Twisthink helps Flexco save mining customers millions of dollars in downtime using AWS IoT to predict conveyer belt repair

Case Study

Flexco, a manufacturer of conveyer belt cleaners, worked with Twisthink to develop an IoT sensor and cloud platform that monitors the blade component of their product to reduce unplanned downtime. By connecting the sensor to AWS IoT Analytics and AWS IoT Core, Flexco can apply machine learning models to help mining customers predict when the blades on the belt cleaner will need to be changed, thereby saving millions of dollars in lost productivity. Twisthink helped Flexco get their product to market faster by designing the device and platform to leverage AWS cloud services and APN partner solutions.

Halting conveyer belts during production time is the pits for mining companies

In the mining industry, it is expensive to interrupt production, so companies run their equipment and machinery 24 hours a day, 7 days a week for several weeks. They schedule short periods of downtime to service all their equipment at once. If something goes down outside of the scheduled maintenance window, it can cost the organization millions of dollars in lost productivity.

Flexco manufactures conveyor belt cleaning systems with blades that scrape the belt to remove residue. The more severe the application the sooner they need to be maintained. Service engineers manually inspect the blades during the scheduled maintenance periods to repair broken or malfunctioning ones, but this method relies on an engineer's judgement call. If a destressed belt cleaner is overlooked and breaks, the damage to the belt could result in shutting down the operation entirely.

IoT devices on conveyor belt cleaners carve out new value in an old industry

Many mining companies today have sites across the world, and they're creating new ways to be more efficient through technology and automation. From fully automated dump trucks, to cross continental plant management, they are putting IoT technology to work. Flexco approached Twisthink to find a way to leverage this IoT megatrend for the good of their business and their customers.

Twisthink mapped the useful life of a conveyer belt and developed visual research tools (VRT) to explore potential opportunities. The VRTs were tested to determine what was financially viable and offered benefits to the key stakeholders involved—Flexco, its distributors, technicians, and the mining companies. Based on the research and VRT testing, they proposed creating an IoT device that predicts when blades need maintenance or to be replaced.

About Twisthink

Twisthink transforms companies by bringing new digital and connected offerings to life that their customers desire. By leveraging the proven process of human-centered design (HCD), Twisthink creates new user experiences and business models through digital connectivity that involves sensing, algorithm development, connectivity, IoT and cloud architecture, and UI / UX design. Having connected more than 100 million devices to cloud, Twisthink is at the forefront in designing, validating, and building digital solutions that grow businesses and improve human experiences.

> "The biggest reason we decided to adopt IOT is because our customers are adopting it. Investing in a new IOT offering and a platform like AWS was right in alignment with where our customers are going."
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> — Chip Winiarski, Chief Marketing Officer, Flexco

Preventing unplanned downtime using IoT and AWS is worth its weight in gold

Twisthink developed Flexco Elevate™ Belt Conveyor Intelligence™, an innovative, real-time monitoring system that harnesses predictive analytics to help mining operations know when to provide maintenance or replace blades before they break. The system attaches an i3 Device to the cleaner frame at the end of a conveyer belt where it aggregates and processes data that describes how long the belt's been running with product on it and how long the blades have been in service. The data is wirelessly transferred to AWS IoT Core and AWS IoT Analytics, then displayed on a custom platform, Flexco Elevate.

Created in partnership with Uptake, an industrial AI and IoT data science leader, the platform uses machine learning algorithms to help operations teams know when blades need to be replaced. Uptake chose to build the platform on AWS because it supports Linux and meets local data residency compliance and security requirements across the world. Additionally, the AWS Partner Network (APN) provides fully vetted, ready-to-integrate solutions that Twisthink could leverage in the final product.

Leveraging AWS cloud services and APN partner solutions brings Flexco Elevate to life

Several APN partner solutions contribute to the final Flexco Elevate product. The i3 Device uses edge technology developed on AWS by NXP to process data quickly and store it locally before sending it to the cloud via wireless carrier. Using cellular service and sending data in packets extends battery life of the device and doesn't require internet connectivity at the jobsites. To transfer data from the wireless carrier to the cloud, Twisthink and Uptake used a connectivity solution developed on AWS by APN partner, u-blox.

Uptake built the self-learning algorithms that run the Elevate platform on AWS using AWS IoT Core and AWS IoT Analytics. Being on AWS allows mining companies to deploy sensors all over the world and monitor their belts in near realtime from anywhere. Twisthink designed the digital sensor so it could be retrofitted to tens of thousands of belt cleaners already deployed in the field and connected to the AWS platform without needing to shutdown or disrupt conveyor belt operations.

Using AWS technology eliminates the need for onsite belt monitoring

With Flexco's intelligent belt monitoring device on AWS, companies can more accurately predict when blades will need to be replaced and schedule repairs during a planned downtime. Service engineers no longer need to manually test and determine the life of the blade on the belt cleaner, saving them hours of unnecessary work and helping the plant get back to production sooner.

Why AWS?

Flexco and Twisthink chose AWS as the platform for Flexco Elevate because it provides a great mix of performance, stability, innovation, and cost effectiveness. According to the technologists at Twisthink, "AWS's IoT offering is the most complete on the market, from FreeRTOS, to AWS IoT Core, to Amazon Sagemaker. These products enable our development team to rapidly build and deploy, while giving us confidence that we're getting a platform with a solid long-term roadmap." By choosing AWS, Twisthink was also able to leverage the talent of the APN ecosystem to enhance their design and bring it to market faster for Flexco.