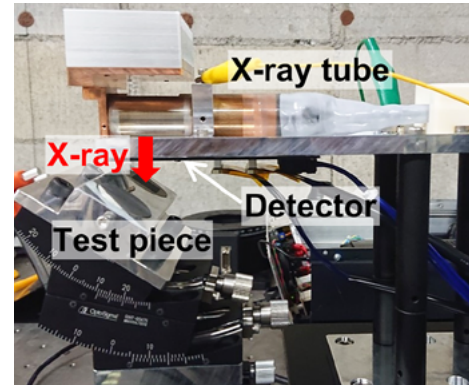


# A compact X-ray inspection instrument for high-thruput, in-situ X-ray residual stress measurement

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In order to evaluate the quality of machine parts and to characterize the condition of infrastructure, there is a need for technologies to measure residual stress, which is an important material property indicator, at high speed and in-situ. Non-destructive and contactless residual stress measurement using X-rays is available, but its typical measurement time is long, making it unsuitable for total inspection. Therefore, we have developed a high-thruput and high-precision X-ray residual stress measurement device combining NMIJ's compact X-ray source technology and the  $\cos\alpha$  method developed by Kanazawa University. By using a coniferous carbon nano-structure (CCNS) electron source, the X-ray tube can be made compact (25 mm in diameter and 84 mm in length). In addition, the device is battery-operated and has a fast start-up time, which is suitable for in-situ measurement. With this device, a residual stress measurement which conventionally required several minutes can be performed in around one second. In the future, we will develop compact light-weight portable devices for various inspection uses.



X-ray residual stress measurement device.