



USE OF THE HARFORD DYNAMIC BOLT FOR STRENGTHENING UNDERGROUND DEPOSITS USING ANKERS

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Abstract

This article covers the theoretical and practical aspects of the harford dynamic bolt for securing underground mine workings using anchor fasteners. The advantages, application area, and installation technology of the harford dynamic bolt were analyzed. The research results show that the anchor reinforcement method is effective in increasing the stability of mine workings, reducing material consumption, and ensuring safety.

Keywords: Bolt, mine working, reinforcement, anchor, mechanical anchor, cemented anchor, chemical anchor, mine safety.

Introduction

In the mining industry, ensuring the stability of underground workings is one of the most important problems. The complexity of geological conditions, high rock pressure, the presence of groundwater can cause rapid destruction of reinforcement structures. Therefore, in addition to traditional methods, anchor fasteners have been widely used in recent years for securing workings using various materials.

Anchor reinforcement is a modern method of working reinforcement, which serves to maintain the natural strength of the working mass and bind it with additional force. The purpose of the research is to study the effectiveness of anchor reinforcement in ensuring the stability of mine workings, to determine the optimal parameters, and to implement them in practice.

Methodology. In the research process, geomechanical modeling, mathematical calculations, laboratory experiments, and the tensile limit of the Harvard dynamic bolt are carried out.

The term "anchor" (German *der Anker*) translates to "Anker." Miners usually call an anchor a steel rod (rod) with a periodic profile, i.e., a fastening element installed in the borehole. One end of the anchor must have a head or thread and a nut for holding the washer. The most suitable option is a threaded and nut anchor.

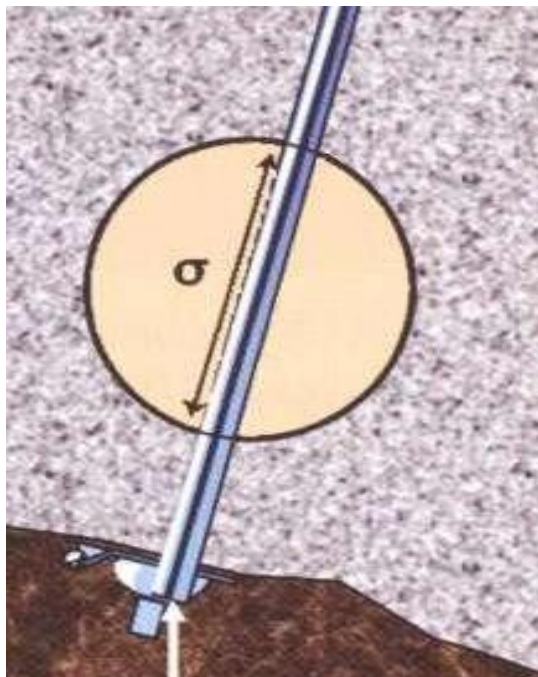


Figure 1. Garford dynamic bolt

(acceptance of stresses on the walls (roof) of the underground mine working)

Result

The nut allowed pressing the washer against the working contour and ensuring the initial tension of the anchor. A rod with a diameter of 16-22 mm and a length of 1.8 - 3.0 m, due to its high elasticity, works more effectively with tensile strength, but also with tensile strength. Therefore, anchors are more effective

against stretching. Therefore, the most rational method is the installation of anchors along the directions of maximum displacement of the working contour. The Garford dynamic bolt is a solid steel rod consisting of a threaded steel bushing. The bolt is designed for working with tar mixture. A threaded sleeve is used for mixing resinous substances. This bolt is distinguished by a special part that allows the bolt to stretch significantly when the rock expands. The diameter of the rod in the anchor position decreases to a smaller size than the initial one (Fig. 1).

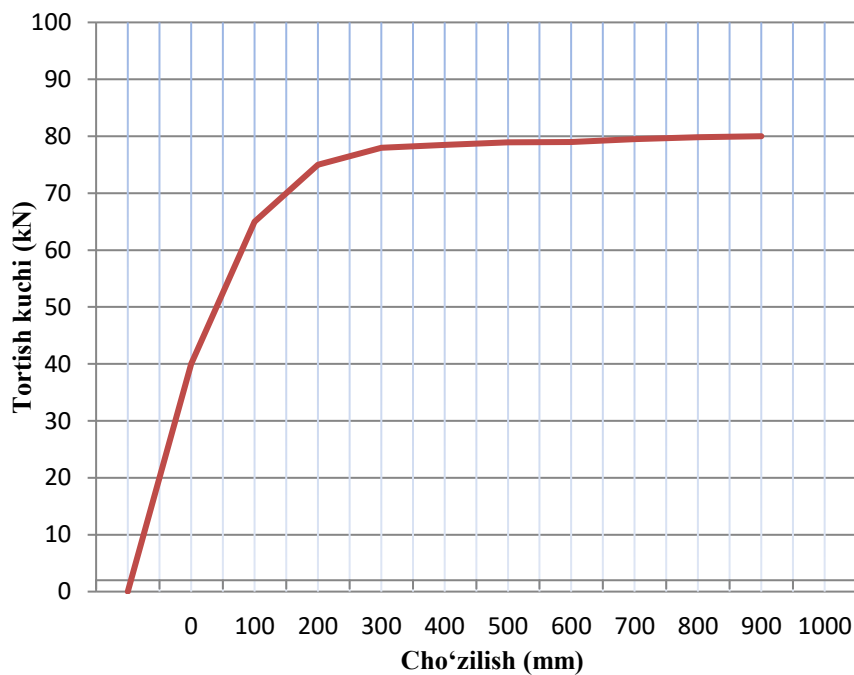


Diagram 2. Garford dynamic bolt tensile strength

Conclusion

Securing underground mine workings with anchor supports is a highly effective technology in the mining industry. This method not only guarantees long-term stability of workings, but also ensures economic efficiency and safety. Therefore, it is advisable to widely apply anchoring technology in modern mines.

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