



Conveyor Health Management Innovation for Continuous Monitoring



Company
FUTURE FIBRE TECHNOLOGIES

Interview with
Paul Rowan, Business Development Manager

- ▶ **Overview**
Conveyor belt replacement and downtime have a detrimental impact on operations. For this reason, it is imperative to take preventative measures by predicting mechanical failures before they occur to avoid operational issues.
- ▶ **Requirements**
 - Accurate, predictive, actionable, and quantifiable data provision.
 - Reliable and easy to install.
 - Adaptable, durable and cost-effective.
- ▶ **Solution**
 - Controller, system includes Advantech single board computer PCE-5129 and 4U chassis ACP-4010.
 - Fibre optic sensing cable.
 - Cloud platform reporting.
 - Control system integration.
- ▶ **Benefits**
 - Significantly reduce production down times and overall labor costs whilst maximizing productivity.
 - Experience an excellent return of investment in an estimated six-month period or less.

Background

A conveyor belt develops particular defects after a period of regular usage, which affect the performance of operations and productivity. Belt replacement and downtime have a detrimental impact on operations. For this reason, it is imperative to take preventative measures by predicting mechanical failures before they occur to avoid any of the issues mentioned above. Proactive monitoring of any conveyor belt ensures the safe and cost-effective operation of the conveyor system well in the future. Condition monitoring systems entail various detection methods including regular visual inspections. However, conventional monitoring methods are unreliable, time-consuming, labor-intensive, costly, and often hazardous. In addition, they rely on hearing, infrared cameras, or microphones, which are flawed as worn bearings don't always emit heat, background noise often creates microphone interference, and people are not perfect.

Requirements

This project involved conceptualizing a solution for Future Fibre Technologies (FFT), who are manufacturers of complete fibre-optic intrusion detection systems. FFT are specialists in fibre optics, developing superior technology that maximizes sensitivity and probability of detection, providing a more reliable solution. The project focused on designing detection methods with the following criteria:

- Accurate, predictive, actionable, and quantifiable data provision
- Reliable and easy to install
- Durable and cost-effective
- Adaptable

A successful project should significantly reduce production downtime, costs associated with production delays, and potentially catastrophic damage like fires, not to mention an overall increase in overall manufacturing performance.

“ We experienced an excellent return of investment in an estimated six-month period or less. This solution protects capital investment, maximizes efficiency, and prevents workflow interruption. ”

- Paul Rowan, Business Development Manager, Future Fibre Technologies

Solution Description

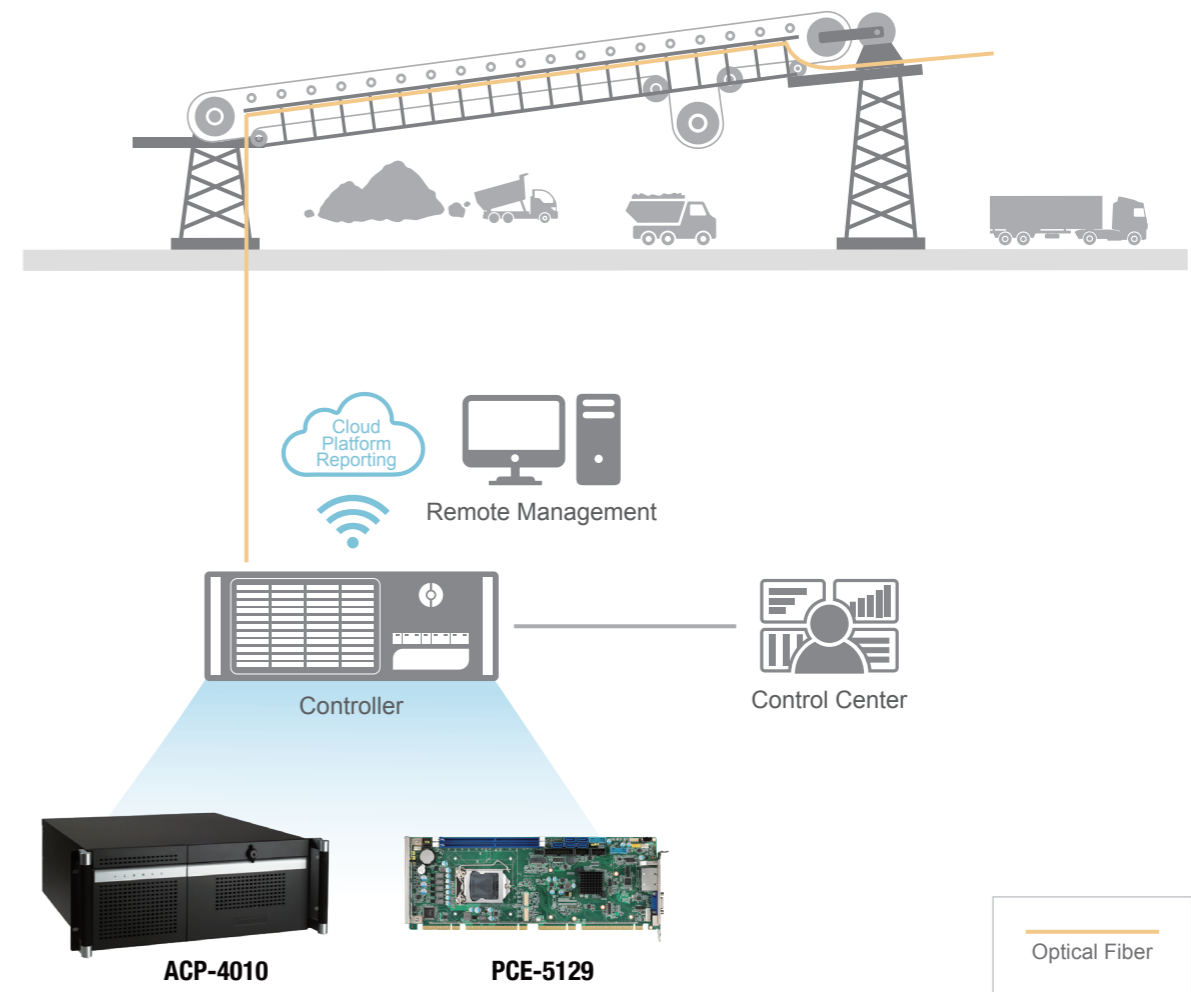
Recent studies show that up to 90% of machinery malfunctions are predictable and can be avoided if adequate maintenance is carried out online without service interruption.

Therefore, the FFT Aura IQ system utilizes Advantech PCE-5129 industrial grade single board computer and ACP-4010 4U rackmount chassis with dual system support, to combine with FFT optical hardware sensing systems and advanced analytic software with cloud connectivity to create an IoT Cloud Edge sensing solution.

An optical fibre cable is converted to a Distributed Acoustic Sensor (DAS) and connected to the central equipment and software. The sensing fibre cable is attached to a conveyor structure that provides unique sensing points every 0.5m.

In real-time, the condition monitoring system provides information to operations and maintenance personnel by examining input data from each sensor point. It allows failures to be predicted long before they occur, allowing for planned maintenance and servicing, preventing disruption, and overall cost associated with bearing failures.

System Diagram



Why Advantech

Conveyor belt condition monitoring system help significantly reduce production down times and reduce overall labor costs whilst maximizing productivity. In addition, the system provides proactive reporting, enabling timely and minimal cost maintenance activities. The customer is provided with a complete solution utilizing ultra-sensitive fibre optic sensors enabling comprehensive MTTF data on rollers and bearings at all points on conveyors. The system is networked over the cloud, utilizes IoT, and is integrated into their existing production and manufacturing control systems. As a result, the successful implementation of the monitoring system enabled by Advantech delivers high reliability, improved safety, minimized maintenance costs, and improved operations to the customer.

The solution is flexible and could be deployed in other plants (including new and existing systems). With this solution, the customer can experience an excellent return of investment in an estimated six-month period or less.