Bandweaver

CASE STUDY

No Fire | No Damage | No Losses

FireLaser LHD Fire Prevention on Coal Conveyor Belt

Project Summary

Client	Cement plant, Ukraine
Application	Raw Coal Feed Conveyor Belt
Solution	Bandweaver FireLaser Linear Heat Detection (LHD)
Technology	Distributed Fibre Optic Sensing
Conveyor Length	Approximately 30 metres
LHD Installation Height	Approximately 70 cm above belt
Key Outcome	Smoldering coal detected at an early stage — no fire, no damage, no production loss

Monitored | Secured | Safe

The Scenario

A raw coal conveyor belt (Belt No. 26), approximately 30 metres in length, is used to transport coal to a cement mill at a cement manufacturing facility located in Ukraine.

On 5 September 2025, the plant was shut down for scheduled repair activities. The coal supply line was idle, and the personnel normally stationed in that area had been reassigned to other maintenance tasks. There were no operators actively monitoring the conveyor at the time.

With the line unmanned and out of service, a smoldering condition was developing undetected within accumulated coal material beneath the belt. Without detection capability, this type of event can go unnoticed for hours — long enough for a fire to take hold.

Client Requirements

Raw coal conveyor systems present a well-documented fire risk in cement production. Coal dust and spillage can accumulate and self-ignite, and a developing smolder can go undetected for hours — particularly during plant shutdowns when routine operator presence is reduced. The cement plant needed a detection solution that addressed this risk reliably and practically within the constraints of an active industrial facility.

- **Continuous detection across the full conveyor length, including during idle and shutdown periods.** Belt No. 26 is approximately 30 metres long. Any detection system needed to cover the entire run without gaps, and remain active even when the conveyor itself was not in operation.

- **Early-stage detection with precise alarm location reported to the CCR.** Operators needed to be alerted to a developing heat event before it could escalate, and the system had to tell them exactly where to look — not just that an alarm had triggered somewhere on the line.

- **Suitability for a cement plant environment.** The installation environment is dusty, subject to vibration, and exposed to coal dust and debris. Conventional point detectors are prone to fouling and false alarms in these conditions, and their maintenance requirements in a working plant are significant.

- **Low ongoing maintenance requirement.** The operations team needed a system they could rely on without frequent servicing or calibration. Any solution requiring regular in-field intervention would place an additional burden on already busy maintenance personnel.

- **A proven technology with a path to expand across the facility.** Belt No. 26 was identified as high risk. Positive operational experience would support the case for rolling out the same technology to additional conveyor applications, including the quarry feed line.

What Did We Do?

Bandweaver's FireLaser distributed fibre optic linear heat detection system was installed along Belt Conveyor No. 26, with the sensing cable mounted at approximately 70 cm above the belt surface. The system continuously monitors temperature along the full cable length, performing 20–30 measurements per minute, and reports alarm location directly to the plant's Central Control Room.

Figure 1 - Fiber optic cable installation

At 18:04 on 5 September 2025, the FireLaser system generated an alarm indicating elevated temperatures on Belt No. 26. Operators in the CCR immediately dispatched an inspection team to the identified location.

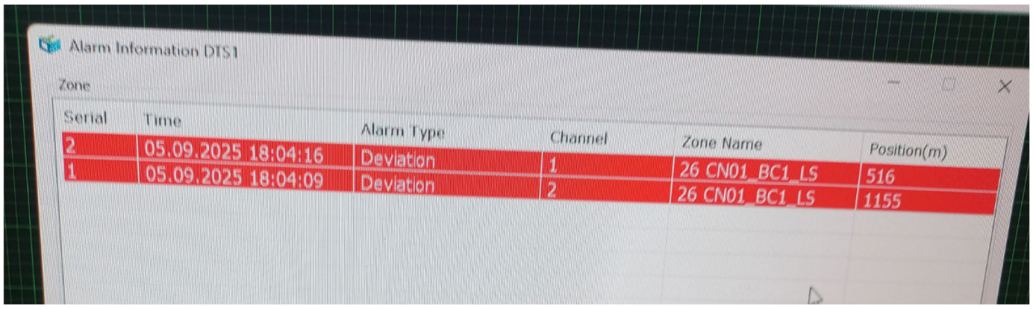

Figure 2 - FireLaser LHD alarm notification

The inspection found several smoldering points within accumulated coal material beneath the conveyor. Recorded temperatures were:

- Up to 400°C within the smoldering material
- Approximately 105°C on the belt surface itself

The production team organised safe cleaning and removal of the affected material. The event was resolved without incident.

Figure 3 - Photo of smouldering material

Root Cause

The investigation identified coal spillage accumulation beneath the conveyor as the contributing factor. This is a recognised operational challenge on raw coal handling systems, particularly during periods when a conveyor is idle and routine inspection routines are temporarily suspended. Addressing coal spillage management and maintaining regular inspection schedules — even during shutdowns — is now a key focus for the site.

Operational Experience and Maintenance Lessons Learned

The cement plant installation has provided valuable operational experience on running a fibre optic LHD system in an active cement plant environment. The following summarises the challenges encountered and how they were resolved.

Initial Challenges

During the initial operating period, several instances of optical fibre damage occurred. The causes were:

- Large lumps of coal falling beneath the conveyor and striking the cable
- Metal wire debris impacting the fibre
- Accidental damage during conveyor roller replacement

These were all mechanical, external causes — not failures of the detection system itself.

Corrective Actions

Two targeted training programmes were put in place:

- Maintenance personnel were briefed on the location of the optical cable and the precautions required when replacing conveyor rollers or carrying out repair work in the vicinity of the fibre.
- Conveyor operators were instructed to inspect conveyor conditions regularly, remove accumulated coal lumps and metal wire debris, and keep the conveyor underside clear.

Following these measures, fibre damage incidents were practically eliminated and system reliability improved significantly.

Welding-Related Alarm Event

A separate incident occurred when welding was carried out approximately 2–3 metres from the optical cable. The FireLaser responded to the heat from the welding operation and generated an alarm. While no fire was involved, the event confirmed the sensitivity of the system.

Maintenance personnel were subsequently instructed to use heat shields during welding and to take the presence of the fibre optic cable into account when planning hot work. No recurrence of this issue has been reported.

Key Recommendations for Future Installations

Based on operational experience at the cement plant, the following are considered essential for any new conveyor LHD installation:

- Develop clear maintenance procedures for working around the optical fibre cable, and share these with all relevant teams before commissioning.
- Train maintenance personnel on cable location and protection requirements before any conveyor repair work begins.
- Establish regular inspection routines for coal spillage and debris removal — and maintain these routines during plant shutdowns.
- Implement hot-work procedures that include heat shielding requirements when welding near the fibre.
- Keep a stock of spare optical fibre cable on site to allow rapid replacement in the event of accidental damage.

Benefits To The Client

Outcome — Early Detection Prevented Escalation	
✓ **No fire developed**	The smoldering event was identified and resolved before any ignition could occur.
✓ **No conveyor damage**	Early detection meant the belt and supporting equipment were unaffected.
✓ **No equipment losses**	No replacement or repair costs were incurred as a result of the incident.
✓ **No production losses**	The plant's repair schedule was not disrupted by a fire-related shutdown.
✓ **Detection during shutdown**	The system alarmed on an idle, unmanned conveyor — precisely when human monitoring was absent.
✓ **Precise alarm location**	The FireLaser displayed the location of the heat anomaly in the CCR, enabling a targeted and rapid response.

About Bandweaver Technologies

With an installed base of over 90,000 km and 9,000 systems installed worldwide, Bandweaver's vision is to be the first choice for integrated distributed fibre optic sensing solutions across the globe. Since 2002, Bandweaver has been committed to delivering reliable, innovative, client-centric and value-added products and services, via a dedicated and talented team of people.

Bandweaver manufactures and distributes advanced fibre optic monitoring sensors and integrated technologies, enabling customers to monitor, secure and keep personnel and critical assets safe.

Utilising the latest technologies, Bandweaver provides solutions for Linear Heat Detection, Intrusion Detection, Condition Monitoring, Dynamic Cable Rating and Leak Detection.

For further information please contact our global team at info@bandweaver.com