FLEXCO

ELEVATE YOUR OPERATION WITH A
SMART BELT CLEANER

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eleVate e®
BELT CONVEYOR INTELLIGENCE™

www.FlexcoElevate.com

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Flexco Elevate is a remote monitoring solution for belt cleaners and belt health that utilizes real-time data and machine learning insights to detect belt cleaner issues before they affect your operation.

A CHECK ENGINE LIGHT FOR YOUR BELT CONVEYOR SYSTEM

Similar to the check engine light in your car, Elevate alerts you when your belt cleaners need attention. It allows for the early detection and early resolution (EDER) of events related to the operation of your belt conveyor system.

Employee Safety & Time Management
Managing time on inspections

Belt Health
Maintaining optimal belt condition

Product Wear
Changing parts too soon or too late

Failure Modes
Inadequate maintenance routine

Carryback
Unnecessary maintenance and part damage

THE ULTIMATE SMART BELT CLEANER

Cleaner Health and Maintenance

Flexco Elevate® takes the guesswork out of cleaner maintenance and blade health by highlighting predictive insights early to help align the work to your shutdown from day one.

Gain Insights on Your Cleaner and Belt

The i3 device and other smart components can be an additional tool to provide information to help you or any other key team members.

Data Management and Best Practices

Service records, equipment lifecycle insights, and belting events are recorded to be shown in our dashboard or delivered to your plant systems.

TURN ANY FLEXCO BELT CLEANER INTO A SMART BELT CLEANER

The Flexco Elevate IoT system combines the i3 Device, i3 Mobile App, and i3 Dashboard that integrates with Flexco belt cleaners in a few easy steps. Once the i3 device is installed in conjunction with any Flexco belt cleaner, insights are immediately transferred to the Elevate dashboard. That information, combined with maintenance information that is logged by your team on the mobile app, provides predictive data-driven insights directly to your dashboard so you can remotely monitor belt cleaner productivity and be notified when your belt cleaners need attention.
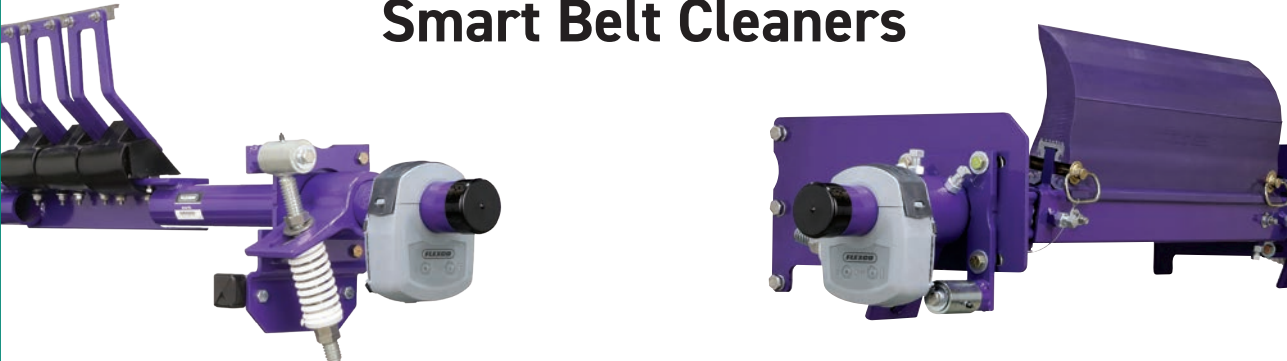
i3 Device
A single self-contained unit comprised of sensors, communication, and power with no additional equipment

+

Flexco Belt Cleaners
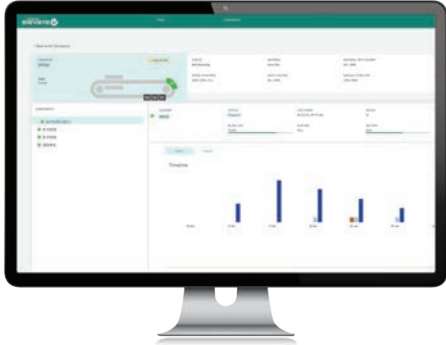Remove carryback and excess material

EQUALS

Smart Belt Cleaners

### i3 Mobile App
Create digital service records from the field

i3 Dashboard
Browser-based interface to access insights, service history, data, and notifications

Notifications
Alerts from the system on insights or status changes to inform you externally from the dashboard

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i3 DASHBOARD CAPABILITIES

Conveyor Overview

Alerts Generated by Data Science

Detailed Service History
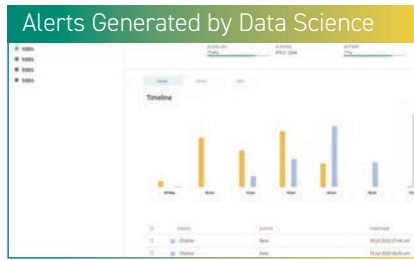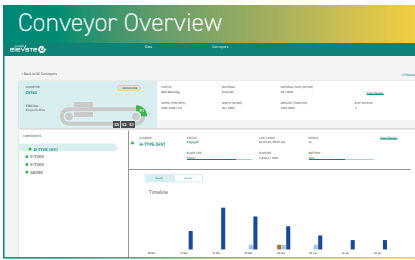
A key feature of the Elevate Dashboard is Flexco's traffic light system. Points are allocated based on the severity of each alert and tallied so that users can easily view the general health of their conveyor belt. The interactive dashboard tells operators:

- Anomaly event notifications
- Chatter alerts
- Disengaged cleaner notifications
- Device orientation change notifications

- Urethane and carbide blade wear
- Location of installed cleaners across your operation
- Belt conveyor system specifications: belt speed, material conveyed and belt width

- Belt cleaner engagement status
- Belt and cleaner run times
- Digital maintenance logs

DIGITAL SERVICE RECORDS

The i3 Mobile App enables service crews to input maintenance details during physical inspections. This creates a detailed digital service record. Checklist inputs include:

- Cleaner inspected
- Record remaining blade life
- Tension adjusted
- Battery changed
- Manually disengaged cleaner
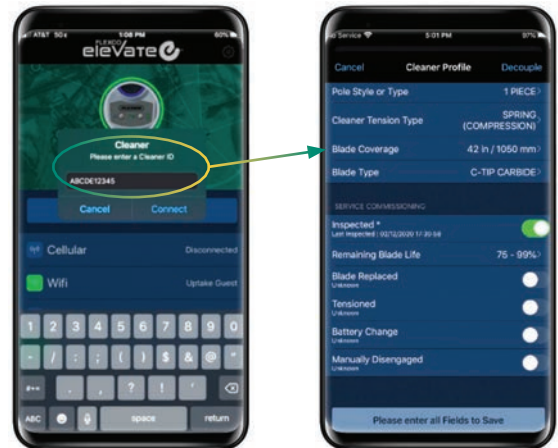
EASY INSTALLATION & SERVICE

From installation and activation, to the mobile app and dashboard, everything about Flexco Elevate is user-friendly and designed to make your job easier.

Each device is simply clamped to the pole end of a Flexco precleaner or secondary cleaner within minutes. It is not necessary to shut down the conveyor to install the device. Cleaner specifications are pre-entered into the Dashboard by Flexco before the installation, so once its installed and paired to the i3 Mobile App, it immediately begins to gather belt cleaner data and insights for remote access by plant personnel.

INSIGHTS

The Elevate platform works on both machine learning and statistical algorithms to provide insights into abnormal activities occurring on your conveyor system.

Belt Running

Reports whether the conveyor is operating. This is done by analysing several statistical features (inputs) over a single 1-second sample.

Cleaner Engaged

Reports whether a cleaner is contacting the belt. The model is trained to detect the difference between a disengaged and engaged cleaner; learned statistically over the last 120 samples. The model seeks to detect a net decrease in vibration power. This insight employs both Machine Learning and service event-based rules to predict the engaged state.

Anomaly Event

Reports when an event is deemed to be an outlier (or abnormal) in terms of previously recorded events. The severity measure is also reported (the degree to which the event was considered abnormal).

Device Orientation Change

Reports the i3 device orientation change from one wake period (check-in) to the next. Sensitive to >11deg change in pole angle rotation and >5deg change in tilt with respect to the pole.

Chatter

Reports whether the cleaner is skipping or bouncing across the belt. The algorithm places a threshold over the difference between a state learned statistically over the last 3 device check-ins and a state determined from the current check-in. The algorithm seeks to detect a net increase in vibration power.

Blade Run Time

Reports how long the conveyor has been running, in the context of a given blade. This is done by summing up the time intervals recorded between belt-running insight responses. Blade runtime is used when computing carbide blade life.

Blade life

Reports how much blade life is remaining (0%-100%) before the blade will need to be replaced. For urethane blades, this is done by accumulating the device rotational angle change over time as the blade wears.

For carbide tips, an initial manual input is needed. From there, the device will estimate the remaining blade life based on the previous runtimes of the belt cleaners.

Impact Event

Triggered if the magnitude of 3-axis accelerometer exceeds a configurable threshold at any time. The default threshold is 15.5g.

TECHNICAL SPECIFICATIONS
FLEXCO ELEVATE®
Cleaner Mounted i3 Device

i3 Devices
3 unique device types used by geography -
US, Australia, and Global

Dimensions
7.875" x 6.375" x 3.5"
(200mm x 165mm x 90 mm)

Compatible Pole Diameters
2.375" and 2.875" (60mm and 73mm)

Compatible Cleaner Type
Flexco Precleaners and Secondary Cleaners

Battery Type
Non-rechargeable, lithium-thionyl chloride

Operating Temperature Range
-22°F to 149°F (-30°C to 65°C)

-4°F to 104°F (-20°C to 40°C)
in explosive environments

Regulatory
FCC (US); RCM (Australia); CE, ISED (Global)

Certifications, Standards
IP66, RoHS (US, Australia and Global)

Explosive Environments
IECEx (Australia); MSHA and ATEX
(contact Flexco regarding specific standards)

Security

- End-to-End Security:
  Encryption layers in OS and
  in transit AWS hosted API
  endpoint end-to-end security

- Wi-Fi Security:
  WEP, WPA, WPA2

- i3 Mobile App:
  Permission-based access
  (only pre-defined authorized
  users can access portals)

- i3 Dashboard:
  Permission-based access
  (only pre-defined authorized
  users can access portals)

- Data Ownership:
  All belt cleaner i3 data is wholly
  owned by the customer

Wireless Communications

- Cellular Communication:
  LTE CAT-M1 on AT&T (US);
  LTE CAT-M1 on Telstra (Australia);
  2G/3G on AT&T (Global)

- Wi-Fi Communication:
  802.11a/b/g/n/ac

- Bluetooth®
  Wireless Communication:
  Low energy up to 10m range

Insight Access

- i3 Mobile App:
  Android, iOS Compatible

- i3 Dashboard:
  Optimized for Google Chrome,
  but accessible via
  preferred browser

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