

A Study on the Legal and Standard Nature of Special Equipment Safety Technical Specifications

Yang Bai*

China Jiliang University, Hangzhou, Zhejiang, China

**Corresponding Author.*

Abstract: Special equipment safety technical specifications, formulated by administrative authorities as mandatory documents, face persistent ambiguities in their legal and standard nature, complicating practical implementation. This study contrasts their enforceability with legal norms and mandatory standards, revealing that while not inherently legal, these specifications logically extend from legal frameworks and align technically with mandatory standards. By disentangling and integrating their dual attributes, the research clarifies their role in enhancing regulatory systems and harmonizing technical and legal requirements. Empirical analysis of cases, such as the Shanghai escalator accident and Hubei power plant incident, demonstrates how conflation with legal norms or standards leads to enforcement challenges. The paper proposes structural reforms, including "hard-soft separation" to streamline specifications and mechanisms inspired by the U.S. NTTAA to improve coordination. These recommendations aim to resolve hierarchical conflicts, ensure adaptability to technological advancements, and strengthen safety governance. This work contributes theoretical insights and actionable strategies for refining China's special equipment regulatory framework.

Keywords: Special Equipment; Safety Technical Specifications; Mandatory Standards

1. Problem

Special equipment safety technical specifications are a type of document that focuses on the safety performance and energy-saving requirements of special equipment. Its main content includes rules for the design, manufacturing, installation, modification, use

management, and inspection and testing methods of special equipment. Article 8 of the Special Equipment Safety Law provides general requirements for the implementation of safety technical specifications for special equipment, which states that "the production, operation, use, inspection, and testing of special equipment shall comply with relevant safety technical specifications and standards for special equipment". In the legal context, the word "should" is usually understood as meaning "must", and this provision becomes a mandatory rule, providing a legal basis for the mandatory implementation of special equipment safety technical specifications. The interpretation of Article 8 of the Special Equipment Safety Law in the Interpretation of the Special Equipment Safety Law states that safety technical specifications are one of the basis for government departments to fulfill their responsibilities, and are mandatory and binding norms that directly guide the safety work of special equipment. As a mandatory requirement stipulated by the government, safety technical specifications shall bear corresponding legal responsibilities for violating its provisions. The Guidelines for the Development of Safety Technical Specifications for Special Equipment provide definitions and interpretations of safety technical specifications for special equipment. These written regulations and interpretations are all aimed at emphasizing the mandatory nature of safety technical specifications for special equipment, but whether their nature tends towards legal norms or mandatory standards varies among scholars in the special equipment industry.

The author believes that there are significant differences in the recognition of the nature of special equipment safety technical specifications in the theoretical community, mainly due to the lack of understanding of the direction of technical specifications by some

scholars. It is not appropriate to simply judge special equipment safety technical specifications based on legal norms, mandatory standards, and other mandatory documents just because they are mandatory documents. Different from the direction of legal norms, technical norms are aimed at adjusting the relationship between humans and nature, with the purpose of avoiding potential harm caused by non-compliance with technical norms. Even from the perspective of legal regulation, it is not complete to consider technical norms and legal norms as a special form of legal norms based solely on the regulatory function of security technical norms and the infringement of legal interests by violating security technical norms. However, some administrative agencies do consider the safety technical specifications for special equipment as "law" in practice. In the "Investigation Report on the General Accident of Injury Caused by the" 12-21 "Escalator at the Paris Spring (Huaihai Store) in Huangpu District, Shanghai", the accident investigation team believes that the elevator company involved did not inspect the length of the tension spring of the escalator handrail in accordance with the special equipment safety technical specification "Elevator Maintenance Rules". And this inspection item is a statutory maintenance item for escalators. The administrative authorities' use of the provisions of special equipment safety technical specifications as "statutory" has led to confusion between safety technical specifications and legal norms, mandatory standards, and has caused confusion in the supervision and production of special equipment safety. Therefore, based on the perspective of positivism, the author attempts to explore the positioning and interpretation of the nature of special equipment safety technical specifications by comparing them with legal norms and mandatory standards.

2. Relationship and Distinction from Legal Norms

2.1 Formal Analysis

Legal norms are the conceptual origin of safety technical specifications for special equipment. Article 8 of the Special Equipment Safety Law proposes and adopts the legal concept of special equipment safety technical

specifications in the Special Equipment Safety Supervision Regulations. According to the general regulations of the special equipment industry, the safety technical specifications for special equipment are an integral part of the special equipment regulatory standard system. Their function is to concretize the principles and provisions of relevant laws, regulations, and rules on special equipment, and their adjustment scope is limited to the field of special equipment. The second paragraph of this law grants the power to formulate and interpret safety technical specifications for special equipment to administrative agencies. Administrative agencies need to determine what special equipment safety technical specifications are, which special equipment safety technical specifications need to be formulated, and their specific contents. At the same time, the responsibility for violating safety technical specifications is established by law, and the basis for determining whether an action violates special equipment safety technical specifications is also determined by administrative agencies based on the safety technical specifications themselves. This approach is not uncommon in legislation and can play a significant role: firstly, through the management of "technical specifications", establish a "basic reference system" for the supervision of special equipment, and use government public power as endorsement [1]; Secondly, by setting adverse consequences for violating security technical specifications, clarifying the predictability of punishment for participating entities, and strengthening compliance with security technical specifications; The third is to establish the initial behavior of legal norms' assumptions' and the criteria for determining 'sanctions'. It can be seen that the concept of safety technical specifications for special equipment is set by legal norms, and its content has the function of constructing legal norms, which is a specific supplement to legal norms.

The procedures for developing and modifying safety technical specifications for special equipment are not entirely the same. The main body responsible for formulating the safety technical specifications for special equipment and the regulations of the market supervision department is the State Administration for Market Regulation. As supporting documents of the higher-level law, comparing the

procedures for formulating the two can make a certain formal judgment. The Guidelines for the Development of Safety Technical Specifications for Special Equipment stipulate the procedures for the development of safety technical specifications for special equipment, including project initiation, drafting, review, soliciting opinions, deliberation, approval, and promulgation. The Regulations on the Procedures for the Development of Regulations by the State Administration for Market Regulation clarify that the regulatory procedures for market supervision departments include the main stages of project initiation, drafting, review, decision-making, and publication. Although the two have similarities in the setting of the development procedures, there are significant differences in the actual operation process. Taking the drafting process as an example, if the regulatory content of the market supervision department involves major institutional adjustments, the drafting institution must evaluate the expected effects and possible impacts of the relevant measures, and hold a hearing to listen to the opinions and suggestions of stakeholders. This is a way to protect the interests of stakeholders, safeguard the public's right to know and supervise, prevent and mitigate the adverse effects of the system, and promote scientific decision-making. On the contrary, the drafting group of special equipment safety technical specifications adopts a more direct approach to safeguard the rights and interests of participants in special equipment economic activities. Specifically, the drafting team has incorporated representatives from various stakeholders to directly participate in the drafting process, ensuring that the interests of all parties are fully expressed and balanced, thereby strengthening the protection of the rights and interests of participants in special equipment economic activities. For example, in the review process, the regulations of the market supervision department are subject to legality review by the legal institution of the State Administration for Market Regulation, and fair competition review is also conducted for regulations that affect the economic activities of market entities. In contrast, the safety technical specifications for special equipment are reviewed by the special equipment safety supervision agency of the State Administration for Market Regulation,

and must be reviewed by the Special Equipment Safety Technical Committee before approval. Although there is no legal review or fair competition review process in the formulation of the latter, this does not mean that the safety technical specifications for special equipment do not have the function of adjusting the economic activities of special equipment. For example, the "Safety Technical Regulations for Large scale Amusement Facilities" stipulate that the technical standards and management systems for large amusement facilities shall not be lower than the requirements of the regulations. This regulation highlights the government's leadership in formulating systems, emphasizes the constraints of basic institutional rules, and requires entities engaged in the design, manufacturing, installation, and other activities of large-scale amusement facilities to comply with the "public interest" of the system, in order to maximize the correction of information failures caused by information asymmetry and externalities [2].

Additionally, there are differences between the two in terms of modifying the program. From the situation listed in the "Regulations on the Procedure for Formulating Regulations of the State Administration for Market Regulation", it can be seen that the revision of regulations is mainly due to external factors, such as changes in the basis of regulations or regulatory authorities, policy practice needs, etc. After the revision of regulations, the latest regulatory text is published. The factors that lead to the modification of safety technical specifications for special equipment are more inclined towards the internal regulatory authorities. The "Guidelines for the Development of Safety Technical Specifications for Special Equipment" adopt the assumption that "partial content of safety technical specifications needs to be modified", leaving a large blank for which situations belong to "needs". In practice, it is mostly the national special equipment safety supervision agency that directly proposes the modification content of safety technical specifications. Similar to the practice of modifying national standards, the modified content of special equipment safety technical specifications is published in the form of a modification form.

It can be seen that although the safety technical specifications for special equipment do not

have the appearance of legal norms, their concept originates from legal norms. Formally speaking, similar to departmental regulations, the safety technical specifications for special equipment are a supplementary part of legal norms, rather than the legal norms themselves. The safety technical specifications for special equipment emphasize the internal nature of the same administrative authority, and have the meaning of administrative authorization by the competent authority, directly reflecting the management awareness of the administrative supervisory department.

2.2 Substantive Inference

If a legal norm is effective, it means that it is binding on the people it refers to [3]. The law establishes rights and obligations to regulate the actions and inactions of individuals, in order to constrain their behavior and achieve legal order. For example, Article 5 of the Special Equipment Safety Law clarifies the legal boundaries and scope of responsibilities of the special equipment safety supervision departments established by the local people's governments at or above the county level in fulfilling their regulatory duties, which is based on the inevitable obligations derived from their administrative functions and positions. Article 1.4.1 of the "Regulations on the Use and Management of Special Equipment" further elaborates on the obligations stipulated in Article 5 of the "Special Equipment Safety Law". In terms of the content structure of special equipment safety technical specifications, there is room for discussion regarding the establishment of obligations.

Exploring whether the safety technical specifications for special equipment can set specific behavioral obligations to constrain legal and natural persons actually touches upon the deep-seated issue of the ambiguity between technical and legal norms. In other words, the core of the problem lies in to what extent special equipment safety technical specifications can go beyond simple technical guidelines and evolve into legally binding behavioral norms, that is, whether the behavior of setting obligations in technical specifications is sufficient to constitute "setting obligations" in the sense of legal norms, and thus generate corresponding legal responsibilities and consequences. This issue

not only concerns the nature and positioning of technical norms, but also involves the complex relationship between balancing the scientific and rational nature of technical norms with the authority and certainty of legal norms in the context of the integration of law and technology [4].

From a nature perspective, technical specifications focus on the technical requirements and guidance for human technical activities and the intrinsic safety of equipment, aiming to ensure the safety, effectiveness, and economy of technical activities. And legal norms are behavioral norms with rights and obligations as the main content. Although technical specifications may contain guidance or requirements for behavior, they do not directly have legal effect unless explicitly referenced or converted into part of legal norms by relevant laws and regulations. From the perspective of purpose, setting obligations in the safety technical specifications for special equipment is to enhance the safety of special equipment and reduce the risk of accidents. But whether this obligation setting has legal effect depends on whether it is directly incorporated into the legal system and becomes a part of legal norms. In summary, from the perspective of the "three elements" of legal rules (i.e. assumptions, behavioral patterns, and legal consequences), the safety technical specifications for special equipment include behavioral assumptions, which assume the specificity of the entities involved in special equipment related activities, limited to production, operation, use, and inspection and testing entities. Although there are doubts from a legal perspective regarding the obligation to establish safety technical specifications for special equipment, this obligation limits the behavior patterns of participating parties and does not exceed the scope of technical activities. The safety technical specifications for special equipment do not directly set consequences, but provide criteria for determining consequences. Therefore, the constituent elements of special equipment safety technical specifications themselves do not have legal regulatory significance, only technical significance [5].

3. The Connection and Differentiation with Mandatory Standards

The Standardization Law stipulates the

mandatory enforceability of mandatory standards, reflecting the rigid constraint of legal norms on technical standards. The safety technical specifications and mandatory standards for special equipment have been given clear binding force by law, becoming an indispensable technical and legal basis for guiding and regulating special equipment activities. Given the important roles of both in the safety management of special equipment, in-depth exploration and comparison of their effectiveness levels have certain practical significance for improving the safety supervision system of special equipment and promoting the coordination and unity of technical specifications and standards.

3.1 Technological Integration Approach: Emphasizing the Cited Content

The legislative arrangements of the Special Equipment Safety Law and the Standardization Law strengthen the authority of special equipment safety technical specifications and mandatory standards as benchmarks for social production activities. Together, they form the dual cornerstone of special equipment safety management and technical practice. Similarly, they have played an irreplaceable role in ensuring production safety and safeguarding public interests, while also reflecting the guiding and safeguarding functions of the law on technological progress [6]. Both are based on the construction of the national legal system, have a clear legal foundation, and integrate certain technical elements within the framework of the legal system. There are roughly two ways of integration: one is to refer to the full text of technical standards in the special equipment safety technical specifications, such as Article 2.2.4.1.1 of the "Supervision Regulations for Safety Technology of Special Motor Vehicles in the Field (Factory)", which stipulates that "forklifts with explosion-proof functions shall meet the requirements of GB 19854-2005" General Principles for Explosion proof Technology of Industrial Vehicles Used in Explosive Environments ", GB/T 26950.1-2011" Explosion proof Industrial Vehicles Part 1: Battery Industrial Vehicles ", GB/T 26950.2-2015" Explosion proof Industrial Vehicles Part 2: Internal Combustion Industrial Vehicles "; Another way is to incorporate specific requirements from the technical

standards into the special equipment safety technical specifications, or supplement the standards in the form of special equipment safety technical specification clauses, or further improve the technical requirements proposed in the standards, with the aim of emphasizing the specific technical field of special equipment. For example, Article 5.6.1 of GB 16899-2011 "Safety Code for Manufacturing and Installation of Escalators and Moving Walkways" stipulates that when the speed of the handrail deviates from the actual speed of the steps, pedals or tapes by more than -15% and lasts for more than 15 seconds during the operation of escalators and moving sidewalks, the handrail speed monitoring device should stop the escalator or moving sidewalk. According to Article A2.2.3.2 of the Safety Technical Specification for Special Equipment - "Rules for Supervision, Inspection and Periodic Inspection of Elevators", the handrail speed monitoring device is required to check whether the handrail speed monitoring device can automatically stop the operation of the inspected equipment when the deviation between the handrail speed and the actual speed of the steps, pedals or tapes exceeds 15% and lasts for 5-15s. It can be seen that the latter has stricter technical indicators for the monitoring range and action speed of the handrail speed monitoring device than the relevant mandatory standards [7]. This to some extent promotes mutual coordination between the two, resulting in a high degree of equivalence at the technical level. Specifically, the formulation of technical specifications is often based on technical standards, and the update and development of technical standards also need to refer to the latest requirements of technical specifications, thus forming an interactive relationship of mutual promotion and complementarity.

3.2 Overlapping Nested Complex Architecture

Undoubtedly, this integration approach comes with a series of challenges and difficulties. Firstly, there may be a certain tension between the rigor of safety technical specifications for special equipment and the flexibility of technical standards. As mentioned earlier, when citing the full text of technical standards in the "Supervision Regulations for Safety

Technology of Special Motor Vehicles in the Field (Factory)", the year of publication of the standard is also cited, limiting the version of the standard. When technical standards are constantly updated and adjusted with technological progress and market demand changes, this makes the lag of safety technical specifications for special equipment particularly prominent. So how to balance the characteristics of both, ensuring that they meet the requirements of special equipment safety technical specifications while also adapting to the needs of technological development, has become an urgent problem to be solved. Secondly, there are significant issues of cross referencing and hierarchical structure disorder within the safety technical specifications and technical standards system for special equipment. As mentioned earlier, the "Safety Technical Regulations for Large scale Amusement Facilities" clearly define that the technical standards for large amusement facilities shall not be lower than the benchmarks set by the regulations. This regulation implies inherent inconsistency in logical construction. Essentially, the safety technical specifications for special equipment aim to propose more stringent requirements than general technical standards, which implies that the natural rank of technical standards should be lower than that of safety technical specifications. If technical standards are regarded as the basic elements of technical input, and special equipment safety technical specifications are regarded as the advanced form of technical output, the nested structure displayed by the loop can easily cause "logical execution exceptions", especially when the content of the two clauses overlaps or conflicts, which will increase the confusion and difficulty of selection and operation in practical applications, and affect the effectiveness and consistency of safety management. In the major high-pressure steam pipeline explosion accident at Madian Gangue Power Plant in Dangyang City, Hubei Province, the accident investigation report determined that the inspection agency of the accident pipeline did not correctly fulfill its legal responsibilities for pressure pipeline inspection and testing, and did not conduct tests on the pipeline in accordance with the requirements of the "Code for Acceptance of Construction Quality of Industrial Metal Pipeline

Engineering". When explaining the cause of the accident, the accident investigation report blurs the boundary between special equipment safety technical specifications and mandatory standards, implying that special equipment inspection agencies fulfill their statutory inspection responsibilities based on mandatory standards rather than safety technical specifications. This is an important warning to strengthen the clarification of the application boundary between special equipment safety technical specifications and standards.

4. Suggestions

From a legal perspective, the safety technical specifications for special equipment do play a substantive role in regulating the activities of special equipment entities, but they differ significantly from legal norms in both form and substance. Although the concept of safety technical specifications for special equipment is referenced by law, its specific content has not been directly incorporated into legal norms. Therefore, the safety technical specifications for special equipment can be understood as matters that naturally extend from the logical connotation of legal norms, supplementing the shortcomings of legal norms in the specific field of special equipment. The safety technical specifications and mandatory standards for special equipment are technical specifications, not legal specifications [8]. Their mandatory nature comes from external legal constraints, rather than their inherent constraints [9]. Like standards, the safety technical specifications for special equipment themselves serve as a buffer against the rigidity of hard laws, with generally weaker binding force than hard laws, especially in terms of legal application, which should be different from administrative documents such as departmental regulations. Therefore, it is necessary to further clarify the positioning of safety technical specifications for special equipment in order to reduce the problem of mixed effectiveness [10].

4.1 Appropriately Adopting the Method of "Separating Software and Hardware" to Streamline the Number of Safety Technical Specifications for Special Equipment

If the "Regulations on the Procedure for Formulating Regulations of the State Administration for Market Regulation" do not exclude technical provisions for departmental

regulations and explicitly provide specific provisions for the implementation of administrative licensing matters set by higher-level laws, regulations should generally be formulated. For example, the role of the "Special Equipment Production and Filling Unit License Rules" is to concretize the administrative licensing conditions, and the "Special Equipment Use Management Rules" stipulate the specific requirements for implementing special equipment use registration licenses. The safety technical specifications for such special equipment can be transformed into departmental regulations. And standards such as "Elevator Maintenance Rules" and "Type Test Rules for Pressure Pipeline Components" that mainly focus on technical requirements can be considered for conversion into technical standards.

4.2 Enhance the Coordination between Special Equipment Safety Technical Specifications and Mandatory Standards through Mechanisms

Some countries adopt supporting mechanisms to enhance the coordination of technical regulations and reference standards, while buffering the conflict between rigid regulations and flexible standards, and restraining the constraints of standards on administrative agencies. The NTTAA Act in the United States provides regulations on how federal government agencies can better participate in the work of standard setting agencies and ensure timely updates of referenced and included standards. According to regulations, federal agencies are required to collaborate with voluntary consensus standard bodies to develop technical standards, ensure a balance of process interests, and dispatch qualified representatives to participate. Representatives should participate equally in discussions, express their opinions, follow standard institutional procedures, and have the right to vote. Federal agencies are required to regularly or timely review the standards referenced in technical regulations, update them as necessary, and consult with stakeholders to ensure that the introduction of new or updated standards is reasonable and meets regulatory modification requirements [11]. For some key mandatory national standards for special equipment, administrative personnel can be involved in the drafting work, or experts and social

organizations can be commissioned by administrative agencies to undertake the drafting task, in order to enhance the discourse power of the standards. In short, improving the dispute resolution mechanism for special equipment safety technical specifications is a long-term task. We look forward to more scholars conducting in-depth research on the legal status and interpretation methods of special equipment safety technical specifications, and promoting scientific and precise supervision of special equipment safety.

5. Conclusion

This study elucidates the dual legal and standard nature of special equipment safety technical specifications, revealing their unique position as mandatory yet non-legal instruments that extend from legal frameworks while aligning technically with mandatory standards. Empirical evidence, including case analyses of the Shanghai escalator accident and Hubei power plant incident, underscores the practical challenges arising from conflating these specifications with legal norms or standards. By disentangling their attributes and proposing reforms such as "hard-soft separation" and coordination mechanisms inspired by the U.S. NTTAA, this research offers actionable pathways to resolve hierarchical conflicts, enhance adaptability to technological advancements, and strengthen safety governance.

The findings emphasize that while special equipment safety technical specifications lack inherent legal force, their integration into regulatory systems is critical for bridging technical precision and legal compliance. Future efforts should focus on institutionalizing stakeholder collaboration, refining dispute resolution mechanisms, and fostering dynamic alignment between evolving standards and rigid regulations. Ultimately, clarifying the distinct yet complementary roles of these specifications and standards will advance China's special equipment safety regime, ensuring both scientific rigor and enforceable accountability in a rapidly evolving technological landscape.

References

- [1] Wei Ji, Fangyuan Li, Rethinking and Analyzing the Concept of "Market Regulation": Safety, Order, and Technical

- Norms. China Administrative Management. 2023 (03): 119-125.
- [2] Hualin Song, Diversified roles in the process of rule making: a discussion centered on the field of technical standards. Zhejiang Academic Journal. 2007 (03): 160-165.
- [3] E. Bodenheimer, Jurisprudence, Legal Philosophy, and Legal Methods. China University of Political Science and Law Press, 2004: 347-348.
- [4] Hualin Song, On the Legal Nature of Technical Standards - Positioning from the Perspective of Administrative Law Normative System. Administrative Law Research, 2008 (03), 36-42.
- [5] Jingwei Liu, The Normality and Normative Effect of Standards: A Perspective on the Protection of Standard Copyright. Law Journal, 2014 (08): P101.
- [6] Jingshen Li, Preliminary Exploration of Technical Standards and Their Legal Nature [J]. Legal and Social, 2012(08): 256-257.
- [7] Wei Chen, As a normative technical standard and its relationship with law. Chinese Journal of Law, 2022 (05): 84-100.
- [8] Jun Chen, Jingwei Liu, Mandatory standards are still in their true form: from the perspective of distinguishing standards from law. Standard Science, 2024 (03): 4-15.
- [9] Tian Mao, Feirong Peng, Revisiting the Copyright of Standards. Standard Science, 2022 (12): 51-56.
- [10] Liao Li, Cheng Hong, Research on the Integration Mode of Law and Standards: Based on the Perspectives of Hard Law and Soft Law and Chinese Practice. Chinese Soft Science, 2013(07):164-176.
- [11] Jia Li, Nana Niu, The Relationship between Technical Regulations and Standards in the United States and Their Implications for China. Standard Science, 2022 (12), 44-50.