

成岩地质体的初始应变能状态及其对开挖引起位移场的影响

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摘要 针对成岩地质体初始应变能状态开展3个试验, 在试验中注意到一些有趣的、以往不理解的现象。以这些试验现象为依据, 提出一个与现有理论不同的关于成岩地质体初始应变能状态的假说。该假说认为, 成岩地质体的初始应变能密度处处为0。以这一假说为依据编制的新计算程序能较好地模拟出开挖引起围岩位移场中各部位位移矢量的方向和相对大小。此外, 还讨论了在经历构造运动的地质体中, 开挖时其初始应变能状态是否能引起竖直回弹应变的问题。

关键词 [岩石力学](#); [初始应变能状态](#); [物理模拟](#); [开挖](#); [岩体变形](#); [位移矢量的方向性](#); [数值模拟](#)

分类号

ORIGINAL STATE OF STRAIN ENERGY IN A ROCK MASS AND ITS EFFECT ON EXCAVATION-INDUCED DISPLACEMENT FIELDS

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Abstract

Because of the suspects on the theory of unloading rebound, three experiments are performed; and it is noticed that some interesting phenomena that are not understood previously are discovered. Based on the observed phenomena, a hypothesis on the original state of strain energy in a geological body after diagenesis, which is different from present theories, is advanced. On the hypothesis, there is no strain energy in a geological body after diagenesis unless other external forces act on it. This new hypothesis gives a possible reason for the surface subsidence around an open pit. The constitutive equation by which the behavior of the cast material body is characterized in one of the three experiments is established. A new

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computer program is developed; and it is employed in trial examples of simulation of displacement fields from excavation; and satisfactory results are obtained. The achieved results agree well with in-situ measurements in direction of displacement vectors as well as in relative magnitude. The question when a geological body after tectonic movement(s) is excavated, is discussed, whether or not its original state of strain energy will cause up-rebound strain.

Key words [rock mechanics](#); [original state of strain energy](#); [physical simulation](#); [excavation](#); [deformation of rock mass](#); [direction of displacement vectors](#); [numerical simulation](#).

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