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Research on Informatization Management of Metrological Inspection Institutions

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Abstract: Metrological inspection institutions are mainly responsible for providing accurate and reliable metrological inspection services to society, and their informatization management level is closely related to the service quality and efficiency of the institutions. Informatization management of metrological inspection institutions has become an inevitable choice to enhance their core competitiveness and achieve sustainable development. This paper focuses on metrological inspection institutions, first briefly expounds the importance of informatization management of metrological inspection institutions; second, focuses on the effective paths of informatization management of metrological inspection institutions from four aspects: improving management mechanisms, cultivating professional talents, innovating inspection tools, and building a solid security defense line. It is hoped to provide new ideas for the informatization management of metrological inspection institutions and comprehensively improve the quality and efficiency of management of metrological inspection institutions.
Keywords: Metrological inspection institutions; Informatization management

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1. Introduction

The informatization management of metrological inspection institutions mainly refers to the comprehensive management and coordination of various work of the institutions by using modern information technology means, covering many aspects such as the integration, sharing and utilization of information resources, as well as the construction, operation and maintenance of information systems. The implementation of informatization management helps to comprehensively improve the efficiency of inspection work of metrological inspection institutions, greatly enhance service quality, ensure the accuracy and security of data, and promote the sustainable and high-quality development of metrological inspection institutions while meeting the diverse and personalized needs of customers.

2. Importance of informatization management in metrological inspection institutions

As professional institutions engaged in testing, inspection and measurement of products, equipment and systems, metrological inspection institutions play an undeniable role in social scientific and technological progress and industrial upgrading. With the advent of the digital age, metrological inspection institutions are facing unprecedented opportunities, especially in efficiency improvement and service innovation, while also accompanied by a series of challenges, including

data security and technology integration [1]. Research shows that the implementation of informatization management can not only greatly improve the work efficiency of metrological inspection institutions, but also optimize resource allocation, promote data sharing and ensure data security.

Furthermore, first of all, informatization management is conducive to improving data processing capacity. As we all know, metrological inspection institutions have to process a large amount of complex data and documents. Relying solely on traditional manual processing, it is easy to have information errors and losses. At this time, metrological inspection institutions can start to build informatization systems to realize automatic data collection, structured storage and intelligent processing, which can greatly improve data flow efficiency and ensure data accuracy. For a simple example, the informatization management system can directly connect to inspection equipment, thereby automatically collecting instrument sensor data and uploading measurement data in real time, effectively avoiding errors caused by manual operations, simplifying the inspection process, and providing visual support for work progress monitoring and quality control [2,3].

Secondly, informatization management is conducive to ensuring data security and promoting resource sharing. On the one hand, the introduction of advanced technical means such as data encryption can achieve precise protection of private data, effectively prevent information leakage, and maximize the protection of information security such as product design and experimental results; on the other hand, through the construction of a unified data platform, it can effectively break the information barriers between departments, promote the cross-departmental sharing of inspection data, technical materials and equipment information, and effectively reduce redundant work and resource waste.

Finally, informatization management is conducive to providing a scientific basis for institutional decision-making and resource allocation. With the help of big data analysis, data mining and visualization tools, metrological inspection institutions can achieve the goal of in-depth integration and intelligent analysis of massive inspection data. By effectively identifying potential laws and predicting development trends, managers can have a scientific basis when making decisions, and at the same time assist them in accurately judging quality control, service optimization, technological research and development, etc., so as to improve the accuracy and effectiveness of decision-making [4].

3. Effective paths of informatization management in metrological inspection institutions

3.1. Improve management mechanisms

First, metrological inspection institutions should clarify the goals and tasks of informatization management. The former mainly focuses on improving inspection efficiency, enhancing the accuracy of inspection results, rationally allocating human and equipment resources, and fully ensuring data security and privacy; the latter mainly includes building a systematic and perfect informatization management system, scientifically formulating reasonable inspection plans, coordinating the development of inspection activities, and dynamically monitoring and managing the whole process of inspection. Only by clarifying the goals and tasks of informatization management can we establish and improve the management mechanism and further promote its development in a systematic and refined direction [5,6].

Second, establish and improve the supporting management system. The establishment of the system is to provide a solid guarantee for the effective operation of informatization management, so as to achieve the goals of standardizing management processes and clarifying technical standards. When formulating systems, metrological inspection institutions should implement the basic principles of comprehensiveness, rationality and operability, and at the same time clarify management rules to ensure that the system is applicable to multiple links such as data collection, transmission, storage and analysis. Of course, in order to effectively ensure the implementation of the system, metrological inspection institutions should also establish and improve supervision and assessment mechanisms.

Third, strengthen the technical support capacity of informatization management. As we all know, technology is an important engine to promote the orderly development of the informatization management of metrological inspection institutions. Therefore, metrological inspection institutions should actively introduce advanced technical means such as

artificial intelligence and the Internet of Things, and at the same time start to build an integrated inspection information platform and attach importance to the development of professional inspection and analysis software. More importantly, metrological inspection institutions should vigorously promote the continuous innovation of technology. In this way, it can not only improve the automation level of inspection and the intelligence of data processing, but also provide customized inspection services for customers to meet their diverse inspection needs [7].

Fourth, build an effective feedback and continuous improvement mechanism. This mechanism helps metrological inspection institutions to continuously improve themselves. By regularly carrying out internal audits, customer satisfaction surveys, and actively introducing third-party evaluations, metrological inspection institutions can accurately identify the shortcomings and problems existing in the current system operation and formulate targeted solutions, promote the management model to gradually change from “extensive” to “refined”, and comprehensively improve the informatization management level of metrological inspection institutions.

3.2. Cultivate professional talents

The professional ability of inspectors in metrological inspection institutions is the core element to ensure the accuracy and reliability of metrological inspection results. Therefore, metrological inspection institutions should attach great importance to the cultivation of professional talent teams, and effectively provide solid team support for the orderly development of informatization management work. Specifically, it can be carried out from the following aspects:

(1) Carry out systematic training and continuing education activities. Metrological inspection institutions should formulate periodic training and continuing education plans to provide inspectors with rich opportunities and platforms to timely grasp cutting-edge technologies and proficiently operate new equipment. The training content should include technical theories, practical exercises and typical case analysis; the training forms can be carried out in various forms such as industry expert lectures and online courses [8]. It is worth emphasizing that metrological inspection institutions can build a hierarchical training system. For management personnel, they should be provided with opportunities to deeply participate in business process reengineering; for executive personnel, systematic operation training should be further strengthened to improve their data analysis ability and lay a solid foundation for efficiently participating in informatization management work in the future.

(2) Build a competency-oriented assessment and incentive system. Metrological inspection institutions can incorporate employees’ theoretical level and practical ability into core assessment indicators. For employees with outstanding performance, material or spiritual rewards should be given. Through various methods such as salary incentives, professional title promotion and honorary recognition, the enthusiasm and initiative of employees in work and learning can be fully mobilized, and finally a positive competitive atmosphere of “promoting learning through assessment and promoting excellence through incentives” can be formed [9-10].

(3) Promote team collaboration and technology sharing. Strengthen the organizational construction of inspection teams, break professional and departmental barriers, and promote technical exchange and experience sharing among personnel with multiple backgrounds and levels. Metrological inspection institutions can regularly organize various activities such as technical seminars, cross-departmental project cooperation and skill competitions, create an open, collaborative and mutual learning team cultural atmosphere, and greatly improve the overall technical collaboration ability.

(4) Stimulate the independent innovation awareness of practitioners. Metrological inspection institutions should actively encourage inspectors to promote innovation through practice, let them constantly embrace new ideas, new methods and new technologies, and provide solid project approval support and resource inclination for innovative achievements with application value. Metrological inspection institutions can adopt various methods such as setting up innovation awards and establishing and improving achievement transformation mechanisms to fully stimulate the subjective initiative of technical personnel in innovation and creation, so as to promote the organic unity of personal growth and industry technological progress imperceptibly.

3.3. Innovate inspection tools

In recent years, the development of measurement technology has been accelerating. Against this background, a series of new metrological inspection equipment characterized by intelligence and digitization has been emerging. Due to the integration of advanced sensing technology and high-precision analysis modules, new inspection equipment can achieve the purpose of accurate and efficient measurement of various physical and chemical parameters, which is of great benefit to improving inspection efficiency and data quality, and can also minimize errors caused by human intervention [11].

First, metrological inspection institutions should scientifically plan equipment selection and procurement. Especially before the equipment enters the institution, the primary task is to clarify their own inspection task scope, technical indicators, precision requirements, etc., so as to better ensure that the purchased equipment perfectly meets the actual application. Regarding equipment selection, metrological inspection institutions should pay attention to core technical parameters on the one hand, and comprehensively consider its stable operation, manufacturer's technical support and after-sales service quality on the other hand. Only in this way can we ensure that problems with the equipment can be solved in a timely and effective manner, and also ensure the long-term benefits of the institution.

Second, promote the transformation of equipment management towards informatization and intelligence. Metrological inspection institutions can independently build or introduce an integrated equipment management platform to monitor equipment operation status in real time and analyze data accurately. If abnormal equipment conditions are found, the platform will automatically issue an early warning to prompt relevant personnel to handle it promptly. In addition, the platform can dynamically track equipment use efficiency and precision change trends, and predict maintenance cycles based on historical data, effectively providing a scientific basis for managers to make scientific and reasonable decisions and comprehensively improve the overall resource allocation efficiency [12-13].

Finally, improve equipment operation specifications and establish a sound record traceability mechanism. Managers should formulate clear and executable standardized operating procedures, and at the same time establish a complete equipment operation file, which details equipment use, maintenance, failures and handling situations. In this way, once there is a problem, the cause can be further traced, providing a basis for continuously optimizing the inspection process and ensuring the reliability of results.

3.4. Build a solid security defense line

Effectively ensuring information security is the premise for promoting informatization management work, which is the key to ensuring the effective operation of the management system and the accuracy and reliability of data assets. Usually, information security runs through multiple dimensions such as networks, data, equipment and personnel operations. It is the foundation for ensuring the stable operation of metrological inspection institutions and an important support for the credibility of inspection institutions. Metrological inspection institutions can build a solid security defense line from the following three aspects.

First, establish and improve the information security management system and improve system support. The safety management system formulated by metrological inspection institutions should cover all links. In addition to clearly defining management responsibilities, it should also clarify operating specifications and, at the same time, set a unified safety policy, preferably forming a three-dimensional safety governance structure from top to bottom and from outside to inside. Regarding system design, metrological inspection institutions should, according to the actual situation, focus on the characteristics of inspection business processes, always adhere to the principles of compliance and applicability, and truly make data security cover the entire cycle of data collection, data transmission, data processing and data filing, to ensure the safe and orderly development of informatization management work [14].

Second, attach great importance to network security protection and improve monitoring capabilities. The network security defense system of metrological inspection institutions should follow the principles of multi-level and full coverage. In addition to deploying key technical equipment such as firewalls, intrusion detection and access control, it is also necessary to actively explore and practice network security management strategies and standardize response processes

[15]. Of course, metrological inspection institutions should also monitor the network security status in real time 24 hours a day. If abnormal traffic or other potential threats are found, targeted solutions should be taken to eliminate security risks in the cradle as much as possible, comprehensively improve the defense capability of the network system, and make it indestructible.

Third, establish an informatization security emergency response mechanism. Metrological inspection institutions can predict possible information security incidents in advance, and on this basis, formulate plans and focus on solutions. In order to improve response speed and problem-solving efficiency, metrological inspection institutions should also establish and improve cross-departmental and cross-level information-sharing and communication mechanisms. For personnel who are not familiar with the process or related matters, metrological inspection institutions can organize relevant training. In order to strengthen proficiency, regular emergency drills should be organized. This cannot only test whether the plan is really effective, but also can accumulate experience and improve personnel professionalism for flexibly responding to emergencies, thereby ensuring the stable and safe development of related businesses.

4. Conclusion

In a word, with its prominent advantages such as flexibility and convenience, informatization management has effectively provided substantial help for metrological inspection institutions. However, due to the complex content and many details of informatization management work, metrological inspection institutions are required to promote the integration of various work with informatization step by step in a calm and orderly manner. This is a systematic project that needs to be implemented unswervingly.

Disclosure statement

The author declares no conflict of interest.

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