



## Reliable Systems Guarantee Operational and Process Stability

**An industrial image processing system (Inline Control System) prevents disruptions at a Power & Free Golf vehicle assembly line at Volkswagen AG in Wolfsburg, Germany.**

Power & Free systems are among the world's most commonly used conveyor systems. They consist of two tracks: An overhead ("Power") track that holds a conveyor or carrier chain and a lower "Free" track. The overhead track transports the chain-driven trolleys.

### The Challenge

At Volkswagen AG in Wolfsburg assembly work is conducted while the vehicle bodies are hanging from the Power & Free conveyor system before the cars roll off to the final production stage.

The consistent throughput contributes to the wear of assembly line components. Wear and abrasion led to wheel breakage and damaged ball bearings at the conveyor trolleys, resulting in costly production downtimes.

### The Solution

- >> Two 3D cameras monitor the trolley wheels on both sides of the overhead tracks of the Power & Free system and save the analyzed images.
- >> A 2D camera scans and saves the trolley IDs.
- >> If certain trolley wheels exceed the predefined tolerance limits, the corresponding data and the trolley IDs are saved to a database.
- >> When tolerance limits are exceeded, a command is transmitted to the PLC and the corresponding trolley is automatically removed from current production for servicing.





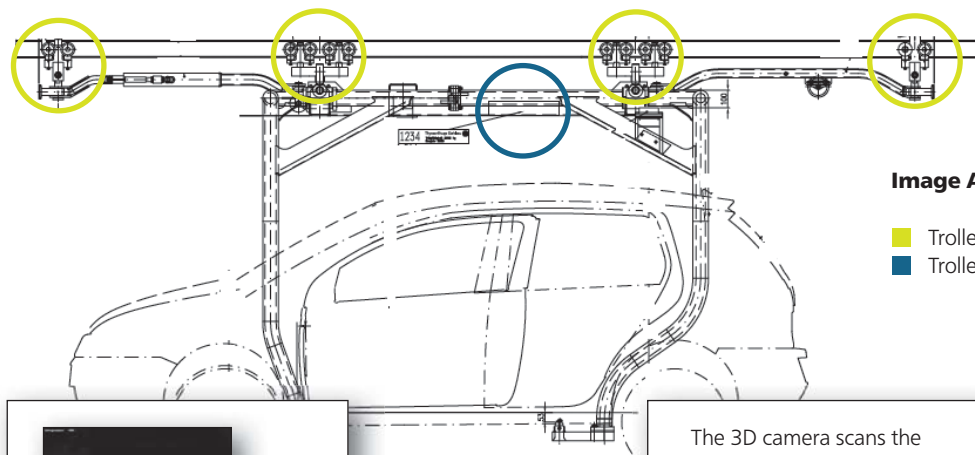
## Project Brief



### 2D/3D SMART camera system for inspecting trolley wheels in Power & Free conveyors (overhead rail chain conveyor)

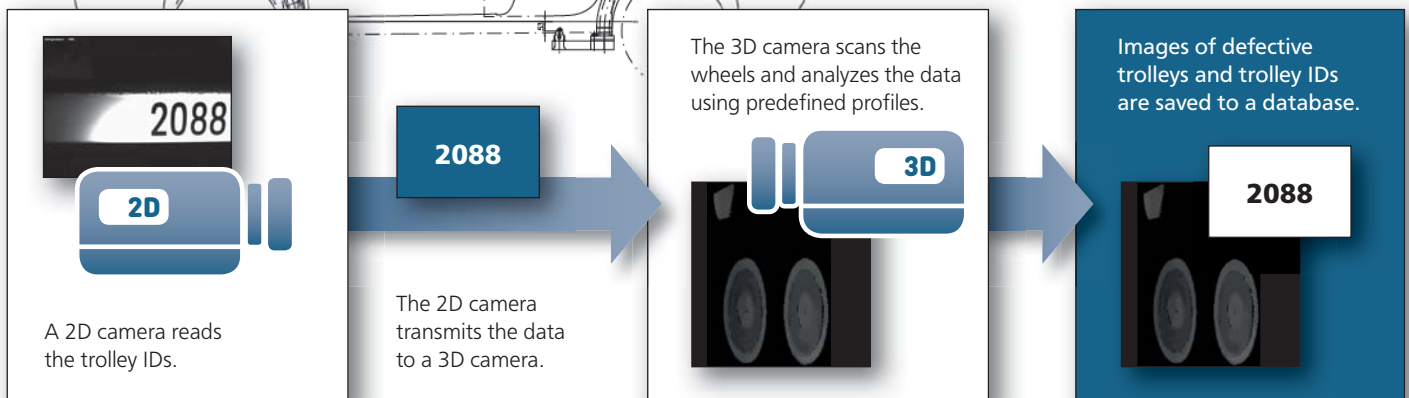
The Inline Control System analyzes the wheels of chain-driven trolleys that are passing through the assembly line. The 3D cameras take three-dimensional images to detect trolley wheel damage. Every picture is analyzed directly inside the camera. If excessive wear or abrasion is detected, the wheel is damaged,

and the camera issues a signal that is used to automatically reroute the defective trolley to a service track for repairs. In addition, all images of damaged trolleys are transmitted to and stored on a server.



#### Image Analysis

- Trolley wheel inspection
- Trolley IDs are read





## The Efficient Use of Industrial Imaging Technology Eliminates Costly Visual Inspections

### Jürgen Bastek, Manager of Maintenance, Volkswagen AG



„A product that was quick to install and would provide a reliable trolley wheel inspection was important to us.

We wanted to proactively detect material fatigue to avoid corrective measures”, says Jürgen Bastek, Manager of Maintenance at Volkswagen AG.

The PSI Technics camera solution completely fulfilled his expectations: “The fully automated inspection of our Power & Free installation guarantees a smooth production process. Costly production downtimes are a thing of the past.”

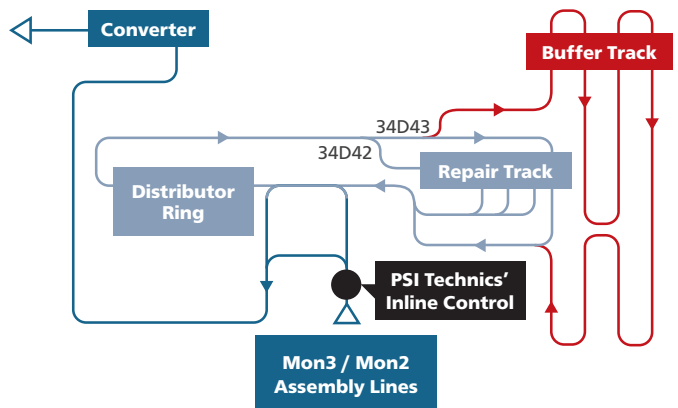
### Project Duration

Volkswagen has been using the Inline Control System since June 2011. The system was installed within a few hours during a planned production-free maintenance period.



### Detection of trolley wheel damage at an overhead vehicle body conveyor system\*

3D camera technology is used to monitor the trolley wheels for potential defects.



\* The system monitors the conveyor trolleys at GOLF assembly lines.

### Trolley wheel inspection at the end of assembly lines Mon3 / Mon2\*

- >> When **no defects** are detected, the trolleys continue to the distribution track where they are either routed to a buffer track or to a transfer track.
- >> When **defects** are detected, the trolleys are routed to the repair track for servicing. Once repaired, they are routed back to the distribution track.

## Digital Image Processing Systems Increase Quality and Productivity

**PSI Technics' Inline Control System is an ideal solution for the automated inspection of Power & Free conveyor systems. It guarantees safe, reliable production processes, contributing to quality and process optimization.**

- >> Optimized workflow
- >> Safe and reliable production processes
- >> Early detection of defects and automatic redirection of damaged trolleys
- >> Analyzed images of damaged trolleys can be saved for either manual or automatic rerouting
- >> Reduced expenses for manual and/or visual tests and inspections, such as measuring, locating, checking and identifying components
- >> Replaces several sensors with one flexible camera
- >> Avoids production downtime caused by defects
- >> Increased productivity
- >> Tremendous cost savings due to significantly reduced downtimes
- >> Quality assurance leads to improved product quality
- >> Fault detection reliability > 99%
- >> Increased customer satisfaction

### Branchen

- >> Automotive
- >> Metal coating plants
- >> Abattoirs
- >> Food industry
- >> Foundries



**State-of-the-art digital imaging technology complements or replaces manual and visual inspections in manufacturing processes.**



#### MEASURE

- >> Length, width, height
- >> Area, volume, size
- >> Object count



#### DETERMINE

- >> Physical presence
- >> Position (x,y), (x,y,z)



#### MONITOR

- >> Correct assembly
- >> Form



#### IDENTIFY

- >> Text and icons
- >> Codes and patterns

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