

douglas

Reducing Measurement & Inspection Times with Vision Technology

Eugene Pigott

douglas

Reducing Measurement & Inspection Times

- Machine Vision – Overview
- Case Studies
 - Medical Device Measurement Application
 - Pharmaceutical Inspection Application
- Questions & Answers

douglas

What is Machine Vision?

“Machine vision is an electronic alternative to human or manual inspection that helps companies increase productivity and save money by eliminating defective products with 100% accuracy”

Machine Vision - Benefits

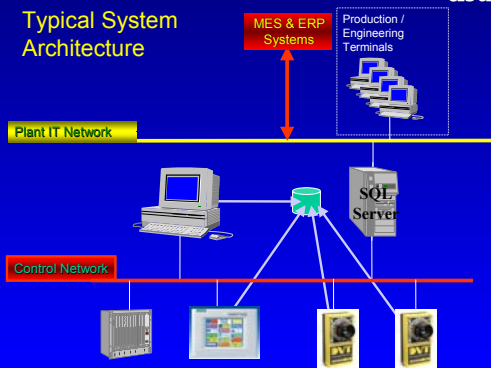
- Eliminates Defects
- Increases Productivity
- Allows 100% inspection / measurement
- Increases Accuracy
- Electronic Paperless Records

Machine Vision - Components

- Typical System consists of
 - Digital Camera (CCD)
 - Optical Lens
 - Lighting
 - Programmable Logic Controller (PLC)
 - Pneumatics
 - PC / Operator Interface
 - Database



Typical System Architecture



Case Study – No. 1
Medical Device
Vision Measurement System

Vision Measurement System

- Product Images



Vision Measurement System

- Measurement of medical devices with a wire diameter of 0.016"
- Multiple cameras and product handling / rotation to measure
 - Length, Angle, Radius etc.
- On-Screen Pass / Fail indication
- MES / ERP interface via SQL database (FDA 21CFR11 compliant)

Vision Measurement System

- Substitute for Shadowgraph Measurement System



Vision Measurement System

- Engineering Design Process
 - Bench / Laboratory Vision Evaluation Trial
 - Detailed System Design
 - User Requirements Specification
 - Quality & Project Plan
 - 3-D Solids Model
 - System Detailed Design Specification (GAMP₄)

Vision Measurement System

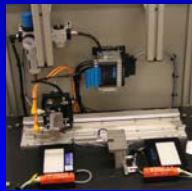
- 3-D Solids Model



Vision Measurement System

- Engineering Design & Test Process
 - System Acceptance Test Protocols
 - CE Certification
 - Operator Training / User Manuals

Vision Measurement System



Vision Measurement System - Benefits

- Increased Productivity
 - 90% reduction in inspection time
 - 100% inspection now possible
- Increased Accuracy
 - 38% reduction in gauge standard deviation (P/T%)
 - 46% reduction in gauge reliability and reproduction
 - Simplified calibration routine
- Ease of use
 - On-screen images, measurement and pass/fail results
 - Electronic paperless records to FDA 21CFR11

Case Study – No. 2
Pharmaceutical Vial Inspection

Vial Inspection

- Detect presence of
 - Stopper
 - Product
 - Ink Jet Code
- Multiple vial sizes and products
- No line changeover parts
- Line speeds > 1,000 per minute
- On-screen pass / fail indication and counts

Vial Inspection



Vial Inspection

- Engineering Design / Test Process
 - Bench / Conveyor Inspection Evaluation Trial
 - Detailed System Design
 - User Requirements Specification
 - Quality & Project Plan
 - System Detailed Design Specification (GAMP₄)
 - Factory and Site Acceptance Test Protocols

Vial Inspection - Benefits

- Increased Quality
 - 100% automatic inspection
- Increased Accuracy
 - 100% automatic inspection
- Ease of use
 - On-screen inspection images
 - Inspection pass/fail counts

Closing Comments

- Machined Vision Technology can
 - Reduce measurement & inspection times
 - Increase quality
 - Increase productivity
 - Eliminate defects
 - Reduce paperwork
