RRC SYSTEM FOR THE CLEARING OF ORDNANCE IRON HORSE - 2002

CASE STUDY

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ABSTRACT

The purpose of this case study is to examine the benefits of HARD-LINE's RRC (Radio Remote Control) and Farsight (extended line of sight) technology in its application to an above-ground used-ordnance cleanup project of a military testing field in Calgary, Alberta, completed by Iron Horse Earthworks. As part of a former military base located on Tsuu T'ina First Nation land, the testing field in question contained remnants of ordnance such as artillery projectile, mortar shells, hand grenades, and live cartridges. Iron Horse Earthworks was contracted to extract and transport all such material to a waste disposal site. The primary concern which drew HARD-LINE's involvement was the danger posed to the **excavator operators** in the course of performing cleanup operations, where they would be at risk of encountering unexploded live ordnances. In 2002, Iron Horse was referred to HARD-LINE by an employee of existing HARD-LINE client Lupin Gold Mine, located in Nunavut. The CEO of Iron Horse, Christopher Bews called HARD-LINE and spoke with President Walter Siggelkow to discuss outfitting an excavator with remote control technology, which would allow the operator to complete the task from a safe distance.

To accomplish this goal, HARD-LINE designed an **RRC Farsight system**, eliminating operator exposure to hazardous conditions by allowing them to control the excavator from a workstation at a distance, with live video feed to facilitate visibility of the workzone. The initial proof of concept was so effective at promoting safe operation that several more machines were outfitted for remote operation, with HARD-LINE's involvement ultimately spanning 7 years.

INTRODUCTION

The client's vision for the project involved hand-held remote control outfitting for an Hitachi hydraulic excavator, which would be used as the test subject for remote control viability on the cleanup project. The objective was for Iron Horse to be able to safely complete the removal of ordnance materials (both inert and potentially live) from the testing field of the former Calgary military base.

They would then dispose of this material at a designated waste management site. HARD-LINE therefore proposed an RRC Farsight system, with the operator using the unit from a chair-based workstation with live camera feeds, constructed within a van. This would facilitate operating from as safe a distance as possible, away from any potential live ordnance and with adequate shelter should live explosive devices be encountered.

CHALLENGE

Before HARD-LINE became involved, the original approach to the problem was to attempt to construct armor plating for the excavators performing the cleanup. However, the extra weight from the armor impeded the functionality of the drive and swing motors, making driving and operating impossible. Any protection afforded to the operator would therefore be required to be lightweight and minimally intrusive to the excavator's systems. A more innovative solution was required.

APPLICATION

The first stage of the project involved outfitting a single Hitachi hydraulic excavator with the RRC Farsight system. Rather than the RRC unit being hand-held, the unit was built into a generator-powered workstation within a vehicle, where the operator could sit at a safe distance to perform duties with live camera feeds of the workzone. The proof of concept project was built and installed within 4 weeks, with the operator trained in its use on-site. Following the installation and the successful test of the system, HARD-LINE outfitted a second excavator, a John Deere bulldozer, and a CAT track loader. A third excavator was also later outfitted, to replace one machine that was damaged. The full project for all machines was complete after approximately 7 years.

This project marked the first construction application completed by HARD-LINE. Additionally, because of the several machines converted to remote operation after the successful proof of concept, it was also the first instance of multiple machines interacting while being remotely connected. Furthermore, this project involved the first RRC Farsight system employed on an excavator in HARD-LINE's history.

BENEFITS

With the successful incorporation of remote control functionality for the excavators, bulldozer, and track loader, operators were able to perform their duties safely and effectively. The site cleanup was completed as contracted and ultimately cleared 12,000 acres of land.

CONCLUSION

Through the application of HARD-LINE's customized RRC and Farsight extended line of sight system, Iron Horse Earthworks was able to complete a project originally thought to be impossible. This innovative system allowed the client to eliminate the threat to the operators' well-being and effectively operate their machines from their workstation at a distance, facilitating successful cleanup of the site, to the benefit of the client and the community served.

Figure 1. CAT bulldozer and Hitachi hydraulic excavator work in unison to clear ordnance from area.

HARD-LINE RRC RADIO REMOTE CONTROL

FARSIGHT

CASE STUDY

FARSIGHT FEATURES

Farsight Portable Video provides video for conventional radio remote control systems. The extended line of sight increases the range allowing heavy machinery to be maneuvered around corners and farther into a draw point. This product heightens the efficiency of the LHD remote cycle, and it can be adapted to easily transfer between machines.

- Pan-tilt zoom features
- 12" colour LCD monitor
- Forward and reverse cameras
- Wireless connection to the monitor
- Provides overall view of obstruction
- Custom options available

Figure 2. Hitachi excavator outfitted with RRC (Radio Remote Control). This marked HARD-LINE's first surface project.

ADAPTABILITY

The radio remote control is designed and produced to achieve superior performance while being exposed to the harsh conditions of underground mining.

- Brand compatible – any machine, make or model
- Easily customized for specific applications in any industry
- Multiple machines interacting remotely

RELIABILITY

RRC's dependability, design, and functionality translate into increased productivity and revenue for any mining operation it is used in.

- Easy to diagnose and repair
- Fewer components means less down time
- Designed to survive in harsh environments
- HARD-LINE maintenance programs available

SAFETY

Bi-directional controls allow not only the control of the machine but a responsive touch that gives the operator the ultimate level of security and safety.

- Operators maintain a safe distance
- Unique link ID prevents controlling the wrong machine
- Continuous signal check to switches and joysticks

SUPPORT
24 Hour service & support

CONTACT
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"IT WAS A GREAT OPPORTUNITY WORKING WITH THE TEAM AT HARD-LINE.

USING THEIR REMOTE-CONTROL TECHNOLOGY ON OUR HEAVY MACHINERY PROVED TO BE A MAJOR SUCCESS FOR THIS ORDNANCE CLEANUP PROJECT. OUR OPERATORS WERE KEPT SAFE THEY WERE ABLE TO PERFORM THEIR DUTIES EFFECTIVELY."

CHRIS BEWS OWNER, IRON HORSE TRENCHING INC.