

Analysis of Safe Broadcasting Issues in Radio and Television Signal Transmission and Emission - Postprint

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Abstract

To ensure that users can smoothly receive and play radio and television programs, it is essential to guarantee both the security and stability of radio and television signal transmission and emission processes. However, at present, radio and television signals in China are frequently subjected to interference from various factors during actual transmission, which poses a serious threat to the stability of signal transmission and emission. Therefore, it is imperative to conduct a detailed analysis of the factors affecting radio and television signal propagation and to adopt appropriate countermeasures to ensure safe and stable signal transmission. This paper will briefly describe the concepts of radio and television signal transmission and emission, and provide relevant strategies for the aforementioned issues, with the aim of assisting relevant personnel and enhancing the stability of television program signals.

Full Text

Preamble

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Analysis of Safe Broadcasting Issues in Radio and Television Signal Transmission and Emission

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Abstract: To ensure users can successfully receive and play radio and television programs, it is necessary to guarantee both security and stability throughout the signal transmission and emission process. However, in current practice, radio and television signals in China frequently suffer interference from multiple factors, posing serious threats to transmission stability. Therefore, it is essential

to conduct a detailed analysis of factors affecting signal propagation and implement appropriate countermeasures to ensure safe and stable transmission. This paper briefly introduces the concepts of radio and television signal transmission and emission, and provides relevant strategies for the aforementioned issues, hoping to offer useful guidance for practitioners and enhance signal stability.

Keywords: radio and television signal; transmission and emission; safe broadcasting; problem analysis

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Safe broadcasting refers to the process where users can normally receive television signals and play programs after the two stages of signal transmission and emission. Typically, to ensure normal broadcasting, relevant personnel must enhance the security and stability of radio and television signals. Therefore, broadcasting signal staff need to emphasize system equipment maintenance and continuously improve the professional skills of maintenance personnel to ensure signals can be transmitted normally.[1] This paper discusses the transmission and emission of radio and television signals, analyzes existing problems in the transmission process, and explores countermeasures, hoping to promote industry development.

With the continuous development of social technology in China, the radio and television industry has integrated digital methods to optimize traditional signal transmission and emission, providing the public with clearer viewing experiences. Currently, radio and television signal transmission and emission represent the most common forms of digital information sharing. If security and stability cannot be effectively guaranteed, the entire broadcasting industry will be unable to operate normally.[2] Furthermore, the signal transmission and emission process determines whether the public can receive pictures normally, making it the core factor in program playback.

2.2 Human Factors

Human factors fall into two categories: malicious attacks and personnel-related issues. Malicious attacks generally refer to illegal interference with broadcast station operations or damage to user equipment and lines. With the continuous development of science and technology and the popularization of the Internet in China, many criminals exploit Internet technology to maliciously attack other

users for economic gain or illegal competition. Additionally, some individuals spread network viruses, causing system infections and functional failures. These behaviors severely impact radio and television signal propagation. On the other hand, many practitioners lack understanding of broadcasting development in modern network environments, cling to traditional signal transmission technologies, and cannot keep pace with the industry's evolution, rendering their capabilities insufficient for current societal demands.[3]

2.3 Natural Disasters

The most common natural disasters are lightning strikes and ice coverage, which most frequently cause signal problems in the broadcasting industry. Lightning issues occur primarily in southern rainy regions and can be categorized into strong lightning damage, weak lightning damage, and lightning induction damage. All types pose serious safety hazards to both local populations and broadcasting line systems. The most common consequences include television damage or signal reception failure. Additionally, lightning can cause power supply interruptions and signal pole collapses, endangering lives and economic interests. Ice coverage mainly occurs in extremely cold northern regions, where snow accumulates on wire surfaces or water vapor freezes onto wires due to low temperatures, causing varying degrees of damage and signal instability. Furthermore, ice-covered wires under multiple tension forces are prone to breakage, causing pole collapse accidents and leaving surrounding areas unable to receive signals normally.

2.1 Technical Accidents

With the continuous development of information technology, the broadcasting industry has integrated its signal propagation model with Internet information technology. Digital television in China has gradually replaced traditional signal transmission modes, but compatibility issues inevitably arise during practical application. Moreover, negligence during digital signal station construction can weaken signal propagation strength or even cause signal loss. Interference from other electromagnetic waves during transmission and emission also affects signals. During peak usage periods, technical limitations restrict line capacity, resulting in poorer broadcasting signals.

3.1 Strengthening Signal Transmission and Emission Technology Management

To better ensure the security of radio and television signal transmission and emission in China, relevant personnel should continuously improve and optimize signal propagation technologies. Since this work requires relatively professional technical support and high competency from technical staff, most Chinese radio and television stations still face technological issues that require advanced management measures to enhance transmission security and stability. For example, personnel can adopt digital monitoring technology, which not only effectively

improves transmission efficiency but also significantly enhances overall broadcasting quality and ensures safe program broadcasting.

3.5 Strengthening Personnel Quality

All aspects of radio and television signal transmission and emission work require professional participation. To improve efficiency and ensure quality, highly qualified professionals are needed. First, regarding political competency, staff must have a thorough understanding of national development policies and political systems, and strictly follow relevant regulations. Broadcasting companies should regularly hold lectures to enhance political literacy. Second, stations should cultivate staff knowledge competency. China's broadcasting industry is highly specialized, requiring advanced professional knowledge. However, current industry analysis shows some signal transmission personnel still lack sufficient expertise to meet modern requirements. Therefore, relevant units should conduct regular professional training and establish assessment mechanisms to comprehensively improve professional competency. Finally, when broadcasting signal problems occur during playback, duty personnel must diagnose causes and select appropriate emergency response plans based on specific situations, demanding certain capability levels. Thus, broadcasting stations should strengthen attention to duty personnel capabilities and conduct regular joint training and assessment with technical staff to improve overall station performance.

3.2 Strengthening Personnel Management

In addition to upgrading technical management measures, relevant personnel must also strengthen and optimize personnel management systems. Recruitment staff should evaluate candidates' professional knowledge, professional ethics, and acceptance of new technologies to ensure solid theoretical knowledge of signal transmission and emission and good frequency modulation skills for stable signal transmission. Workers should inspect transmission and emission devices before formal operation to avoid equipment failures and improve program quality. Finally, staff should strengthen security management of radio and television signal transmission to prevent data leaks and reduce the probability of malicious attacks.

3.3 Establishing a Sound Safety Warning System and Emergency Plan

Radio and television signals face threats from severe weather, geological disasters, and other natural calamities, or malicious attacks, often resulting in prolonged transmission interruptions. This is largely due to inadequate safety warning systems and insufficient emergency response plans in relevant units. Conducting emergency detection and repair work only after problems occur not only creates negative impacts for broadcasting stations but also reduces maintenance efficiency. Therefore, broadcasting stations need to establish sound safety

warning systems, optimize emergency plans, and implement both effectively to enable staff to conduct timely repairs when signals fail, minimizing the impact of severe weather.

3.4 Strengthening Maintenance and Inspection Management of Transmission and Emission Equipment

The operational status of radio and television signal transmission and emission equipment also affects transmission work. Therefore, technical personnel should establish a comprehensive equipment maintenance and inspection management system, regularly check signal transmission equipment, and conduct thorough maintenance at appropriate times based on work characteristics to reduce daily failure probability.[4] During routine inspections, personnel should clean dust from fans and filters to prevent signal emission device problems caused by dust accumulation. During thorough inspections, maintenance personnel should focus on checking power supplies, wires, and internal structures to ensure overall equipment normalcy, wires show no aging or breakage, thereby ensuring normal transmission and emission work and providing stable television programs for the public.

During radio and television signal propagation work, various problems often occur. To ensure normal program broadcasting, relevant personnel should strengthen signal security and stability from multiple aspects to reduce environmental impacts.[5]

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

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