

RESIDUAL STRESS EVALUATION OF THE SURFACE OF RAILWAY RAILS WITH SYNCHROTRON RADIATION

Toshihiko SASAKI¹, Yohei MIYAZAWA², Shunichi TAKAHASHI³,
Ryohei MATSUYAMA² and Yukio HIROSE¹

¹Graduate School of Natural Science and Technology, Kanazawa University, Japan

²Graduate Student of Education, Kanazawa University, Japan

³Graduate Student of Natural Science and Technology, Kanazawa University, Japan

In the field of railway technology, there are problems of rolling contact fatigue (RCF). It is necessary to elucidate the mechanism of the initiation and the growth of the RCF cracks in order to prevent accidents caused by them. Hirakawa recently reported the residual stress influencing the growth of the RCF crack based on the fracture mechanics.

In this study, the authors clarify the residual stress state in the surface of the rail head by the X-ray stress measurement for the purpose of contributing to the RCF problem mentioned above. Considering the practical use, the authors adopted an Image Plate and the $\cos\alpha$ method. The method is expected to obtain higher precision in comparison with the standard method because of the use of information of whole X-ray diffraction ring.

However, the penetration depth of X-ray of each diffraction beam at the diffraction ring differs from each other due to the position (the central angle of the diffraction ring α). The stresses obtained from the $\cos\alpha$ method are averaged over the penetration depth of X-ray. The depth decreases when the incident angle of X-ray is larger. The range of the change of the depth of X-ray along the diffraction ring depends on the wave length of X-ray. Synchrotron radiation is useful to achieve optimum condition for this study. The authors conducted the stress evaluation in rails in the depth direction using Synchrotron radiation at The Photon Factory (PF) of KEK. As a result, the stress distributions of the surface layer in rails were obtained in both depth and width directions.

Information Page

For the **ICRS** conference

We accept to post abstract on the DXC web site.

Speaker's name : **Yohei MIYAZAWA**

Mailing address : Yohei MIYAZAWA

Graduate School of Education,
Kanazawa University,
Kakumamachi,
Knazawa-shi,
Ishikawa
920-1192
Japan

Phone number : +81-76-264-5593

Fax number : +81-76-264-6039

E-mail address : irene-ym@stu.kanazawa-u.ac.jp

We hope we can present our paper by **poster** session for **ICRS** evening poster session.

We want to publish our paper in the **ICRS proceedings**.