Quantifying the difficulty of tunnelling by drilling and blasting

Figure 1. Specific drilling versus excavation cross-section in the examined population. The correlation is hyperbolic and quite sharp.

Figure 2. Powder factor versus excavation cross-section in the examined population. The correlation is still a hyperbola, but is much less sharp than for specific drilling.

Figure 3. Specific drilling vs. the pull of the blast rounds.

Figure 4. Actual pull vs. cross section in the examined population.

Figure 5. Frequency distribution of the actual pulls obtained from the population examined.

Figure 6. Efficiency obtained from the population examined: it appears higher in parallel hole cuts.

Figure 7 – Correlation matrix. Values are the Pearson's correlation coefficient amongst the two variables in rows and columns. Highlighted are the correlation coefficients for the pull efficiency. A detailed description of each parameter is given in Mancini et al. (1998).

Figure 8. Representation of the distribution of rock types according to Class I

Figure 9. Representation of the distribution of rock types according to Class II

Figure 10. Representation of the distribution of rock types according to Class III

Figure 11. Representation of the distribution of rock types according to Class IV

Figure 12. Representation of the distribution of rock types according to Class V

Figure 13. Representation of the distribution of rock types according to Class VI