

Technical Maintenance Procedures for X-Ray Technology

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Abstract: This article examines the technical maintenance procedures for X-ray technology, focusing on ensuring the quality and safety of X-ray equipment. The study highlights the importance of regular maintenance, diagnostic accuracy, and radiation safety. Furthermore, it provides an overview of the requirements for high-quality X-ray machine operation, discusses common challenges, and offers recommendations for improving maintenance procedures. This research is valuable for specialists working with radiology equipment and aims to enhance the efficiency and reliability of X-ray devices.

Key points: X-ray technology, technical maintenance, equipment quality, diagnostics, safety, preventive service.

Introduction. X-ray technology plays a crucial role in modern medicine by enabling accurate diagnosis of various diseases. The continuous and high-quality operation of X-ray machines directly impacts diagnostic precision. Therefore, regular technical maintenance is essential for ensuring the efficiency and longevity of these devices. This article explores the maintenance procedures, quality assurance measures, and best practices for maintaining X-ray equipment in optimal working condition.

Theoretical Section. Principles of X-ray Machine Operation

X-rays are high-energy electromagnetic waves that penetrate the human body, creating images based on tissue density variations. These images are essential for medical diagnostics.

Main Components of X-ray Machines

X-ray source – generates X-ray beams by accelerating electrons onto an anode.

High-voltage generator – provides the necessary power for radiation production.

Image receptor – captures and processes X-ray images on film or digitally.

Types of Technical Maintenance for X-ray Machines

Preventive maintenance – scheduled inspections and minor adjustments to prevent malfunctions.

Routine repairs – fixing minor issues to ensure continuous operation.

Major repairs – replacing or upgrading critical components of the machine.

Practical Section. Technical Maintenance Procedures for X-ray Machines

The maintenance process includes the following steps:

Initial inspection – visual and diagnostic evaluation of the machine's condition.

Electronic component testing – checking the power supply and generator performance.

Radiation intensity assessment – ensuring compliance with safety standards.

Mechanical component examination – inspecting moving parts for proper function.

Cleaning and calibration – optimizing image quality and machine efficiency.

Final testing and evaluation – verifying overall performance and safety.

Requirements for High-Quality X-ray Machine Operation

Safety requirements: Ensuring minimal radiation exposure for patients and operators.

Quality standards: Maintaining high image resolution for accurate diagnostics.

Technical compliance: Adhering to maintenance schedules and manufacturer guidelines.

Recommendations. Establishing a regular technical maintenance schedule and adhering to it.

Utilizing digital diagnostic tools for maintenance evaluation.

Implementing continuous training programs for maintenance specialists.

Enhancing safety measures with modern radiation protection technologies.

Conclusion

The efficiency and safety of X-ray technology depend on proper maintenance and timely inspections. Regular technical servicing extends the lifespan of X-ray machines, ensures high-quality diagnostics, and minimizes radiation risks. Future improvements in maintenance automation and innovative technologies will further enhance the reliability and performance of X-ray equipment.

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