

MULTIAXIAL STRESS ANALYSIS WITH AREA DETECTOR TYPE DIFFRACTION METHOD

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One of the authors has proposed an area detector type X-ray multiaxial stress measurement method in 1995. It is found that the method is useful when diffraction data is precise enough, but it sometimes presents erroneous result due to scattering of diffraction data. The stress, σ_y , has an inclination to be influenced to scattering of data comparing with other stress components.

In order to improve the precision of stresses, a new measurement method, which is called the second method, was proposed in this paper. The effect on the accuracy of the stress calculation was investigated by a simulation study and an experiment comparing with the first method. As a result, it was found that the second method is useful even when the strain data involve error at the fifth decimal place.

The number of diffraction rings which is needed to the stress calculation in the second method is four, while that in the first method is two. Considering the use of the method at outdoors such as railway rails in service, the third method was also developed in this paper. The method uses the incident angle of 45 deg along both x and y axes as well as the normal incident angle. The number of diffraction ring can be decreased to be three. The incident angle of 45 deg is the optimum for the strain sensitivity. The third method was also compared with other two method and was found to be useful for the practical use.

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I would like to publish this paper in **ICRS** proceedings.