

~"Zero" Entry Work at the Tunnel Face~ Automatic Explosive Charging System



Significant improvement in safety through the automation of Explosive charging operations!

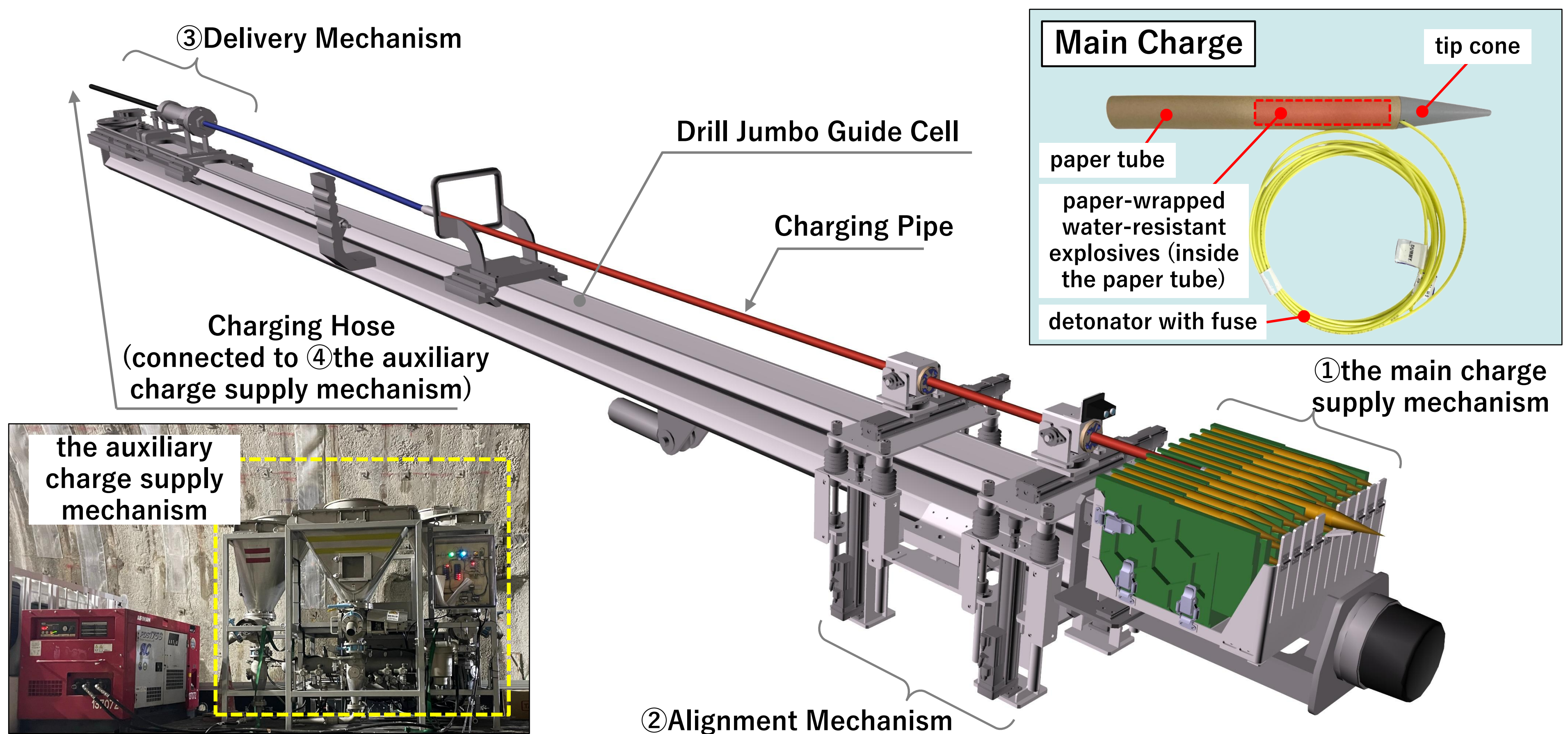
Maeda Corporation has developed the "Automatic Explosive Charging System" which enables charging work without entering directly beneath the tunnel face, to improve safety and productivity in conventional explosive charging operations.

Overview of the System

This system is mounted on the guide cell of a drill jumbo. The system consists of:

- ①Main charge supply mechanism ②Alignment mechanism ③Delivery mechanism ④Auxiliary charge supply mechanism

The main charge consists of water-resistant explosives and non-electric detonators, encapsulated in a cartridge with a tip cone that allows for alignment error tolerance and a paper tube for storage and gripping. The auxiliary charge uses granular explosives, enabling mechanical loading through air pressure for dense packing.

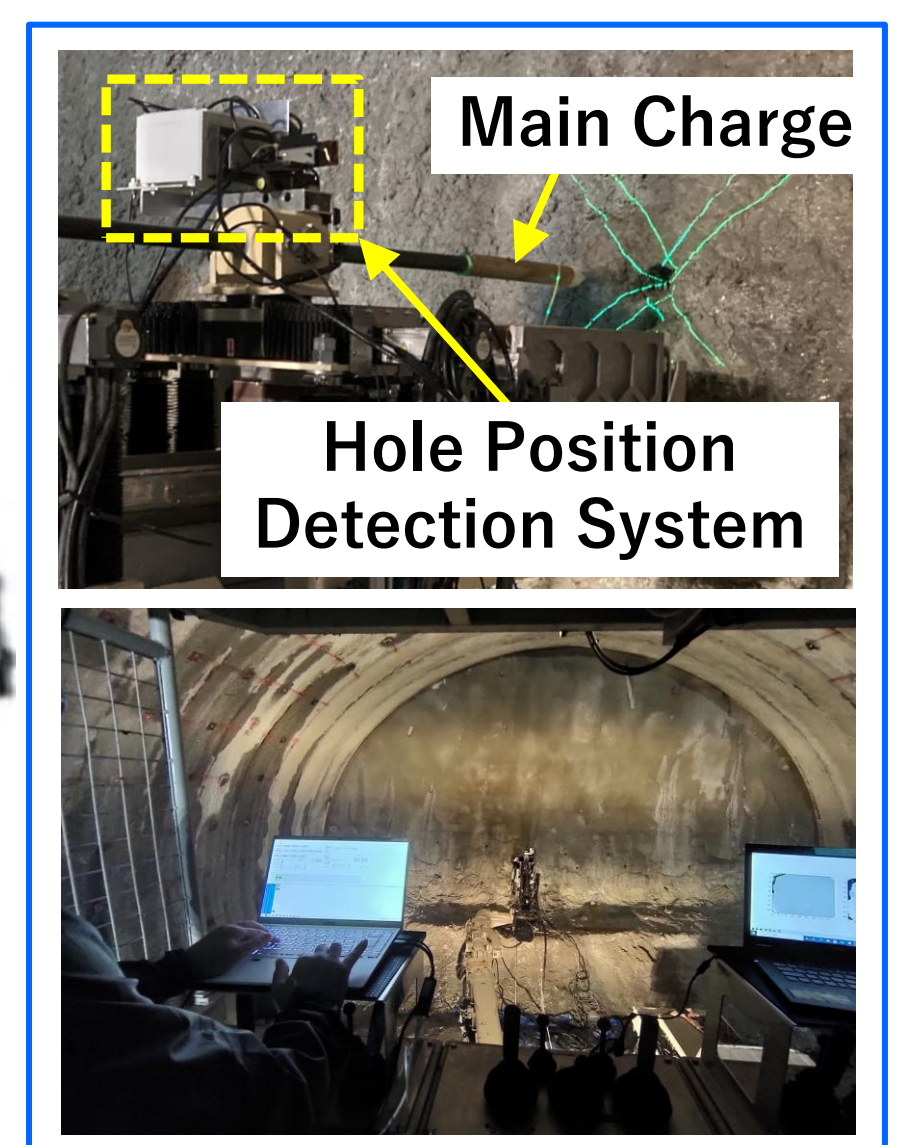


Features of the System

- ◆The drilling position (coordinates), angle, and depth are linked to the dedicated charging machine from the computer jumbo.
- ◆A newly developed hole position detection system accurately calculates the center coordinates of the drilled holes.

Automated Charging Procedure

- ① Rough alignment
- ② Acquire the center coordinates of the
- ③ Pickup of the main charge
- ④ Align to the acquired center coordinates
- ⑤ Insert the main charge
- ⑥ Charge the main charge using air pressure
- ⑦ Charge the auxiliary charge
- ⑧ Charging complete → Move to the next hole



Expected Effects After Implementation

- Safety Improvement

- Charge by machinery reduces the risk of **rock fall accidents to "zero."**

- Labor Reduction

- Reducing the number of **personnel** to a single operator: **5 → 1.**

Contact email address : mizutani.k@jcity.maeda.co.jp