# switchon

AI-Powered Defect Detection for
INJECTOR CLIPS

Industry : **AUTOMOTIVE MANUFACTURING**

Client : **MARUTI SUZUKI INDIA LTD.**

Summary: Maruti Suzuki India Limited (MSIL) is a subsidiary of the Japanese automaker Suzuki Motor Corporation. It is one of the largest automobile manufacturers in India and has been a significant player in the Indian automotive market since its inception. MSIL needed to ensure the presence, absence, and proper fitment of injector clips to avoid serious issues. They implemented the **SwitchOn DeepInspect** System to tackle this challenge. With DeepInspect, MSIL achieved a flawless 100% inspection result, eliminating errors and human intervention.
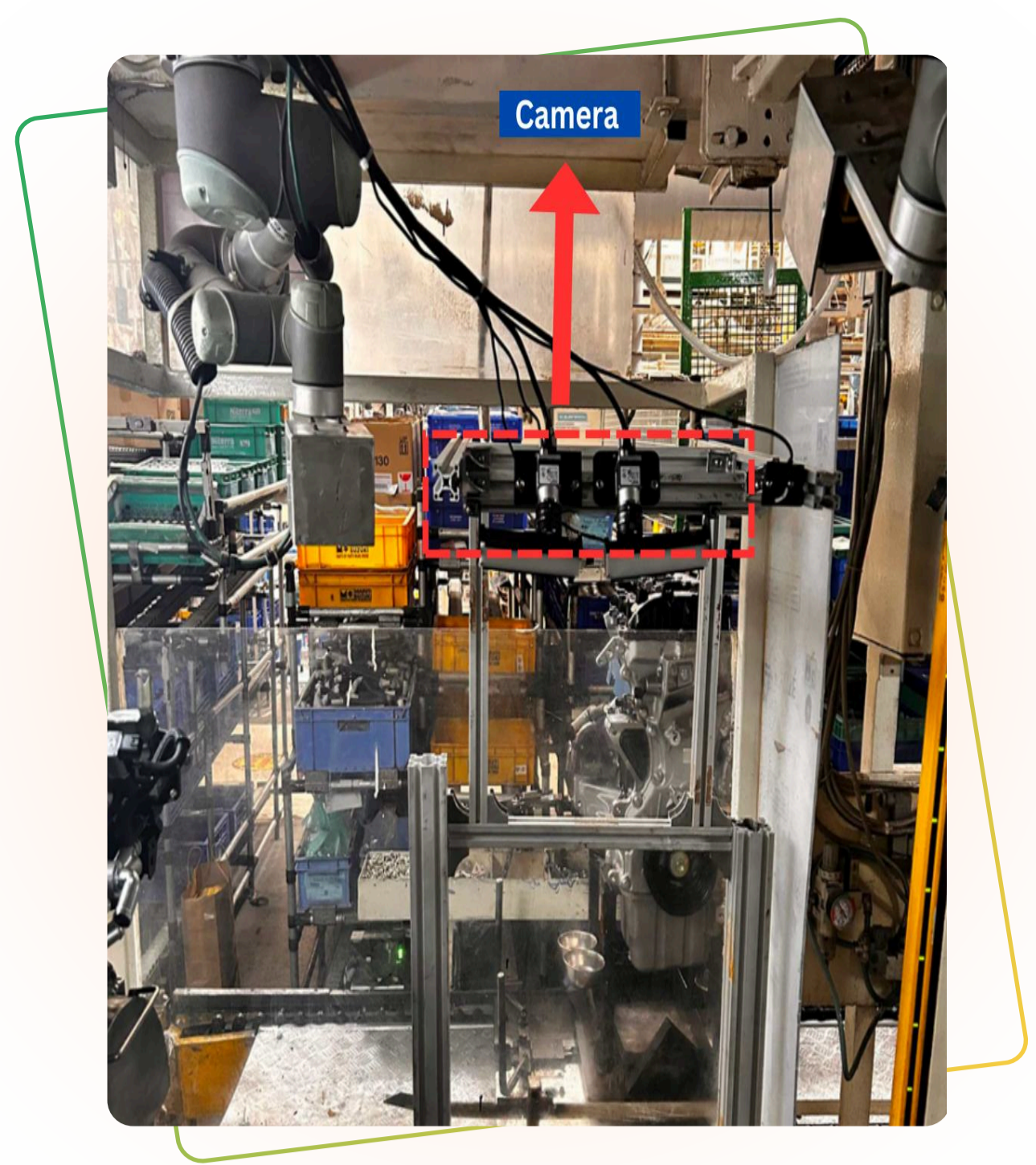
CASE STUDY

Challenge

MSIL required a solution to detect the presence/absence, and fitment of injector clips in the engine of dimension **600 x 500 x 700 mm**.

MARU A Category

"Maru A" signifies the highest level of importance and **strict quality control** in Suzuki manufacturing standards.

Potential Threat

Incorrect fitment can lead to **fuel accumulation** on the engine surface, posing a severe risk of vehicle fire and endangering lives.

The Poke-Yoke Solution

MSIL wanted a "Poka-Yoke" solution—a Japanese term meaning **error-proofing**. The goal of this project was to prevent human error.

Camera & Lighting

Mixed high and low intensity lights for better quality images. Also we changed FOV to 4 injector clips on each camera, making it 2 camera for an engine.

Model Training & Validation

Captured <200 good images to train the DeepInspect AI model and 35 + Not Good images to validate the same.

Solution

MSIL integrated the DeepInspect System into its existing manufacturing line. A sensor detects the pallet carrying the engine on the conveyor, triggering the PLC. The PLC communicates with the Software, signaling the camera to capture images. These images are analyzed by the DeepInspect AI Models, classifying parts as "Good" or "Not Good". The PLC then directs the conveyor system to release "Good" parts and hold "Not Good" parts for further inspection.

The Setup

The setup consists of the listed items with **DeepInspect** software at the heart.

- DeepInspect Software
- Industrial Controller with i5 and GPU
- Industrial Machine Vision Lights
- Industrial Camera
- Mitsubishi PLC

Impact

Following the implementation our customer experienced significant improvements in their operations

01
Ensuring the proper fitment of injector clips prevents fuel accumulation significantly **reducing the risk**.

02
Proper fitment and the presence of injector clips enhance overall **vehicle safety.**

03
Ensuring that only engines with **defect-free** injector clips move forward in the production process.

04
The system's **false positive rate** is reduced to <1%, and success rate increased to 100%.

05
Enhancing the **efficiency and accuracy** of the inspection process, eliminating human errors.

06
Immediate notification of defects allow for **quick corrective actions**, minimizing production downtime.

Conclusion

By integrating the DeepInspect inspection system, Maruti Suzuki has eliminated the risk of human error, ensuring the highest standards of quality and safety in their vehicles. This implementation achieved a 100% success rate, **reduced the cycle time** by 20%, and maintained a false positive rate of just 1%.
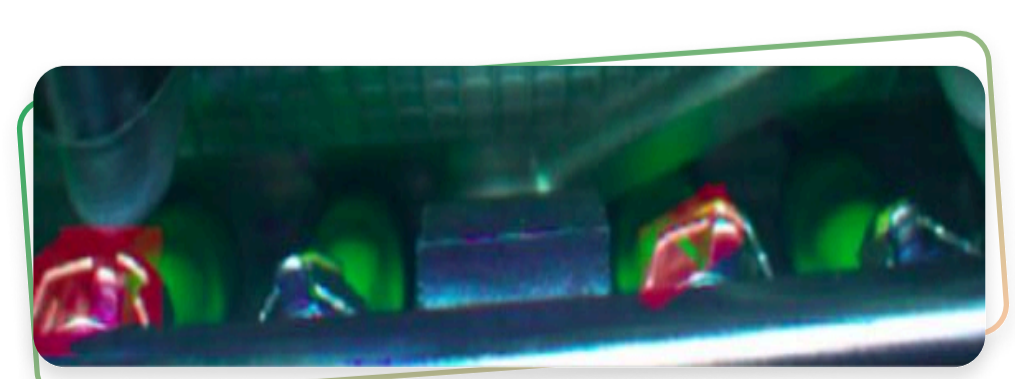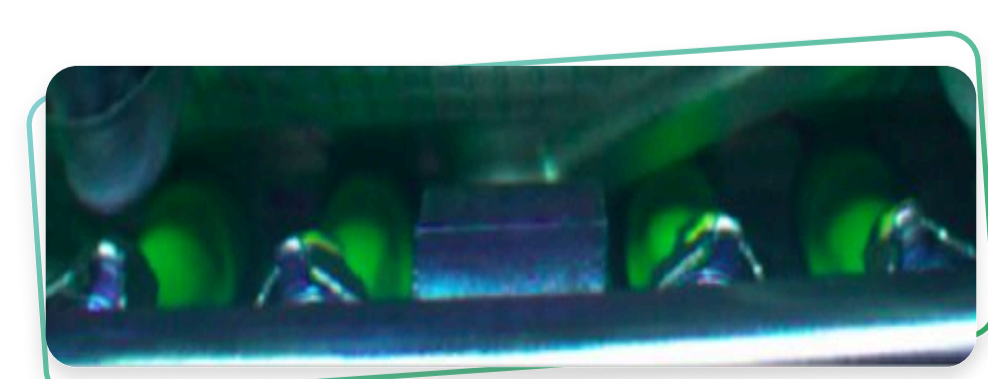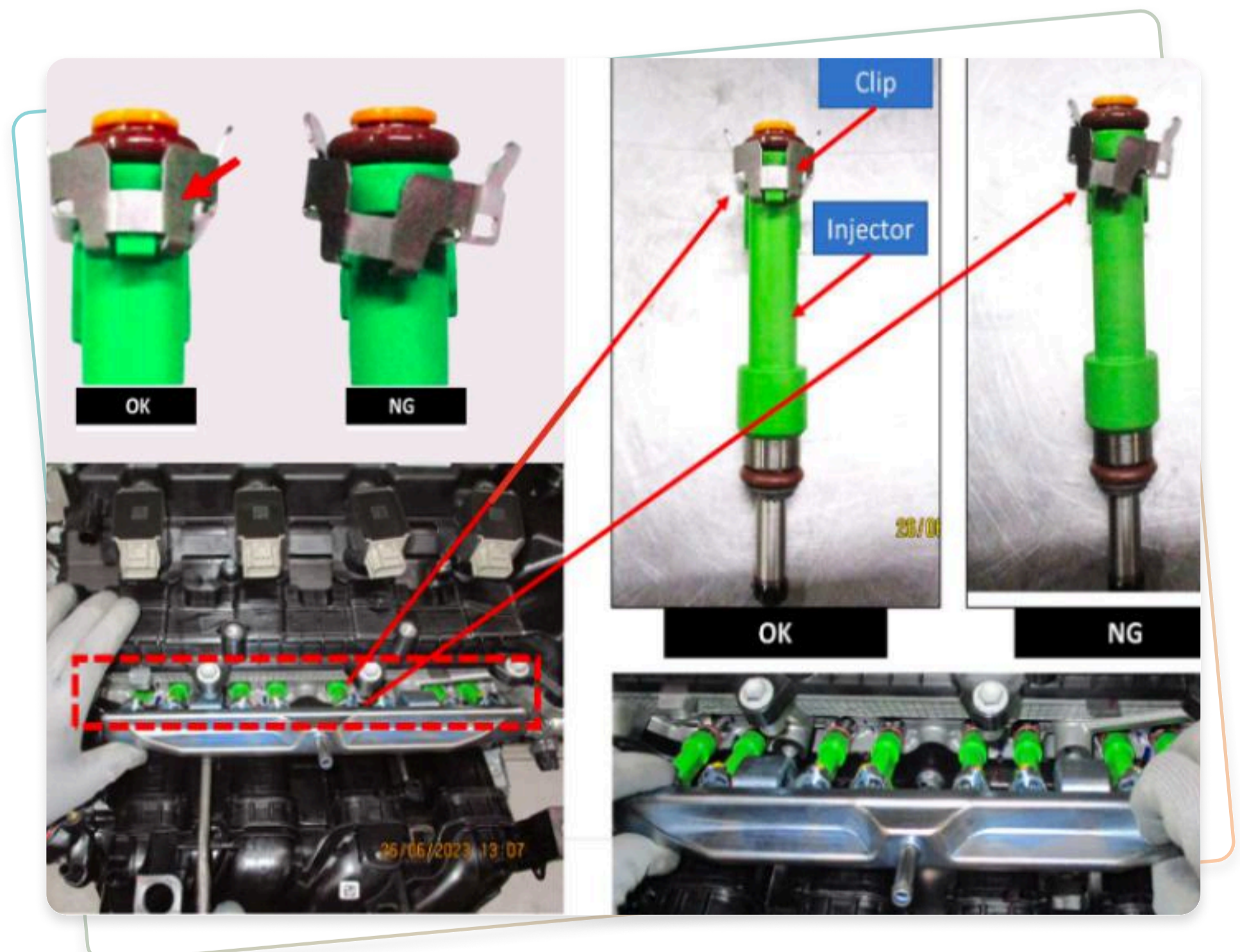
Tag: Good   Score : 100

Tag: Not Good   Score : 87.27

Tag: Not Good   Score : 78.74

Reach out to us

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