

Optical 3D Measuring in the Quality Control of Sheet Metal Products

As a part of a project 'Quality Control in
the Sheet Metal Industry'

Motivation

- Quality costs are 2-3 per cent of the net revenue of the sheet metal industry
- Better quality and faster production
- Quality certificates
- Inspection reports may be required
- Increased processing power of the computers enables on-line inspection

Problem definition

- To be examined:
 - Angles
 - Distances
 - Dimensions
 - Existence of some other features
- Measuring holes, checking scratches etc. is easier in 2D
- Curved surfaces problematic but examining them not needed

Restrictions

- Time available for the measurement varies from 10 seconds to 1-2 hours depending on the application
- Measuring technique should be easy to use and special arrangements shouldn't be needed

Measurement phases

1. Setting up the system
2. Calibration
3. Acquiring the data
4. Preprocessing the data
5. Combining different measurements into one data set
6. Creating a model
7. Comparing the model to CAD

Different techniques

- Shape from shading
- Shape from texture
- Time/Light in flight
- Laser scanning
- Laser tracking
- Moiré interferometry
- Photogrammetry
- Structured light