

Photomechanics laboratory is working on the research of the method that uses optical methods and can perform high speed and high accurate measurement for strain, stress, shape, and deformation without contacting objects. This technology can be applied to various fields such as quality control of products, health evaluation of structures, garment industry, welfare, medical fields, and so on.

Our Objectives

- 1) We propose novel methods on experimental mechanics, especially, photomechanics.
- 2) We develop techniques with the best performance in the world in accuracy, resolution, and speed.
- 3) We become COE in the field of the whole field measurement.
- 4) We put our research in practical applications and contribute them to society.
- 5) We provide the opportunities for students to become active and communicative through their laboratory activity.

Recent study

- 1) We developed a measurement method for displacement distribution in the resolution of sub-nanometer. (the best in the world)
- 2) We developed the smallest transportable measurement system for strain distribution.
- 3) We developed a new method "Whole-Space Tabulation Method" to perform high-speed and high accurate measurement.
- 4) We realized practical use of the shape measurement system.

RESEARCH THEMES

Development of highly accurate shape measurement method using multiple reference planes

We are developing a method to measure a shape with high accuracy by removing the effect of lens aberration. (The accuracy is below 10 μm for 100 mm square of an object.)

(Application fields: Product inspection, metal mold shape inspection, and thermal deformation measurement, etc.)

Development of real-time shape deformation measurement method

We are developing methods to measure a shape and deformation in real time and in time series. We realized the measurement systems with high speed and high accuracy and it is inexpensive.

(Application fields: Human body shape measurement, deformation measurement in time series, and deformation monitoring system, etc.)

Development of shape deformation measurement method for continuous object using line sensors

We are developing a method to measure the shape and deformation of road, walls, pipes and wire rods in high speed.

(Application fields: Road surface shape measurement, wall surface deformation inspection, and continuous product shape inspection etc.)

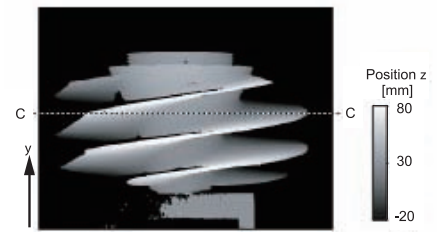
Development of measurement method for sub-nanometer displacement and strain distributions by phase-shift digital holography

Our method achieved quick non-contact measurement of displacement and strain distributions of structures in the highest resolution.

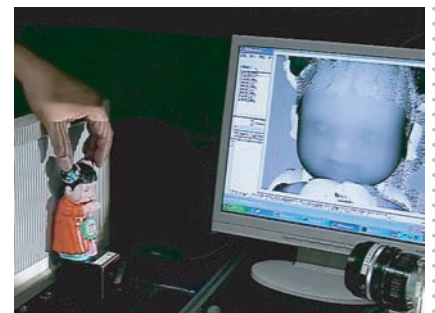
(Application fields: defect inspection of structures and material test etc.)

Other researches

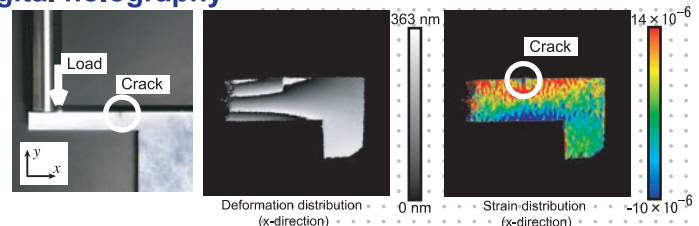
- High-speed shape measurement using Digital Micro Device
- Full-field shape measurement, large object shape measurement, and mobile shape measurement



Shape measurement by highly accurate shape measurement method using multiple reference planes.



Real-time shape measurement in high speed and high accuracy using multiple reference planes.



Measurement of deformation distribution and strain distribution by phase-shift digital holography. (detecting crack)



Human face shape measurement using frequency modulated grating