

**HARD-LINE**  
**RRC**  
RADIO REMOTE CONTROL

**tele@p**

OPEN PIT GOLD MINE  
QUEBEC - 2012

**CASE STUDY**

## ABSTRACT

Many mine sites around the world are situated in areas that are geographically remote, climatically harsh, and face unique geotechnical challenges. The mine outlined in this study is no exception. It is located in the Town of Malartic, in the heart of Abitibi's Gold Belt. The mine is Canada's largest operating open-pit gold mine, with 21 million tonnes of ore extracted and 669,192 ounces of gold **produced in 2019**.

(<https://canadianmalartic.com/en/about-us/operating-mine/>)

The implementation of new technology for mine development activities has allowed the company to apply a teleoperated production fleet to its open pit operations. This article is intended to outline the benefits of using HARD-LINE's Radio Remote Controls (RRC) and TeleOp Control Systems on several heavy-duty machines at the mine starting in 2012.

## INTRODUCTION

A unique challenge the mine had to overcome was that the open pit operations were located directly above several historic underground mines. This environment introduced many hazards and had potential for high-risk scenarios. The hazards included the sudden and unexpected collapse of the open pit floor and pit walls, as well as the potential loss of front-line workers and equipment into the underground workings. This occurred when the mine lost a drill rig amid a cave-in during its open pit drilling campaign. The drill was left behind as the risk and cost of recovery was too high. Fortunately, there were no injuries.

The application of HARD-LINE's remote control technology supported the mine's approach to improve safety and increase production throughout its open pit operations. The company applied HARD-LINE's Radio Remote Control (RRC) system to its production fleet and later upgraded to the TeleOpsystem. This system enables continuous operation of heavy machinery, while the operators complete their duties from an operator station far from the hazards. This approach eliminated all probable risks associated with such a unique environment and ensured that the operators can go home without any injury after every shift.

## APPLICATION

The company initially purchased five RRC systems to operate a CAT D10T dozer, CAT 374 excavator, CAT 345D excavator, CAT 6050 hydraulic shovel, and a CAT 994F front-end loader. The systems enhanced the operator's safety by enabling the operation of heavy machinery from a distant location. The systems provided a diverse and flexible solution that managed all the vehicles in the production fleet, ultimately improving safety, productivity, and control of the mining operations. Malartic later upgraded key pieces of equipment in its production fleet with HARDLINE's TeleOp technology to completely remove the operators from the risk zones. The mine later added a Hitachi EX5600 hydraulic excavator with HARD-LINE's TeleOp system to the fleet.

The installation of control stations offered front-line workers a safe and ergonomic environment. The cabins were installed on site and suspended to provide a better view of the work area. There are currently two control stations implemented to operate the Hitachi EX5600 and CAT 6050. The TeleOp systems are used on a regular basis and play a significant role in the production fleet and schedule. The CAT D10T, CAT 345D, and CAT 374F continue to operate with RRC line of sight.

Figure 2. A TeleOp enabled Hitachi EX5600.



Figure 1. A TeleOp ready CAT 994F Loader (Senior Technician Phil Pelland for scale).

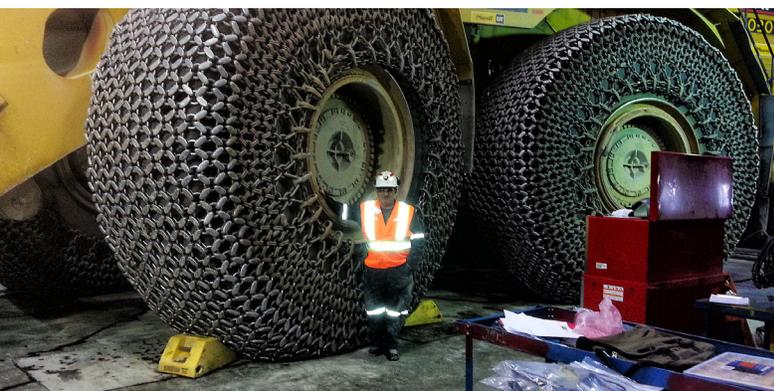


Figure 1. A TeleOp ready CAT 994F Loader.



**CONCLUSION**

Mining technology, over the past decade progressed incrementally from line-of-sight to tele-operations. HARD-LINE's team of experts worked to design, manufacture, install, and support the systems on site. TeleOp and RRC systems eliminate the operator's exposure to hazardous environments. The overall working environment improves significantly as the operator can work from an ergonomic operator control station located in an office setting. Ultimately this method provides enhanced safety benefits, while optimizing the mine's development and production schedule.

Disclaimer: The heavy machinery used in this project are products and creations of Caterpillar and Hitachi.

Figure 3. A Teleop ready CAT 6050 Hydraulic Shovel (F550 for scale).



**PRODUCTIVITY**

- 📈 Increased Profitability
- 📶 Enhanced production
- 👤 Improved work efficiency
- ⚙️ Operation during shift change
- 🖱️ User-friendly software

**SAFETY**

- 🚚 Reduced fuel consumption in transporting personnel
- 🔊 No exposure to dust, flying rock, diesel fumes, and noise
- 🔧 Sustainable parts in remote can be fixed

**WORK / LIFE BALANCE**

This system prioritizes safety and productivity, allowing operators to comfortably control equipment from ground level to save lives.

- ⚠️ Operators removed from underground dangers
- 🚚 Minimized travel risks
- 🚦 Traffic control



**SUPPORT**

24 Hour service & support



**CONTACT**

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