Reflections on the Maintenance and Management of Broadcasting Technology: Postprint

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Abstract

In recent years, China' s cultural undertakings have witnessed rapid development, and radio and television, as a key component of the cultural system, are also confronted with the demand for reform, innovation, and development. Particularly in the context of the new era, new media have emerged in large numbers, attracting vast audiences through advantages such as large information capacity, rich content, and strong interactivity, thereby posing significant challenges to the development of traditional radio and television industries. To more effectively satisfy people' s diverse needs and better adapt to the market environment, the radio and television industry must not only innovate program formats and enrich program content, but also comprehensively enhance network transmission efficiency and quality. As an important foundation for ensuring the stable operation of radio and television systems, the maintenance and management of radio and television technology directly impacts the level of safe broadcasting. Accordingly, this paper analyzes the importance and characteristics of radio and television technology maintenance and management, proposes several practical and feasible countermeasures, with the aim of providing reference for professionals and contributing to the achievement of stable development goals in the radio and television industry.

Full Text

Preamble

Title: Reflections and Explorations on Broadcast Television Technology Maintenance Management

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Abstract: In recent years, China' s cultural undertakings have developed rapidly, and broadcast television, as a key component of the cultural system,

also faces demands for reform and innovation. Especially in the context of the new era, the emergence of new media has attracted a large audience with advantages such as vast information, rich content, and strong interactivity, posing a tremendous impact on the development of traditional broadcast television. To more effectively meet people' s diverse needs and better adapt to the market environment, the broadcast television industry must not only innovate program formats and enrich program content but also comprehensively improve network transmission efficiency and quality. Broadcast television technology serves as the important foundation ensuring stable system operation, and its maintenance management directly relates to safe broadcasting levels. Based on this, this paper analyzes the importance and characteristics of broadcast television technology maintenance management, proposes several practical countermeasures, and hopes to provide references for professionals while contributing to the stable development goals of the broadcast television industry.

Keywords: broadcast television; technology; maintenance management; safe broadcasting; fault analysis

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Introduction

In today' s society, science and technology are advancing rapidly, fostering the emergence of numerous Internet-based new media in the media market. While providing convenient services for the public, these developments have also intensified media competition. In this process, integrated playback control systems can be utilized to rationally integrate television sets and outside broadcast vehicles, maximizing video and audio conversion functions and synchronous playback capabilities, thereby ensuring the stable operation of broadcast television systems.[2]

1.3 Promoting Diversified Development of Broadcast Television

The development of modern science and technology has driven broadcast television toward digitalization, making DVB and HDTV inevitable trends in broadcast television reform and innovation. In this context, various systems within broadcast television also require reform and upgrading using digital technology, including broadcast control systems, transmission systems, and emission systems. This can effectively address the shortcomings of traditional broadcast

television' s single playback function. To meet these demands, the broadcast television industry must not only introduce various modern playback technologies but also properly perform related technology maintenance management to maximize the role and function of broadcast television technology and effectively enhance systemic technological capabilities.

1.1 Enhancing Core Competitiveness of Broadcast Television

The rapid rise of online media has brought tremendous impact to traditional broadcast television development, primarily because broadcast television channel models are relatively singular and lag behind modern Internet technology, leaving broadcast television uncompetitive in the media market. In this context, to attract more audiences, the broadcast television industry must continuously increase broadcast time and frequency. Broadcast television technology serves as the important foundation for program safe broadcasting and represents the lifeline of the entire industry. Only by performing maintenance management well can we promote stable operation of broadcast television systems, thereby expanding frequency coverage and comprehensively enhancing broadcast television' s competitive strength in the media market.

1.2 Ensuring Safe Operation of Broadcast Television Systems

Control systems and transmission systems are two critical components in the broadcast television industry, characterized by complex structures and diverse technologies. During operation, they are susceptible to various factors that can create safety hazards. If not properly controlled, these can directly affect system safety and stability. Therefore, performing related technology maintenance management is crucial. Management personnel must utilize digital technology to improve various systems during this work while strengthening maintenance management capabilities. Additionally, since digital information transmission and processing require digital compression technology, transmission channels must be further developed to provide guarantees for information transmission technology development.

2. Main Characteristics of Broadcast Television Technology Maintenance Management

2.1 Continuously Enriching System Functions

As mentioned above, the key to broadcast television innovation lies in introducing digital technology and upgrading transmission, emission, and broadcast control systems to promote diversified system development. This has significantly enriched broadcast television system functions, facilitating the transition from traditional analog signals to digital signals. During this technological evolution, broadcast television equipment has also upgraded, gradually developing toward high-definition digital equipment. To help broadcast television successfully navigate this transition period, technology management personnel must

not only use digital technology to improve various systems but also enhance maintenance management capabilities. Solid-state maintenance technology, in particular, has achieved considerable progress in wireless emission. This technology offers high efficiency and energy-saving characteristics, earning widespread favor and application from broadcast television signal emission departments nationwide. Specifically, in practical application, solid-state maintenance technology can not only reduce machine room floor space and lower consumption costs but also fully meet broadcast television system safe playback requirements, laying a solid foundation for the stable development of the broadcast television industry.

2.3 Gradually Increasing Transmission Capacity

Traditional broadcast television programs generally suffered from small capacity and short transmission distances during transmission. However, in recent years, the application of digital compression technology, satellite technology, and fiber optic technology has improved these traditional shortcomings, effectively enhancing transmission efficiency and quality. Additionally, the variety of broadcast television cable transmission services has continuously enriched, with transmission capacity expanding significantly. This has increased the difficulty and challenges of broadcast television technology maintenance management. Especially in the context of triple network convergence, broadcast television cable transmission has attracted more audiences, making network security management a top priority in broadcast television technology management that requires heightened attention from technical management personnel.

2.4 Gradually Improving Networkization Level

In the context of the new era, China's broadcast television technology has continuously optimized and improved, achieving remarkable results. These advances are inseparable from network technology support. For example, network live streaming technology is now widely applied in television and radio programs, enabling real-time broadcasting of news events. This not only promotes the development of broadcast television toward intelligence but also fully satisfies audience diversity demands.

2.5 Increasingly Complex Broadcasting Control Systems

In recent years, broadcast television cable technology has become widely popular and increasingly important throughout the industry. However, due to the complexity of broadcast television cable technology control systems, which involve multiple technologies from satellite relay to reception, modulation, and mixing, performing technology maintenance management is crucial. Only by improving network transmission safety and stability can we ensure television program safe broadcasting.

3. Problems in Broadcast Television Technology Maintenance Management

3.1 Uneven Comprehensive Quality of Management Personnel

In the era of Internet technology combined with various modern technologies, safe broadcasting is the most critical link for both broadcast television transmission and front-end operations. In recent years, network and information technologies have been widely applied in the broadcast television field, placing higher demands on practitioners' technical levels, professional capabilities, and comprehensive qualities. However, based on actual conditions, some technicians, despite having long tenure,[5] lack sufficient understanding of modern broadcast television technology and thus habitually follow traditional methods in maintenance management, which cannot fully meet broadcast television industry development needs.

3.2 Poor Psychological Quality of Broadcasting Control Personnel

Safe broadcast television program broadcasting requires coordination and cooperation among multiple departments. However, due to the many involved links, numerous interference factors exist. Additionally, broadcast television signals require coverage transmission through point-to-multipoint methods during transmission, meaning once a program is broadcast, there is no room for reversal. If forced to stop broadcasting, it will not only affect program quality but also cause a series of unpredictable losses. Therefore, during program broadcasting, management personnel must possess strong psychological qualities to ensure effective control of all links. If psychological qualities are inadequate, various problems will occur in the broadcast control process.

3.3 Low Level of Technology Maintenance Management

In recent years, to gain a foothold in the online media market, the broadcast television industry has continuously introduced digital and network technologies to optimize and transform systems. While improving program broadcast quality, transmission efficiency, and coverage range, this has also increased the difficulty of broadcast television technology maintenance management. Management personnel must continuously learn new knowledge and skills, comprehensively understand software scheduling, system optimization, and other technologies, and skillfully apply them to maintenance management work to improve broadcast television system operation levels and ensure program safe broadcasting. However, due to the substantial increase in current broadcast television technology maintenance management workload, many management personnel lack time to learn new knowledge and skills, resulting in lagging technical levels that prevent timely problem detection and ultimately affect program broadcast quality.[6]

4. Countermeasures for Broadcast Television Technology Maintenance Management

4.1 Enhancing Personnel Professional Competence

Broadcast television broadcasting involves extensive content, including the combined use of wireless technology, satellite technology, and broadcast links. To ensure stable operation of the broadcasting system, management personnel must possess high qualifications and capabilities. Especially with technological advancement, broadcast television network technology levels continue to improve, placing higher demands on the technical management team' s comprehensive level. The broadcast television industry must provide daily and regular training to the workforce, instilling knowledge of new technology usage techniques, digital and network technology safety, and providing staff with practical opportunities. This ensures that personnel can combine theory with practice in broadcast television technology maintenance management work, comprehensively improving management levels.

4.2 Improving Psychological Quality of Broadcasting Control Personnel

As mentioned above, broadcasting is one of the most important links in broadcast television, requiring broadcast control personnel to perform comprehensive inspections before broadcast. However, advanced broadcast television technology is a double-edged sword: while improving program broadcast quality, it also increases broadcast control difficulty. This highlights the importance of improving management personnel' s psychological qualities. As is well known, psychological qualities vary from person to person; even for the same event, individuals have significantly different perspectives and tolerance levels. The special nature of broadcast television broadcasting work is not something ordinary people can handle. Therefore, during talent selection and training, we must consider not only professional capabilities and technical levels but also psychological qualities. Selected talents must undergo further psychological endurance training and complete comprehensive assessment systems to ensure their psychological qualities meet requirements before taking up positions.[7] Additionally, broadcast control personnel must enhance self-learning awareness, continuously summarizing experience in work and actively learning new knowledge and technologies to enrich themselves. By honing their psychological qualities, they can lay a foundation for better competency in broadcast control work. On this basis, broadcast television industries should also organize work exchange activities to guide broadcast control personnel in sharing experiences with colleagues, helping them recognize their strengths and weaknesses, learn from each other, and progress together. This ensures proficient mastery of equipment operation skills while promoting smooth work development, fundamentally reducing or avoiding broadcast accidents.

4.3 Improving Maintenance Technical Level

The rapid development of computer technology has led to continuously increasing audience demands for television program quality. To meet audience needs, the broadcast television industry has widely applied hard disk storage technology as the main system for video network broadcasting. This technology can organically integrate software and hardware to form a safe and stable system environment. Nowadays, hard disk storage technology has become the mainstream trend in broadcast television broadcasting. In this development context, the workforce must continuously improve both ideologically and operationally. Since television program production, uploading, and broadcasting involve multiple departments, meeting safe broadcasting requirements necessitates coordination and cooperation among all departments. Therefore, comprehensively improving maintenance management levels across all departments is crucial.

The power supply system serves as an important component of broadcast television; if it fails, all operations become unstable. Therefore, proper planning and arrangement of the power supply system are particularly important. Typically, the power supply system should be constructed using a dual-circuit power supply method. Secondly, in emergency situations, to ensure stable operation of lighting, fire protection, and other facilities, corresponding generators should be configured. Thirdly, power supply for television stations, radio stations, and other machine rooms must be independent to prevent power supply issues in one machine room from affecting stable operation of other machine room systems. Finally, when conditions permit, television and radio stations should be equipped with UPS power supplies to achieve preventive measures.

4.4 Adequate Preparation for Maintenance and Management

As analyzed above, broadcast television technology maintenance and management play important roles in promoting stable industry development. Due to the complexity of maintenance management work, adequate preparation is required before execution to lay a foundation for analyzing technical value. Additionally, broadcast television technology maintenance and management share many commonalities, requiring technical personnel to summarize experience in practice, identify key points and difficulties, and targeted improve technical levels.[9] When conditions permit, modern instruments and equipment can be introduced to provide guarantees for improving broadcast television quality. During machine room construction, equipment redundancy issues should be considered, separating equipment primary/backup paths from power system primary/backup paths as much as possible. Modern science and technology should be utilized to integrate equipment functions, optimize monitoring systems, and add sensors for power, smoke, temperature, etc. Through remote monitoring, problems and potential hazards in equipment operation can be detected promptly, laying a foundation for timely problem resolution and handling, thereby eliminating issues at their source.

4.5 Effective Fault Analysis

In maintenance management work, broadcast television technology personnel must combine their work experience to summarize key points and difficulties in various tasks. Based on understanding working principles and processes, they should conduct in-depth analysis of equipment fault types and causes. This facilitates rapid fault range determination and accurate fault location in practical work while drawing lessons from experience.[10] Meanwhile, the broadcast television industry should communicate common fault phenomena and solutions to all technical personnel during training or internal exchanges, enabling timely and proper handling when similar faults recur. Additionally, broadcast television machine room emergency plan construction should be completed, equipment management levels strengthened, and equipment maintenance mechanisms optimized to ensure strict adherence to plans during faults, thereby shortening equipment repair time and restoring operation quickly.

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Note: Figure translations are in progress. See original paper for figures.