

Advanced Technologies from Hitachi for a Changing Mining Business

AUTONOMOUS HAULAGE SYSTEM TRIALS OF DUMP TRUCKS IN AUSTRALIA

The mining industry in the past has been characterized by rising production volumes based on a background of strong demand for mineral resources from emerging economies. With the slump in commodity prices since the widespread economic recession triggered by the 2008 global financial crisis, however, the focus of mining company businesses has been undergoing a major shift toward improving things like productivity and safety.

Making use of data and other information in operations is important for improving productivity and efficiency. Wenco International Mining Systems Ltd., a subsidiary of Hitachi Construction Machinery Co., Ltd., supplies a fleet management system (FMS) that collects and analyzes data from excavators and dump trucks used at mines, and is used by vehicle dispatchers to issue instructions and other information to drivers (for more information, see the article on p. 20 of this issue).

Because the typical practice at a mine is for each excavator to work in conjunction with a number of dump trucks, improving mine productivity requires that these vehicles be operated more efficiently. To achieve this, Hitachi is also working on the development of its autonomous haulage system (AHS) for dump trucks, which improves safety and reduces operating costs. A current challenge is how to operate a number of dump trucks within the same area. The know-how built up by Wenco is crucial to identifying safe and efficient ways of operating at mines where large numbers of vehicles, not just dump trucks, are moving around the site.

An AHS demonstration project underway in Australia consists of trials involving both real and virtual



Demonstration project for autonomous haulage dump-trucks underway at a mine in Australia

dump trucks. This approach was adopted to minimize the cost and time of the trial and to reduce the risk of vehicle breakdowns, and also to make development more efficient by using simulations of virtual machinery. The information and communication technology (ICT) of the companies in the Hitachi Group is utilized in the development of this advanced technology.

ACHIEVING IDEAL MINE OPERATIONS THROUGH PIT TO PORT OPTIMIZATION

Whereas the scope of FMSs in the past has been restricted to individual mines, the migration of its FMS to the cloud is a field where Hitachi's comprehensive capabilities ("One Hitachi") can be put to good use. While this brings new technical challenges such as ensuring reliable information security and reducing the communication delays that are a function of physical distance, it is also a business where Hitachi can deploy the ICT it has built up through its work on building infrastructure systems. Migrating the FMS to the cloud will enable remote dispatching, meaning that managing and issuing instructions for vehicle dispatch at distant mine sites can be handled from an urban command center. Furthermore, analyzing data from a number of mines should help identify potential solutions that would not be evident from the information obtained from a single site. Hitachi recognizes the mining industry as a key field for the application of big data.

As well as being a site for the operation of large machinery such as excavators and dump trucks, a mine also consumes a lot of water, energy, and other resources. In recent years, mining companies have been showing a growing interest in "pit to port" optimization involving all of the processes from excavation to processing, transportation, and loading at the port. With its extensive know-how in social infrastructure that includes ICT, plant, water treatment, power generation, and railway systems, Hitachi has the potential to deliver promising solutions for ideal mine operations.

REFERENCES

- (1) "Hitachi Construction Machinery's Dynamic Solution is Set to Change Mine Management—What is 'MICT'?", *Tierra+*, No. 112, pp. 3–9 (Mar. 2015) in Japanese.
- (2) "A Stage for Collaborative Creation for Big Data Utilization as it Spreads Worldwide," *Realitas* 12, pp. 28–33 (Mar. 2015) in Japanese.