

Exclusive Rock Bolt Placement Machine that Realized Full Mechanization of Drilling, Mortar Injection, and Rock Bolt Insertion

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Summary

KAJIMA CORPORATION developed an Exclusive Rock Bolt Placement Machine that conducts drilling, mortar injection, and rock bolt insertion continuously by one boom. This machine was built on a generic wheel loader with one boom for rock bolt placement only, two booms with baskets, and a guidance system that shows the drill position and placement angle. This machine reduces the task of rock bolt loading at high places, which is laborious work, as well as reducing the dangerous work at the tunnel face.

Structure of the Rock Bolt Placement Boom

The boom for rock bolt placement has a guide cell for drilling, a guide cell for mortar injection, and a guide cell for rock bolt insertion. The three guide cells move concentrically. Once the machine is set, the process from drilling to rock bolt insertion can be done without moving the boom. A maximum of nine rock bolts can be loaded on the rock bolt holder in one supply.

Guidance System using Relative Coordinates

By allowing the guide cell for drilling to conduct a three-point pickup of the position of the already placed rock bolt, the guide cell can lead the operator to the drilling position and placement angle of the next rock bolt. With this system, the operator does not have to measure the absolute coordinate of the machine. As only relative coordinates necessary for determining the drill position and placement angle, time to finish the process became shorter with only the cabin operator necessary for the work.

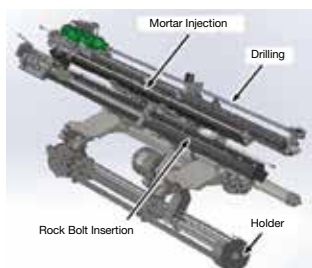


Fig.1 Composition of the Rock Bolt Placement Boom



Fig.2 Rock Bolt Placement Machine

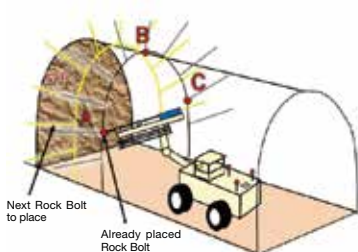


Fig.3 Structure of Guidance System

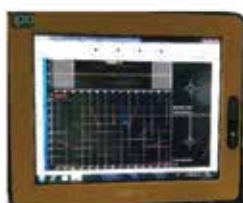


Fig.4 Guidance Screen inside Cabin