferable from productivity prospective. However, even the highest value of the safe charge are going to provide safty at the given distances.

Based on the all five cases, correlation was conducted for the measured and predicted PPV and component velocities.

- The correlation was found for R to be 98.37%, for T to be 98.34%, and V to be 89.34%.
- The correlation coefficient for the predictions from the models used lies between 72.90% to 74.28% for the coal mine and ranges from 65.18% to 90.40% for the stone quarries.
- The correlation coefficient is 92.04% and 75.76% by Backpropagation ANN technique and multivariate regression analysis, respectively.
- The correlation coefficient between measured and predicted frequency is 60.65% and 26.0% by Backpropagation ANN technique and multivariate regression analysis, respectively .

## **6.2 Recommendations for Future Work**

The researchers taking this kind of work in future should try to go for:

- Drone based high speed videography per-blast and post-blast survey to delineate the precise impacts over structures of the BIGV.
- Numerical modelling of the blasting as a dynamic phenomena be adopted for larger flexibility and accuracy in prediction of structural daamges due to BIGV.