USE CASE

SURFACE INSPECTION OF GRINDING DISCS

CLIENT/INDUSTRY BACKGROUND

The client is a German-based multinational engineering and technology company. The company is a leading supplier of abrasive and tools abrasive discs, abrasive wheels, etc.

The grinding discs are made up of abrasive grains that are held together by a bonding agent. A grinding disc acts as a cutting tool to remove the material from the workpiece.

PROBLEM

Unidentified defects like spots, cavity, and waviness cause a false acceptance rate to be 19%

PROBLEM IMPLICATIONS

- These defects reduce the endurance limit of the grinding wheel and cause early ruptures
- Due to cavities and waviness vibrations will be there and may cause the spindle(on which the wheel is mounted) to break
- Low-quality standard products are not acceptable by the clients

CLIENT REQUIREMENTS

- To automate the inspection of grinding wheels in order to reduce the false acceptance rate with the help of a machine vision system.
- To reduce the inspection cycle time
- Eliminate the human intervention for inspection of grinding wheels

CURRENT PROCESS

The inspection is being carried out manually by the operators. They handpick the wheels for visual inspection and place the defective ones in the rejection bin.

BUSINESS IMPACT

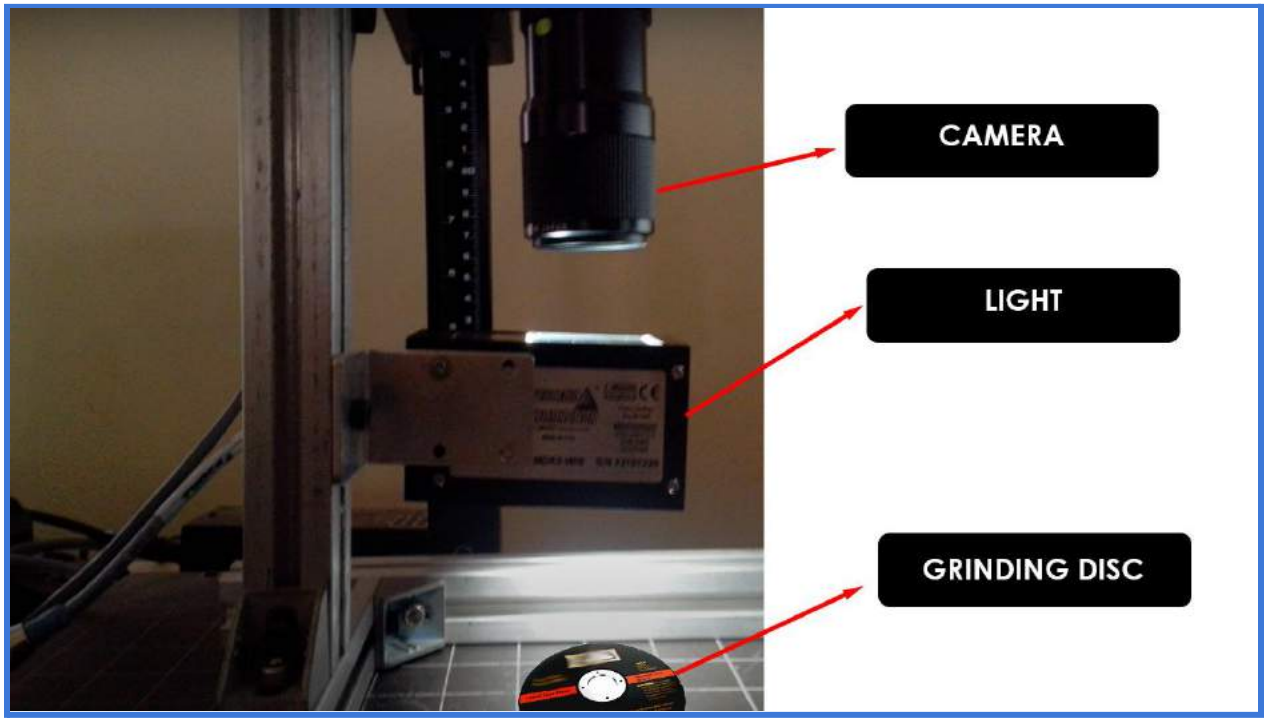
1. Increase in cost of quality (COQ)
2. Increased cost for additional labor and training
3. Losing clients will reduce the profitability

SOLUTION USING MACHINE VISION

A camera or set of cameras with appropriate illumination is set up to identify the defects on the grinding wheels. 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 defect detection takes place, based on which the results are sent to PLC to take action.

The disc from the stack will be lifted through the vacuum suction, once it is lifted the bottom part of the disc is imaged to identify the surface anomalies after which the disc will be placed on the conveyor, once it is placed on the conveyor the top part of the disc is imaged using another camera to identify the surface anomalies.

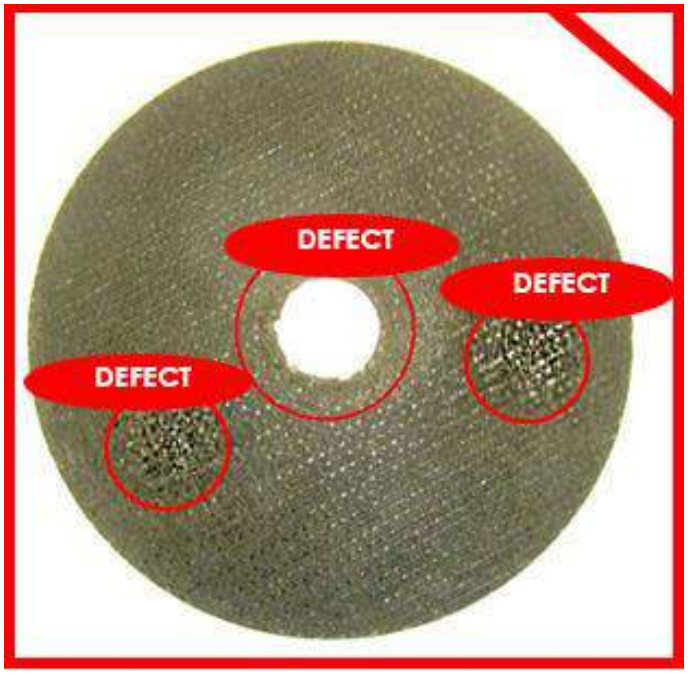
SETUP



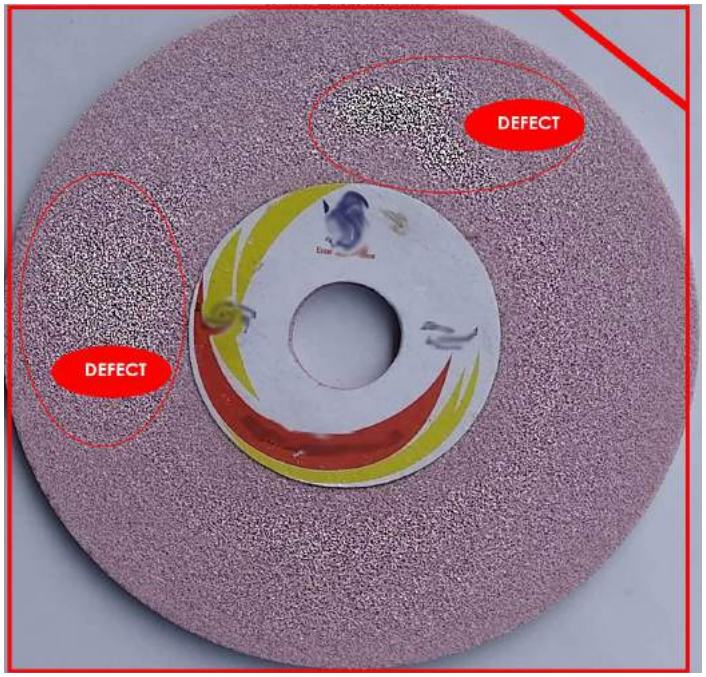
IMAGES

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

DEFECTIVE DISC **ABRASIVE WEAR**



FAULTLESS DISC **ABRASIVE WEAR**



CONCLUSION

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

1. Defects Identification Accuracy is ~ 96%
2. Inspection time is reduced up to 1 second
3. Complete elimination of human intervention was observed

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