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Non-destructive testing - Industrial endoscopy visual testing - Part 2: Atlas

无损检测 工业内窥镜目视检测 第2部分:图谱

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part

1.Structure and Drafting Rules for Standardization Documents" drafting. This document is part 2 of GB/T 41856 "Nondestructive Testing Industrial Endoscope Visual Inspection", GB/T 41856 has been released 2 parts.

2.Atlas. Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents. This document is proposed and managed by the National Nondestructive Testing Standardization Technical Committee (SAC/TC56). This document is drafted by: Aerospace Intelligence (Shanghai) Technology Co., Ltd., Shanghai Materials Research Institute, Shanghai Space Propulsion Institute, Shanghai Aerospace Equipment Manufacturing General Factory Co., Ltd., Hubei Sanjiang Aerospace Jiangbei Machinery Engineering Co., Ltd., Shanghai Aerospace Precision Machinery Research Institute, Nanjing Di Will High-end Manufacturing Co., Ltd., CRRC Changchun Railway Vehicle Co., Ltd., CITIC Dicastal Co., Ltd., Beijing Jiasheng Zhijian Technology Co., Ltd., Capital Aerospace Machinery Co., Ltd., Shanghai Electric Power Station Equipment Co., Ltd. Power Station Auxiliary Machinery Factory, Shanghai Jinyi Testing Technology Co., Ltd. Co., Ltd., Xuzhou Wilt Photoelectric Technology Co., Ltd., Shanghai Taisi Testing Technology Co., Ltd., Luoyang LYC Bearing Co., Ltd., Shanghai Wei Star Equipment Research Institute, Shanghai Daming Technology Co., Ltd., Shanghai Aerospace Control Technology Research Institute, Yijingtong Optical Technology (Shanghai) Co., Ltd., Shanghai Haitengnuo Electromechanical Equipment Co., Ltd., Eintik Testing Technology (Shanghai) Co., Ltd., Beijing Wellin Yiweit Industrial Endoscope Co., Ltd. Division, Matrix Science and Engineering Testing Technology (Beijing) Co., Ltd., Shanghai Electric KSB Nuclear Power Pump and Valve Co., Ltd., Shanghai Composite

Materials Technology Co., Ltd. Division, Jiangxi Hongdu Aviation Industry Group Co., Ltd. The main drafters of this document. Xu Guozhen, Lu Yanda, Jiang Jiansheng, Ding Jie, Chen Yiwei, Xu Wei, Wang Xiaoyong, Zhou Jianping, Wei Quan, Chen Changhua, Tian Meng, Liu Jun, Shuai Jiasheng, Ma Jun, Wei Ming, He Qiang, Yu Chunsheng, Zhang Yiming, Chen Cuili, Sun Jiangang, Wang Daolong, Yuan Zhizuo, Chen Gang, Zhang Jun, Zhang Rui, Sun Qiang, Jiang Yunxi, Xu Hong, Sheng Tao, Ma Jun, Liu Gang, Ha Yao.

The visual inspection of industrial endoscopes is a method that is difficult to detect by direct visual inspection without destroying the inspected parts or the operation of in-service equipment. The condition of the part or inner surface is detected and evaluated by using an endoscope detection system with optical images or photoelectric conversion video images. At present, it has been widely used in aerospace, aviation, weapons, metallurgy, machinery, automobiles, high-speed rail, electronics, geology, biology, archaeology and other fields, especially for production The quality of the inner surface of the product, the control of burrs and excess in the inner cavity of catheters and containers all play a vital role. Endoscopic Visual Inspection The process mainly depends on the experience of the inspectors, and human factors are relatively large, which may easily lead to wrong and missed judgments. In order to correctly apply industrial endoscope visual inspection technology To correctly judge the nature of defects, meet the requirements of visual inspection of industrial endoscopes, establish and unify the methods and methods of visual inspection of industrial endoscopes Formulate this series of standards based on basic requirements such as use and diagrams. GB/T 41856 gives the methods used in visual inspection and the impact of visual inspection defects. It aims to establish a universally applicable visual inspection method for industrial endoscopes. GB/T 41856 is proposed to consist of two parts.

---GB/T 41856.1 Nondestructive Testing Industrial Endoscope Visual Inspection Part

1.Method. intended for endoscopic visualization Detection Develop a general detection method to ensure the reliability of the detection method.

---GB/T 41856.2 Nondestructive Testing Industrial Endoscope Visual Inspection Part

2.Atlas. The purpose is to standardize endoscopic The evaluation work of visual inspection provides intuitive reference maps for inspectors to reduce misjudgments and omissions. This document is part 2 of GB/T 41856.Atlas acquisition is derived from the endoscopic visual original image of the first-line object detection, from which to select Typical images are used as a reference and compiled into this document. By using the comparison method between the example photo and the reference map, the type of defect is analyzed and evaluated, Peeling, wrinkles, folds, pull marks, scratches, scrapes, scratches, pits, bumps, cracks, excess of machined parts, Rust, rust, corrosion, spot marks, burrs, flanging, knife marks, joint lines, milling and planting knives, iron oxide scale, weld surface condition of weld seam (weld seam forming Unevenness, welding spatter, weld spatter, arc damage, misalignment, incomplete penetration, pores, welding slag), brazing seam status, weld oxidation, weld cracks, in-service equipment Wear, breakage, lack of coating, coating

peeling off of equipment, over-burning, burn-through, ablation, coating oxidation, coating curling and other defects of test failure parts Spectrum, so that the testing personnel have a unified basis for judgment, reduce ambiguity or misunderstanding, and use an intuitive, true, reliable, repeatable, convenient and quick comparison method, To ensure the reliability of visual inspection of industrial endoscopes, and better promote the trade, communication and technology of visual inspection of industrial endoscopes in non-destructive testing cooperate. Non-destructive testing industrial endoscope visual inspection Part

1 Scope

Part 2 of China's national standard for industrial endoscopic visual testing, providing the atlas. An atlas is a catalogue of reference images showing what each kind of defect looks like through an endoscope, and for a method whose output is a judgement rather than a number it is the most useful part of the standard. Endoscopic images are difficult to read: the illumination comes from the instrument so everything is lit from one direction, the wide angle optics distort scale toward the edges, and a scratch, a crack, a machining mark and a deposit can look identical. An inspector who has seen a hundred confirmed examples of each interprets an image far better than one working from a written description, and the atlas is how that experience is transferred. It is also the reference against which two inspectors' disagreement can be settled, which is what makes the method usable in an acceptance context.

This document specifies the map features of various defects found in the visual inspection of industrial endoscopes (hereinafter referred to as endoscopes). This document is suitable for evaluating the internal structure and internal surface morphology of metal or non-metallic parts of industrial products using endoscope reference atlas Features, as well as surface imperfections for indirect vision, etc.

Note. The atlas given in this document is used as a reference for the evaluation of defective images. By using the comparison method between the example photos and the reference atlas, the defects are analyzed and evaluated. shape.

2 Normative references

This document has no normative references.

3 Terms and Definitions

This document does not have terms and definitions that need to be defined.

4 Atlas Composition

The map shows raw materials, high-temperature pipelines, pressure vessels, gearboxes, machining, welding seams, operating status of in-service equipment and test failures, etc.

surface imperfections. The map is based on the surface state of raw materials such as peeling, wrinkles, folds, pull marks, scratches, scratches, scratches, pits, protrusions, cracks, and redundant machined parts objects, rust, rust, corrosion, stains, burrs, flanging, knife marks, joint lines, milling knives, iron oxide scale, weld surface condition of the weld (weld formation uneven shape, welding spatter, weld spatter, arc damage, misalignment, incomplete penetration, pores, welding slag), surface condition of brazing seam, weld oxidation, weld crack, Abrasion, fracture, lack of coating, coating peeling of in-service equipment, over-burning, burn-through, ablation, coating oxidation, coating curling and other defects of test failure parts 78 pictures of 5 types and 34 groups of different features are provided, as shown in Table 1. Table

1 Composition of typical defect maps Sequence number detection object missing attribute drawing number

Peeling Figure 1, Figure