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人工神经网络在巷道爆破中的应用研究

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摘要 应用人工神经网络模型，分析装药量、炮眼数量等爆破参数对巷道掘进循环进尺的影响。通过对实验结果的分析，得到如下结论：(1) 提出单位炸药循环进尺和单位炮眼循环进尺的概念，这2个概念可为巷道爆破设计的优劣提供评判标准。(2) 当炮眼数量足够时，单位炸药进尺随循环装药量的增加而降低，最后趋于一个稳定值，也就是装药过多会浪费炸药。(3) 在相同装药量情况下，随着循环炮眼长度的增加，单位炸药循环进尺将得到提高，但装药量越高这种提高幅度会相对越小。(4) 当装药量足够时，单位炮眼循环进尺随循环炮眼长度的增加而降低，最后趋于一个稳定值，也就是炮眼过密或过长会浪费炮眼。(5) 在循环炮眼长度一定的情况下，增加循环装药量，单位炮眼进尺将得到提高，但提高的幅度随着循环炮眼长度的增加而相对地减小。

关键词 爆破工程；人工神经网络；巷道爆破；单位炸药循环进尺；单位炮眼循环进尺

分类号

APPLICATION RESEARCH OF ARTIFICIAL NEURAL NETWORKS TO TUNNEL BLASTING

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Abstract

With the artificial neural networks(ANN) model，the paper analyzes the influence of the blasting parameters including explosive charge，blastholes on tunnel circulation measurement. The analytical results are advisable and as follows：(1) The concepts of tunnel circulation measurement of one-kilogram explosive and tunnel circulation measurement of one-meter length of blasthole are put forward. They provide a certain standard for the judgment whether a tunnel blast design is acceptable or unacceptable. (2) When there are enough blastholes，circulation measurement of one-kilogram explosive decrease when circulation charge increases till to a steady value. That is to say some explosives will be wasted if too much is used in a cycle. (3) Circulation measurement of one-kilogram explosive rises with the increases of circulation length of blastholes when circulation charge keeps to the same，but the enhance extent relatively becomes small with circulation charge increases. (4) When the circulation explosive charge is enough，circulation measurement of one-meter length of blasthole decreases with circulation length of blastholes increasing till to a steady value. (5) Circulation measurement of one-meter blasthole goes up with the increases of circulation explosive charge when circulation length of blastholes keeps the same，but the enhancement extent relatively becomes small with the increase of circulation blasthole length.

Key words blasting engineering；artificial neural networks (ANN)；tunnel blasting；circulation measurement of one-kilogram explosive；circulation measurement of one-meter length of blasthole

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