

Activities on Standardization of Full-field Optical Stress and Strain Measurement Methods in Japan

VAMAS TWA26 Round-table

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Current Standards in Japan

JIS Z 2300-91	Glossary of terms used in non-destructive testing
JIS B 7602-93	Load cell – test method
NDIS 4001-87	Glossary of terms for indicating the performance of strain measuring devices
NDIS 4002-76	Glossary of terms relating electric resistance strain gages
NDIS 4108-97	Information on performance characteristics of electric resistance strain gages
NDIS 4402-97	General rules of strain measurement method by electric resistance strain gages
NDIS 2417-95	Measuring method of stress using acoustoelasticity
JSMS-SD-1-00	Measurement of stress in ceramics by X-ray method

JIS: Japanese Industrial Standard

NDIS: Non-destructive Inspection Standards of the Society

JSMS: Society of Materials Science, Japan

Our Past Activities

We informed Japanese engineers and researchers of the standardization activities of VAMAS TWA26.

- † “On the International Standardization of Full-field Optical Stress and Strain Measurement Methods,” at the JSNDI 32nd Symposium on Stress-strain Measurement and Strength Evaluation (January 2001)
- † “Activity on Standardization of Full-field Optical Stress and Strain Measurement Methods,” at the JSME-MMD 2001 Spring Symposium (March 2001)

Japan Society for Experimental Mechanics

† The Japan Society for Photoelasticity was renamed and **the Japan Society for Experimental Mechanics (JSEM)** has been established.

(President: Prof. Okamura of Science University of Tokyo)

† **The Standardization of Full-field Optical Stress and Strain Measurement Division** has been established in JSEM.

(Chair: Prof. Morimoto of Wakayama University)

Activities of JSEM

- † Annual Conference of JSEM will be held in June 28-29 at Aoyama Gakuin University in Tokyo.
- † The Standardization Division will organize the session of “**The Present Situation of Full-field Optical Methods and Its Standardization.**”
- † In the organized session, introduction, current situation and application of optical methods will be presented by several researchers and users.

Organized Session in JSEM Conference

Activities of Standardization by VAMAS TWA26	Dr. Yoneyama	Wakayama Univ.
Full-field Measurement by ESPI	Prof. Toyooka	Saitama Univ.
Displacement Measurement by Use of Speckle Pattern	Prof. Kato	Chubu Univ.
Current Situation of Photoelasticity	Prof. Umezaki	Nippon Inst. Tech.
Displacement Measurement by Moire Interferometry	Prof. Arakawa	Kyushu Univ.
Development of Hybrid Method	Prof. Nishioka	Kobe Univ. Marcantile Marine
Method of Caustics and Its Application	Prof. Shimizu	Kanto Gakuin Univ.
Thermoelasticity and Its Application to Non-destructive Inspection	Prof. Sakagami	Osaka Univ.
Full-field Measurement in Field of Thermo- and Fluid Dynamics	Prof. Matsui	Tsukuba Univ.
Inspection of Nuclear Plant by Optical Methods	Dr. Yamashita	Hitachi Corp.
Displacement Measurement of Tire by Fourier Transformed Grid Method	Dr. Iwase	Toyo Tire Corp.

Results of Questionnaires

- † We obtained information about stress and strain measurement methods by means of questionnaires at the JSME-MMD Spring Conference and through the JSEM web site.
- † Not many companies responded to the questionnaires.

Sample statistics:

Company: 7

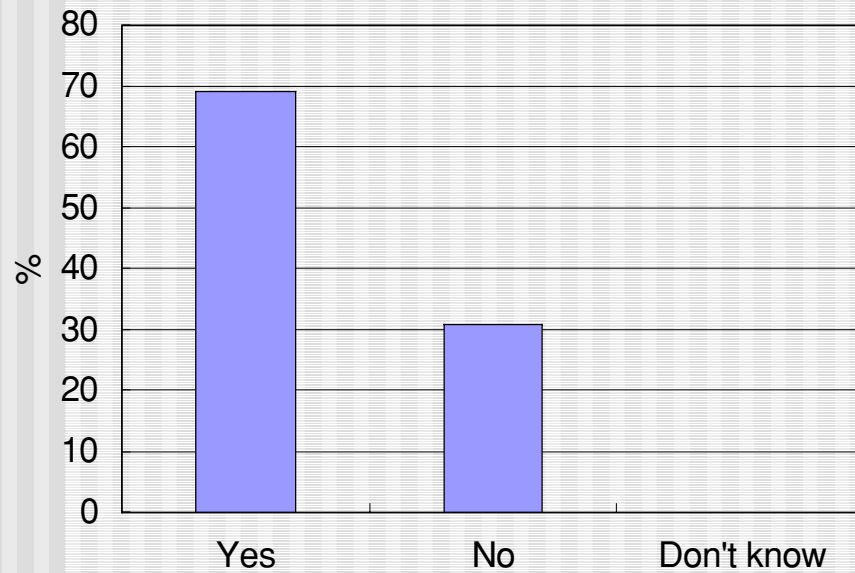
Public agencies: 4

University: 32

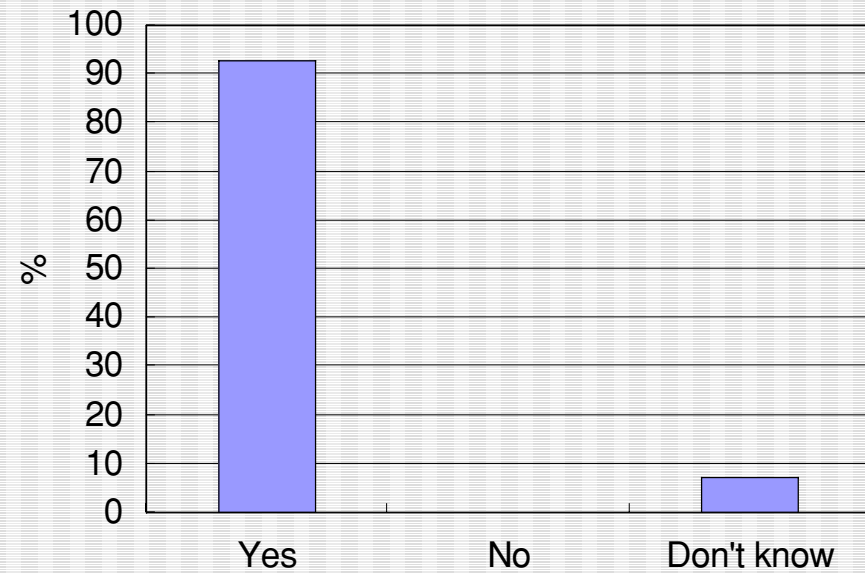
Other: 8

Results of Questionnaires

Do you use optical methods?

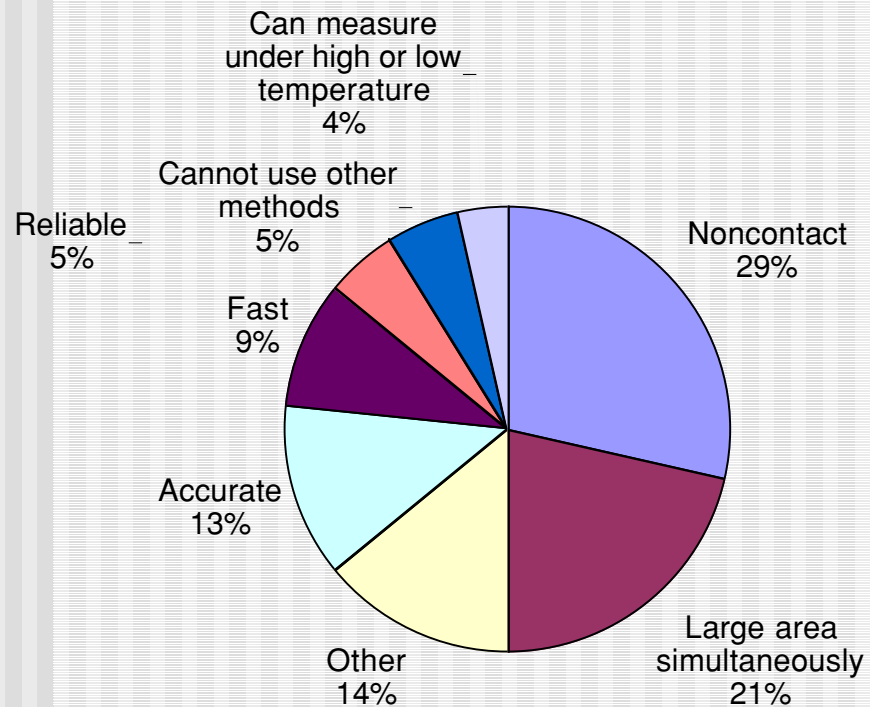


Is optical methods effective?

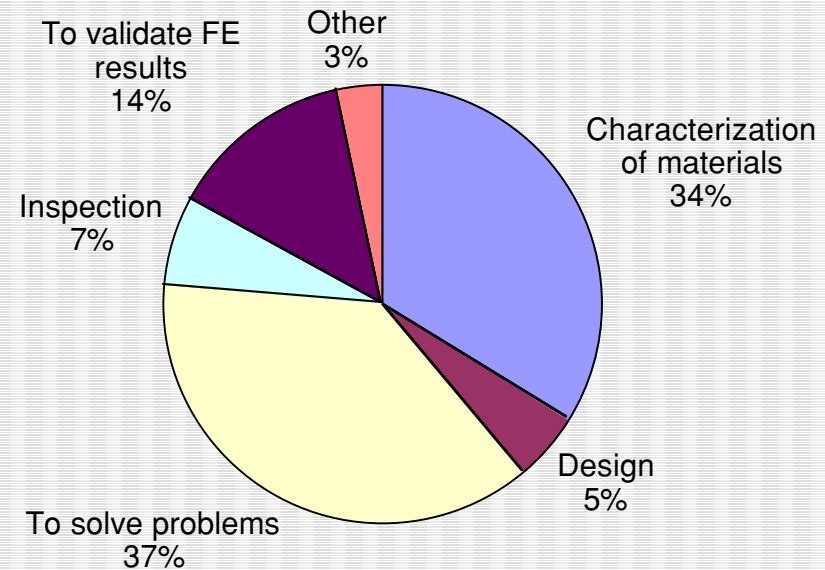


Results of Questionnaires

Why optical methods are used?

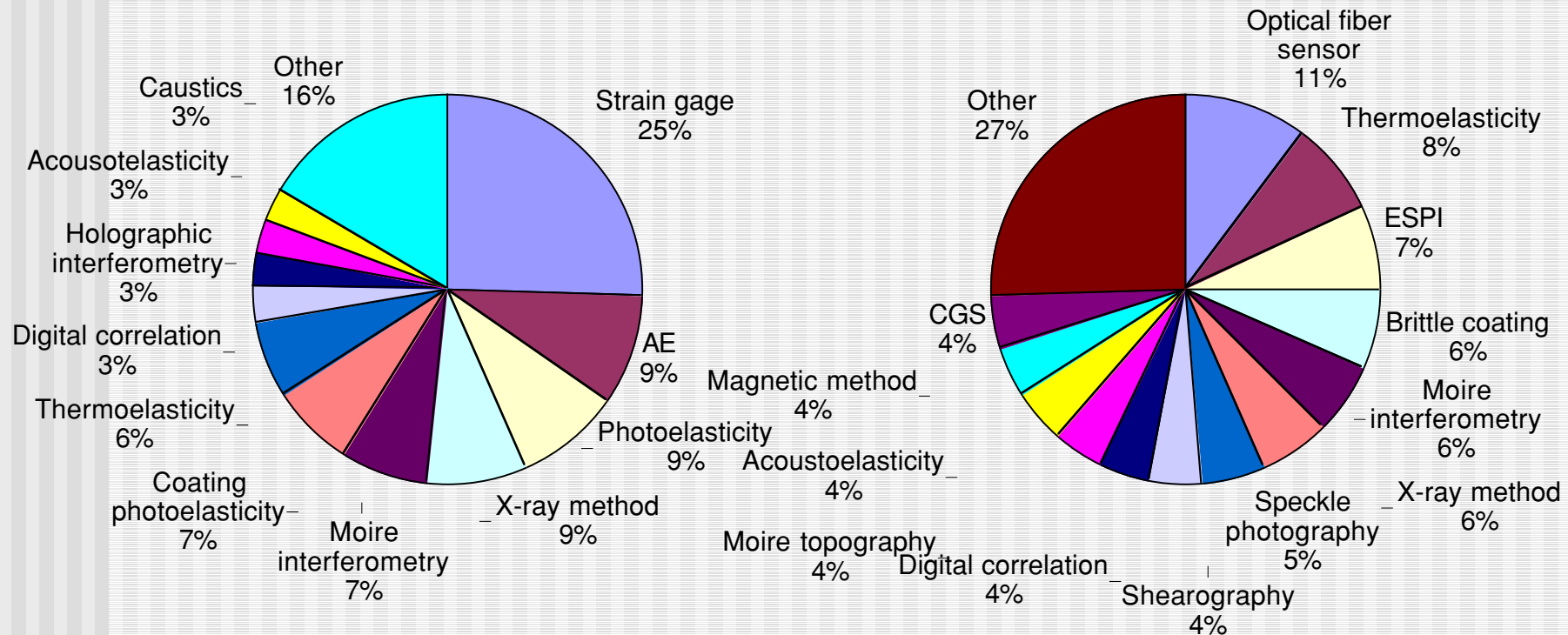


Objective of the use of optical methods are...



Results of Questionnaires

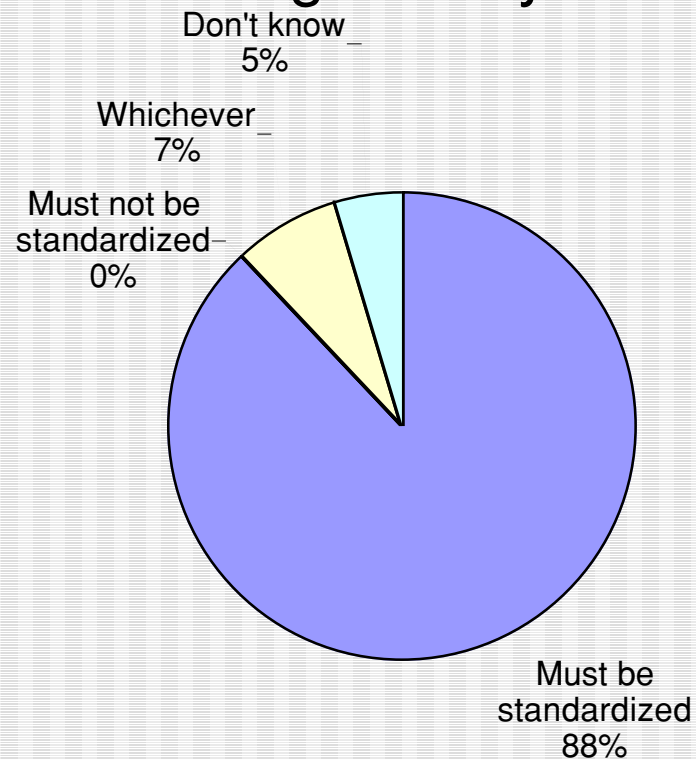
Measurement methods used. Measurement methods may be used in the future.



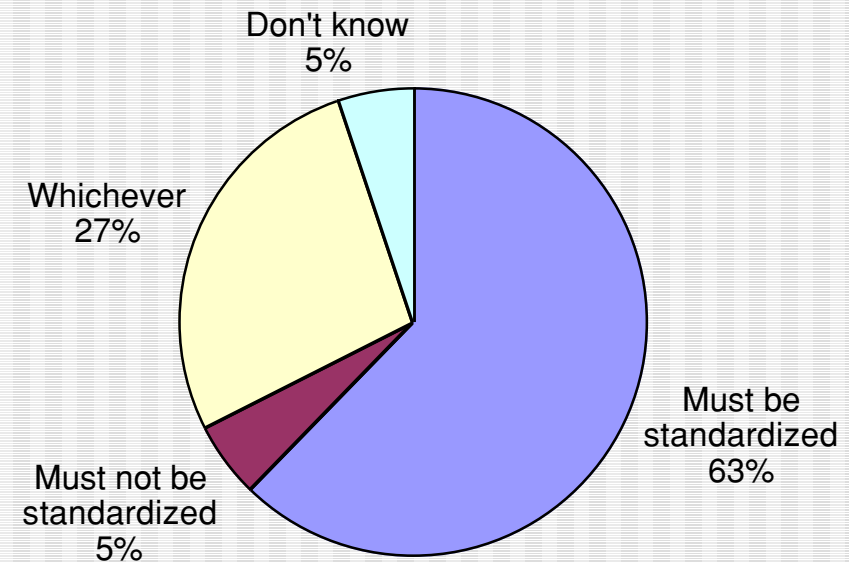
Results of Questionnaires

Which subjects should be standardized?

Terminologies & symbols

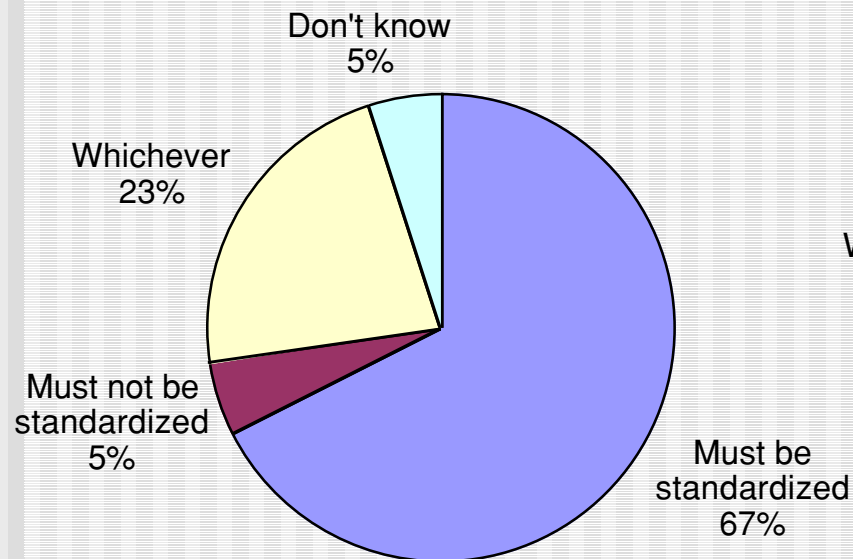


Experimental procedure

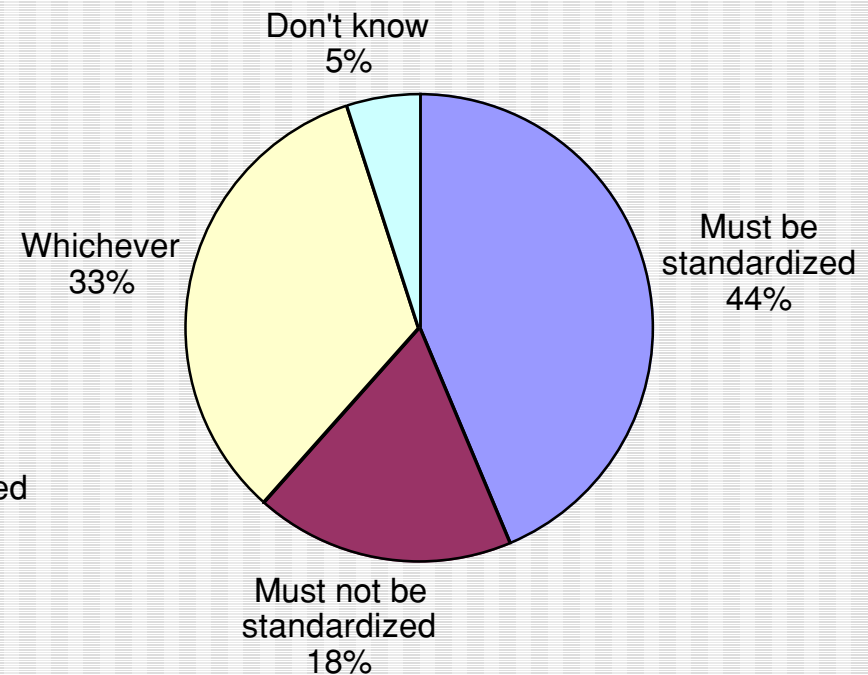


Results of Questionnaires

Light sources (wavelength, stability, etc)

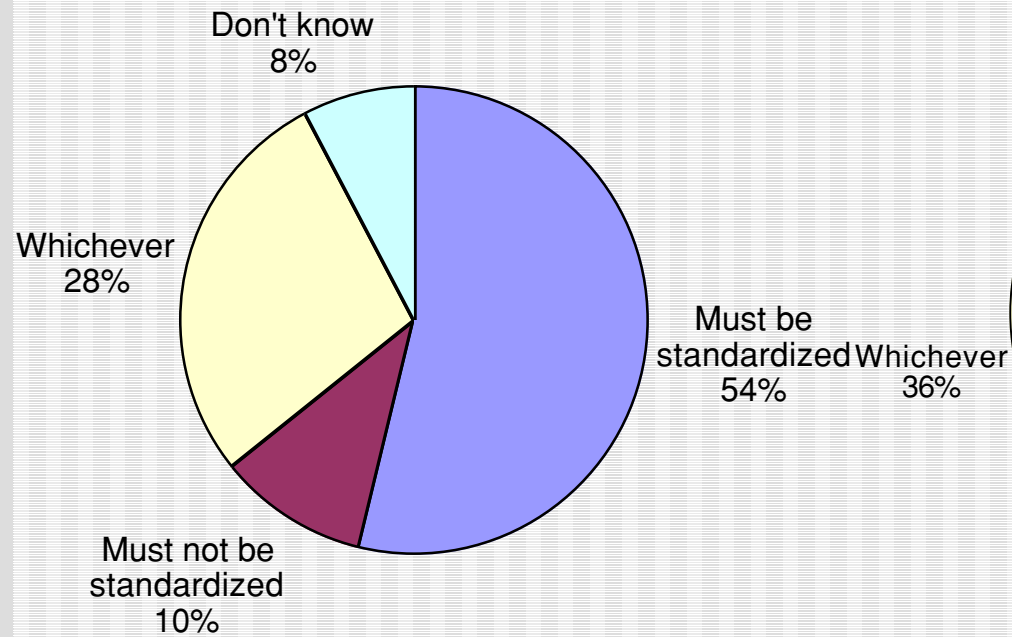


Instruments & equipments (cameras, detectors, etc)

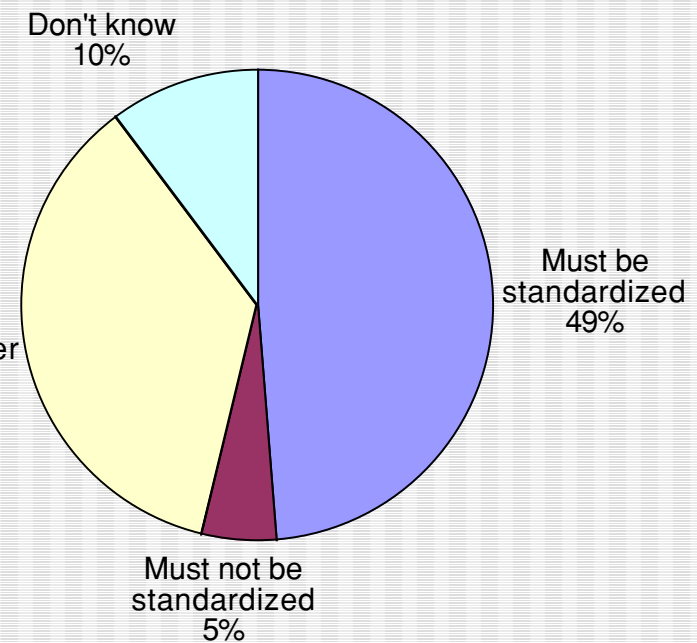


Results of Questionnaires

Optical elements (lenses, etc)

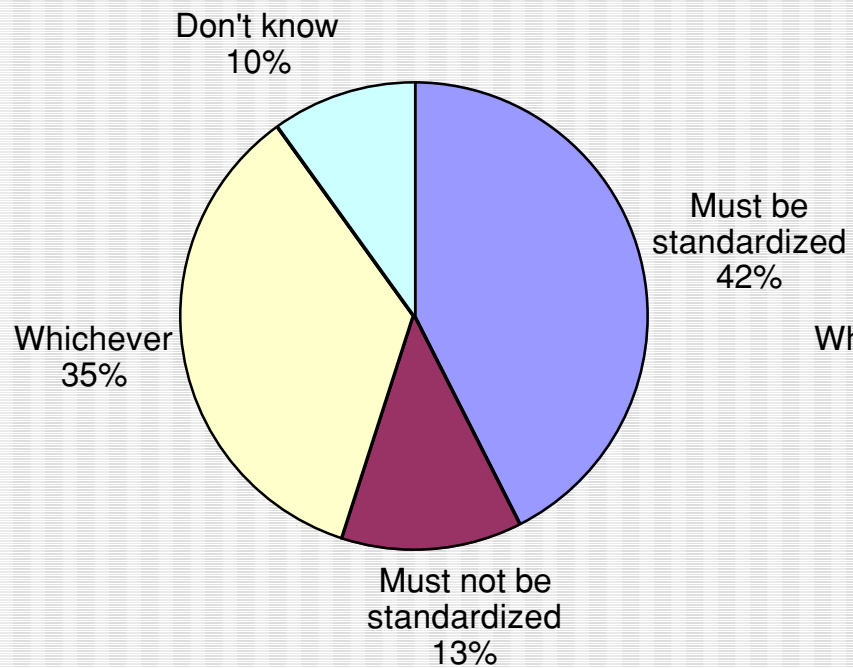


Data format

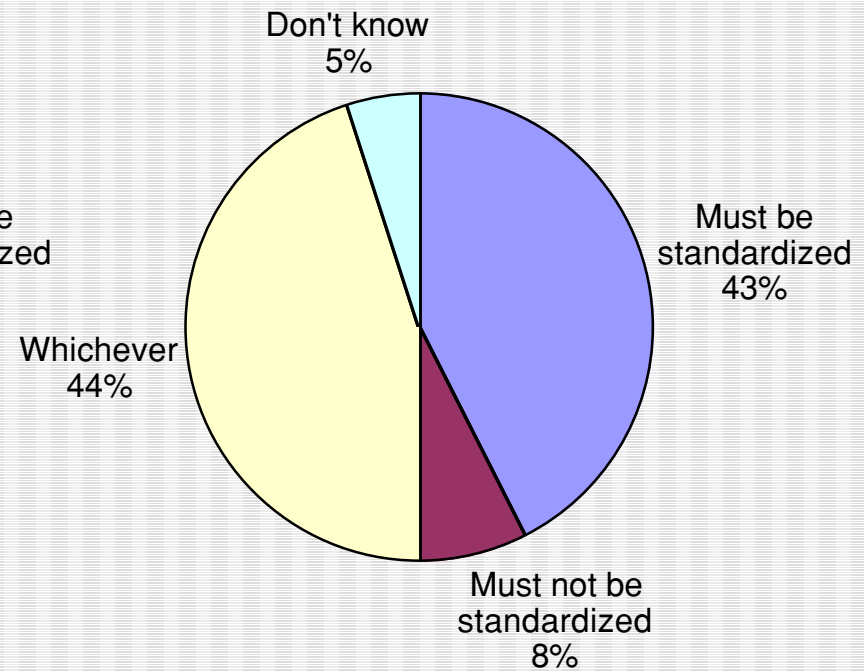


Results of Questionnaires

Materials & specimens



Data processing



Current Situations in Japan

- † Japan should contribute international standardization activities of not only optical stress measurement methods but other fields.
- † However, many Japanese companies have not been interested in standardization.
- † We informed companies of the standardization of optical methods, but we received a few response.

Current Situations in Japan

- † Many Japanese engineers and researchers are not interested in the standardization as well as optical stress and strain measurement methods.
- † We would like to continue the activities to spread optical methods and notify the importance of the standardization in Japan.
- † At present, we cannot express definite opinions from Japanese side.