Application of Indentation Testing Equipment for Evaluation Mechanical Properties and Residual Stress

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1. Introduction

We can see many accidents due to materials fault. For reason of that, life assessment of materials is very important thing in the industry. From small components to huge facilities, we need to evaluation mechanical properties and residual stress to prevent accidents. here are many testing methods for measuring mechanical properties and residual stress of metal materials, such as uniaxial tension test for measuring tensile strength, and hole drilling method or saw cutting method for measuring residual stress. But, if you have to preserve that object, you cannot use these methods. To overcome these shortcomings FRONTICS Inc. developed the indentation tester that can be used in laboratories and work sites. This is non-destructive evaluation, and you can measure very easy and fast.

2. Instrumented Indentation Testing Method

The instrumented indentation testing method measures the displacement value of the continuously imposed load in real-time, and analyzes the acquired indentation load-depth curve to evaluate the mechanical properties and residual stress. The instrumented indentation testing equipment based on the instrumented indentation testing method has been optimally designed to be used not only in laboratories and shops but also at work sites. Due to this characteristic, it is used in diverse fields from acceptance trials of incoming subsidiary materials and quality verification documents during construction of various structures and industrial facilities, to soundness tests, mechanical property tests, and life evaluation of structures during usage.

3. Advanced Indentation System

FRONTICS Inc. developed the indentation tester for evaluation mechanical properties and residual stress. It is called AIS(Advanced Indentation System). The AIS series, applied with the non-destructive method of IIT(Instrumented Indentation Test), is an all-in-one device that can measure mechanical properties and residual stress. The AIS Series is used from macro scale to nano scale including general industrial facilities, acceptance inspection of introduce materials, quality tests, degradation evaluations and soundness tests. Application of technology is enabled in the developing, manufacturing and operating stages. In particular, it can be used very effectively when it is difficult or impossible to acquire a sample piece.

4. Applications of Advanced Indentation System

Fig.1 Advanced Indentation System

Fig.2 Measuring tensile strength of thermoelectric power plant

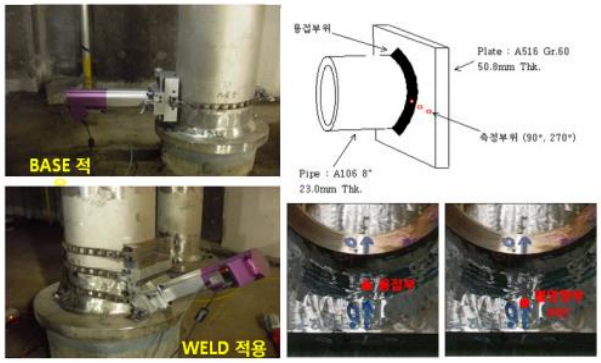

Fig.3 Measuring residual stress of nuclear power plant

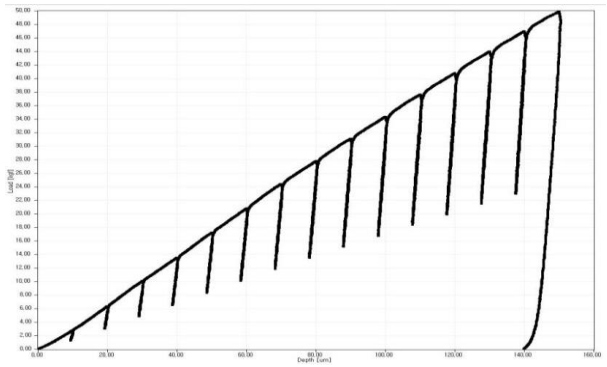

Fig.4 Indentation load-depth curve for evaluating tensile strength

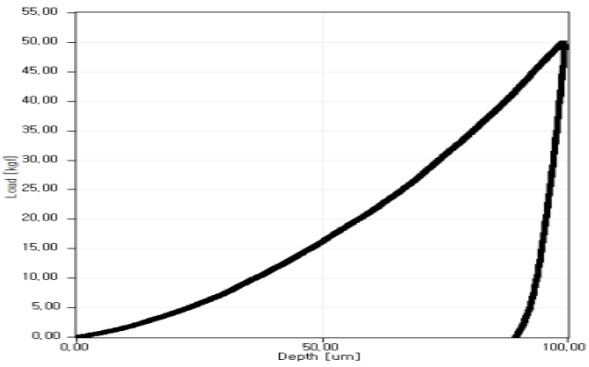

Fig.5 Indentation load-depth curve for evaluating residual stress

References

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