

USE CASE

SURFACE INSPECTION OF ENGINE BLOCK



CLIENT/INDUSTRY

BACKGROUND

For more than 90 years, our client has been making sustainable progress possible and driving positive change on every continent. Customers turn to them to help them develop infrastructure, energy and natural resource assets. They are the world's leading manufacturer of construction and mining equipment, diesel and natural gas engines, industrial gas turbines and diesel-electric locomotives. Their company principally operates through its three product segments - Construction Industries, Resource Industries and Energy & Transportation - and also provides financing and related services through its Financial Products segment.

PROBLEMS

- Foreign particles of different sizes from 0.5mm to 1mm are not visible easily during manual inspection
- Special training is required to the manpower for inspection

PROBLEM IMPLICATIONS

- Presence of a foreign particle may cause leak of flue gas or affect the compression ratio
- Provide training to manpower is time consuming

CLIENT REQUIREMENTS

- Visual automation for identifying the presence of foreign particles on the engine block with the help of machine vision technology
- Achieve high accuracy in detecting particle to reduce the false acceptance rate
- Reduce the inspection cycle time

CURRENT PROCESS

The inspection is being performed manually. Operators check visually for foreign particle. If present, they stop the line to clean it or to remove the block from the line for repairing. This process takes time and is error prone.

BUSINESS IMPACT

1. Increase in Cost Of Quality(COQ)
2. Decrease in profitability

SOLUTION USING MACHINE VISION

A camera with appropriate illumination is set up to identify the presence of foreign particles. Images are captured and sent to the software ([Qualitas EagleEye® Platform](#)) cloud where the training is done using deep learning algorithms. Once the program is trained, real-time detection of particles takes place, based on which the results are sent to PLC to take action.

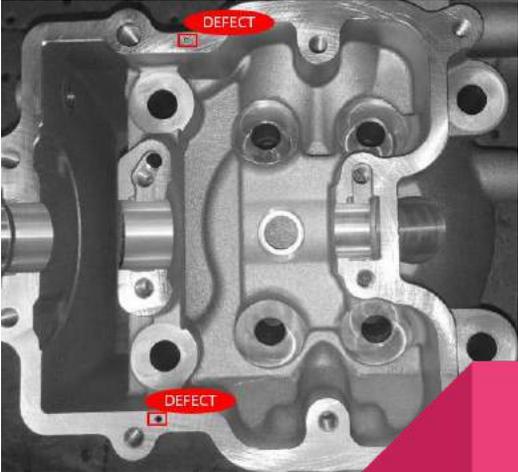
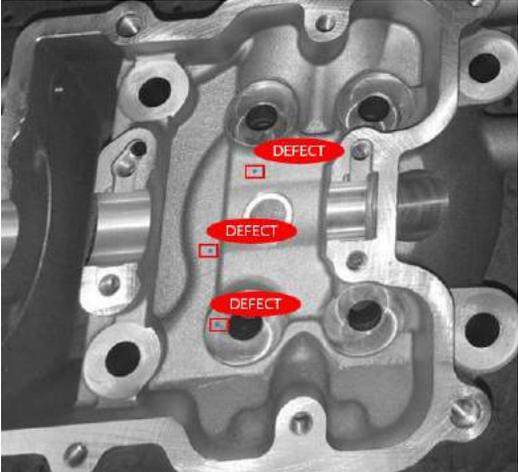
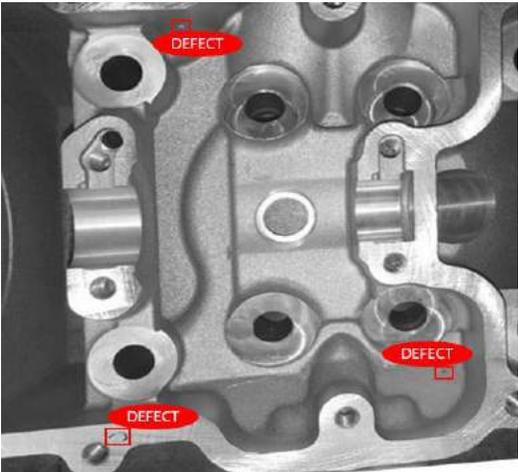


SETUP



IMAGES

DETECTING PARTICLES IN QEP(QUALITAS EAGLE-EYE® PLATFORM)



CONCLUSION

POC(Proof Of Concept) is conducted and the following conclusion is observed:

1. False acceptance is reduced up to 2-3%
2. Smallest particle of 0.5mm was detected with accuracy
3. Time taken to inspect a cylinder head is less than one seconde
4. Human intervention is reduced and hence the profitability



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