

Research on the Key Technologies of Stress Detection By Magnetic Barkhausen Noise

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Ferromagnetic materials are widely used in industrial equipment. For the key bearing parts of these equipment, ensuring that the stress state during service does not exceed the required stress is an important guarantee for their safe operation. Therefore, rapid stress detection or periodic monitoring becomes very important. Traditional strain gauge and X-ray diffractometer have the disadvantages which are long time consuming, low efficiency and difficult to obtain the whole stress distribution. Magnetic Barkhausen Noise stress detection technology is a new stress detection technology developed in recent years, which has the advantages of nondestructive, convenient, efficient and easy to scan to obtain the stress distribution. Although Magnetic Barkhausen Noise is sensitive to stress, the high accuracy and strong anti-interference ability of the sensor and instrument system must be guaranteed to ensure the accuracy of the detection results in field testing. In this paper, the key technologies of Magnetic Barkhausen stress detection are discussed, including high-precision stress detection sensor design technology, low-frequency low-noise continuous power amplification, small signal amplification technology and stress calibration technology and so on. A Magnetic Barkhausen Noise stress detector is developed, which can detect and evaluate the stress state of different ferromagnetic materials. The field application shows that the developed test instrument has the advantages of quick and convenient scanning detection of key stress distribution of equipment in service, as well as high sensitivity and accuracy of stress detection.