

Review Article

The Main Adjustment of New Version China's "Coal Mine Safety Regulations"

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Abstract: The new version of China's "Coal Mine Safety Regulations" has been comprehensive revised and implemented. It will have a significant influence and play an important role on national safety production of coal mine. As the main regulation of coal mine safety production, it has been highly valued by the Party and government, coal mine enterprises and employees. Before this comprehensive revision, it has undergone 13 times of system and revision. "Coal Mine Safety Regulations" specifically reflects the requirements of the state for coal mine safety work, and adjusts the relationship between people in coal mine safety work. It can correctly reflect the objective law of coal mine production and adjust the relationship between man and nature in coal mine safety work. The comprehensive revision is not a repetition. It focuses on perfecting, upgrading, checking and filling gaps. It can withstand deliberation and practical test. It has increased from 4 to 6, 20 to 34, 751 to 721, and 19.2% of them have been substantially revised. It is mandatory, scientific, normative and stable. This thesis state the status and function of the "Coal Mine Safety Regulations", the basic principles of this revision, and the main changes of new version regulations, adjustment of technical equipment and the important rule of emergency rescue are emphatically analyzed, in order to correctly understand and implement the requirements of relevant regulations.

Keywords: Safety Regulations, Technical Equipment, Emergency Rescue, Adjustment

1. Introduction

The comprehensive revised "Coal Mine Safety Regulations" [1] have been formally implemented since October 1, 2016, which has brought new requirements, new guidelines and new norms to the work of coal mine safety production of China. It will greatly promote the structural adjustment, transformation and upgrading of China's coal industry, and improve the technical outlook of coal industry, and comprehensively enhance coal mine safety production capacity of China. It is great significance to correctly understand and thoroughly implement the relevant provisions of the new edition of "Coal Mine Safety Regulations" [2] for ensuring and promoting the safety production of coal mines of China. It also has reference for the safe mining of coal in countries around the world.

2. Status and Functions of "Coal Mine Safety Regulations"

The "Coal Mine Safety Regulations" has a high authority in China's coal industry, and its important functions are mainly reflected in the following aspects:

(1) It is the most important supporting regulation of laws and regulations such as "Work Safety Law of the People's Republic of China" [3], "Law of the People's Republic of China on the Prevention and Control of Occupational Diseases" [4], "Regulations on Safety Supervision over Coal Mines" [5] and other laws and regulations, and the main regulation of coal mine safety production. It plays a basic principal role at the same level of regulations and standards, such as "Regulations for coal mine rescue", "Regulations on prevention and control of coal and gas outburst" [6], "Rules

for coal mine water control" [7] in coal Mines, etc. Regulations and standards at the same level and normative documents at the following levels shall not conflict with it.

(2) It embodies the national requirements for coal mine safety work and adjusts the relationship between people in coal mine safety work. It can correctly reflect the objective law of coal mine production and adjust the relationship between man and nature in coal mine safety work. It is the code of conduct for coal mine safety production and the criterion for safety management. It is the basis for coal mine enterprises to formulate various rules and regulations, standards and norms, operation procedures and operation procedures.

(3) It is the law enforcement basis for safety supervision of coal mines. The State Administration of Coal Mine Safety and local government coal mine safety supervision organizations should be based on it is provisions in the process of carrying out coal mine administrative law enforcement.

3. Main Principles for This Revision

The Chinese government, coal mining enterprises and miners have always attached great importance to the revision of the "Coal Mine Safety Regulations", which has undergone 13 revisions before this comprehensive revision. With the progress of science and technology progress and the improvement of productivity level, every revision has systematically summarized safety production experience and disaster accident lessons, and has condensed the wisdom of the vast number of miners. The comprehensive revision of the "Coal Mine Safety Regulations" is mainly follows the following principles:

(1) Highlighting legal compliance and enhancing preventiveness. It reflects the requirements of the central government's decision-making and economic and social development, and conforms to the development trend of the reform of management systems. The revision work adhere to the policy of "safety first, prevention first, comprehensive management", follow the national laws and regulations on safe production, and effectively link up the relevant standards and norms; Seriously sum up the lessons learned from coal mine disasters in the past ten years, implement the main responsibility of coal mining enterprises, and strengthen accident prevention and advanced governance [8].

(2) Strengthening Scientific nature and rationality. All safety technical requirements and indicators should have scientific basis and conform to the objective law of market economy and coal technology progress. In order to reflect the rationality, all provisions of the regulations must reflect the scientific and realistic, but also take into account the regional geological conditions, imbalance of mining technology level and management level development [9]. At the same time, it is necessary to reflect the progress of advanced productivity of coal mines and the latest achievements of coal mine equipment of China, to reflect the development direction of advanced productive forces, and not protect the backward

technology.

(3) Focusing on operability, enforceability, and supervision. It is necessary to fully reflect the basic requirements for ensuring safe production, that is, the "red line" cannot be broken, and it must be in line with the current economic and social development requirements and the development level of coal mine productivity. All clauses adhere to the principle of realizable, enforceable and usable in coal mines, and that safety supervision and supervision organs can supervise and monitor, so as to ensure that the stipulated safety technology and management requirements and measures are put into effect and play a role.

(4) Adhering to comprehensiveness and systematicness. It is necessary to make provisions on the safety production of coal mines in accordance with the "Work Safety Law of the People's Republic of China", etc., and also to raise relevant requirements for the prevention and control of occupational hazards in coal mines according to the "Law of the People's Republic of China on the Prevention and Control of Occupational Diseases"; It is necessary to be based on the prevention and control of disaster accidents, and also attach great importance to safety avoid danger and emergency rescue in the event of disasters; From the whole aspects of people, things, environment and management, and the whole process of geological security, design, construction, production process control, emergency rescue, closed pit, etc., systematic safety requirements and regulations are proposed.

(5) Highlighting authority and maintaining stability. The revision process adheres to the combination of coal mining enterprises, colleges and universities, scientific research and design units, supervision institutions, and collects the wisdom of various professional experts to ensure the regulations authority and practicability. The comprehensive revision is not a reorganization. It focuses on perfecting, upgrading, checking and filling in the gaps, unifying scientific and technological terms, unifying legal measurement units, unifying technical names and standards, and having a rigorous wording, which can withstand deliberation and practical testing.

4. Main Changes of "Coal Mine Safety Regulations"

The new "Coal Mine Safety Regulations" has made substantive amendments to 19.2% of the provisions. The main changes are as follows: 4 parts are increased to 6; 20 chapters are increased to 34; 751 clauses are reduced to 721 reduction; The total number of words has increased from 112 thousand words to 113 thousand words. The main changes are as follows:

(1) Enhancing the threshold of coal production access and strictly control the intensity of coal mining. The designed production capacity of newly built outburst mines shall not be less than 0.9Mt/a, and the mining depth of the first production level shall not exceed 800m; The depth of extended horizontal mining in a production mine shall not

exceed 1200m; The mining depth (first level) of newly built large and medium-sized non-outburst mines should not exceed 1000m; The mining depth should not exceed 1200 m in the reconstruction and expansion of large and medium-sized mines; The mining depth of new and expanded small mines should not exceed 600m. The level of simultaneous production in production mines shall not exceed 2.

(2) Explicating authority and giving the site management the necessary rights. Highlighting the main responsibility of coal mine enterprises for safe production and clearly stipulating that coal mine enterprises are the main body of emergency management, and the main person in charge is the first person responsible for emergency management and accident rescue work. Highlighting the key responsibility of mine manager, and it is clearly stipulated that the work with greater danger such as underground electric welding must be approved by the mine manager. Highlight the role of site managers, and it is clearly stipulated that when the gas reaches the power-off concentration, team leaders, tile inspectors and mine dispatchers shall have the right to order the site operators to stop their operations, cut the power and Evacuate; When the warning of coal and gas outburst is found, team leaders, tile inspectors and mine dispatchers have the right to order relevant site operators to stop working, cut power and withdraw to a safe place. In case of emergency and life-threatening situations in the rescue process, the commander in charge has the right to make a decision to withdraw from the dangerous area.

(3) Highlighting people-oriented and improving the requirements for employees. In order to ensure the safety and health of workers, The regulations stipulated that underground personnel should be transported by machinery, and by special transporter vehicles; It improved dust control requirements and adopting mechanical cooling measures; It stipulated that coal mine enterprises should faithfully informing occupational hazards and regularly carrying out occupational health examinations, etc. At the same time, it is stipulated that miners must be familiar with emergency rescue plans and disaster avoidance routes, and have knowledge of self-help and disaster avoidance. Team leaders should have the knowledge and ability of part-time rescue team members and be able to organize self-help and safety avoid the danger, in the first time after a dangerous situation; External personnel must be trained in basic knowledge of safety and emergency response, master the use of self-rescuer, and sign for confirmation before entering the mine.

(4) Stricting safety requirements and improving safety guarantee ability. It is stipulated that outburst mines must extract gas before mining. New high gas mines, outburst mines, coal seam spontaneous combustion mines and mines with heat damage should use zonal ventilation or diagonal ventilation. At the beginning, only one mining area can be arranged for production if the central side-by-side ventilation is applied. It is strictly prohibited to use special gas drainage lane. It is to promote coal mining enterprises to implement gas extraction first and then mining, so as to achieve the

target of extraction and balance of extraction, excavation and mining.

5. Main Adjustments of Technical Equipment Provisions

As the foundation and guarantee of safety in production, the new regulations have made many adjustments to its provisions [10], mainly including the following aspects:

(1) Eliminating backward technology, equipment and craft. In the construction process of vertical shaft, it is forbidden to use lifting bucket without cover and wooden pallet support. The caving coal craft is forbidden to use the single hydraulic prop, and the metal friction support can't be used in mining workface. In "one ventilation and three prevention", it is forbidden to use auxiliary ventilators in underground mine and local ventilators in coal mining workface to dilute gas. Underground transportation, it is forbidden to use rails below 15kg/m for track, and no longer allowed to transport personnel by wire rope core belt conveyor. It is not allowed to use sliding vane compressor and oil immersed electrical equipment in the coal mine.

(2) Restricting backward technology and equipment. Wire rope traction belt conveyor, Trolley locomotive and ordinary rail inclined shaft man car shall not be used in new or expanded mines; Wire rope scraper loader cannot be used in tunneling faces and rock cross-cut coal uncovering workfaces in the high gas mines, coal or gas outburst mines and risk of coal or dust explosion. Coal electric drill and ordinary miner's lamp can only be used in low gas and high gas mines. Only the power carrier can transmit non intrinsic signals over a long distance, and other means must use intrinsically safe signal transmission.

(3) Adding the provision of new technology, new equipment and new technology. Safety regulations of reverse well drilling rigs, umbrella drills, rock grabbers, excavators and formwork trolleys have been added for under construction mine; Safety requirements for mechanized filling and continuous shearer mining, as well as safety regulations for rear supporting equipment of road header such as coal truck, forklift, shuttle truck, crawler type walking support, anchor drill truck, feeding crusher, continuous transportation system or bridge type transporter, etc. have been added in excavation operation; Safety requirements for trackless rubber-tyred vehicles, monorail cranes, endless rope tractors, rail-jammed vehicles, batteries and power supplies are added to the mechanical and electrical transport.

(4) Improving the safety requirements of technical equipment. The cable connection of live mobile equipment should be firm and reliable, and measures should be taken to prevent it from being pulled out; The anchor bolt drilling car must have a protective operating platform when working; Crawler type hydraulic support should have a starting device, warning delay system, pressure real-time display device, and miner self-rescue and escape function; The spray pressure of

shearer and road header is no less than 2MPa, and the external spray pressure is not less than 4MPa; When spraying concrete, wet spraying or damp spraying should be used, while dust removal device and the purified water curtain should be used; When using gel, inhibitor and filling, plugging and reinforcing polymer materials, safety and environmental protection must be evaluated, and safety monitoring is a must; Locomotive transportation monitoring system or centralized signal control system should be set up in the newly built large mine shaft station and transportation roadway; The delivery of more than 15t, the tuck of main roadway in mining area should be used not less than 30kg/m rail; The single-phase grounding capacitance current of 6kV and above power grid in the newly-built mine has changed, from the original regulation of no more than 20A to no more than 10A; Two main cables of monitoring system should be arranged in different shafts or different positions of the same shaft; The monitoring system should be interconnected with other networks through network security devices; Methane sensor should be added to the mining workface, coal bunker, corridor, the top of the belt conveyor roller and other places, while In the outburst mine, the methane sensor should be full range or high and low concentration sensor and the wind direction sensor is a must.

(5) Enhancing equipment management requirements. It is stipulated that the coal mine must set up a system for checking and maintaining the equipment and facilities, and keep a record; The tests of new technologies and processes involving safety must be demonstrated and safety measures formulated. Strictly prohibit the use of technology, processes, materials and equipment prohibited by the state; Underground air compressors must be manned; Safety monitoring, personnel position display and control terminal, cable dispatching station must be located in the mine dispatching room, and monitors are on duty 24 hours a day; Strengthen MA certification management requirements, stipulated that new equipment and new materials must pass safety performance test, and obtain MA certification; When the explosion-proof electrical equipment comes to the mine for acceptance, it shall check the product qualification certificate and MA certification information, and check the consistency with the audit of MA center.

(6) Relaxing the upper limit and management requirements. In view of the improvement of technical performance and safety assurance of some equipment, the upper limit regulations and management requirements of some technical equipment have been relaxed. For example, for the main fans, skip hoists, water pump houses and transformer chambers to realize automatic operation, there is no special person on duty, but video monitoring must be set up and regular patrol inspection; For rope aerial passenger transport system, the maximum speed is increased from 1.2m/s to 1.7m/s. The electric voltage of mining workface can be higher than 3.3 kV, but special measures must be formulated; The exhaust temperature of rubber tyred car is relaxed from 70 degree to 77 degree; Special transformer for tunneling face, which could supply up to 4 local fans before, and now can supply

power to 4 tunneling faces at most (that is, 8 local fans); The calibration period of the catalytic methane sensor is relaxed from 7d to 15d; Safety monitor and control system must be used to electric wire, while now cable can also be, and the system must be private network has been adjusted to could interconnected with other networks through network security equipment.

6. Main Provisions for Emergency Assistance

As an important part of safe production, emergency rescue has been paid more and more attention. This revision has made the emergency rescue a separate article, that is to highlight the status and role of emergency rescue in coal mine safety production. The main provisions of emergency rescue are as follows:

(1) Emphasizing the important status and role of avoiding accidents, and increasing the requirements for the construction of emergency refuge system. It is clearly stipulated that a mine must establish a mine emergency refuge system. This fully reflects the new "coal mine safety regulations" is highly valued on the importance of coal mine safety production, and emphasizes the important role of emergency refuge system for underground miners' safety.

(2) Adhering to the principle of giving priority to escape. In the event of a dangerous situation or accident, the underground personnel should evacuate the dangerous area according to the emergency rescue plan and emergency rescue order, and only when escape is obstructed, they should evacuate from the dangerous area to emergency refuge facilities. The emergency refuge system should include two basic elements: emergency evacuation (safe escape) and emergency refuge facilities. They should be integrated with safety monitoring and control system, personnel positioning system, communication system, air supply system, water supply system and so on, and to seek maximum support and protection from these systems, so as to increase the chances for success of rescue for people in distress.

(3) Building the emergency refuge systems on demand and managing dynamically. The construction of the mine emergency refuge system should according to the specific situation of the mine and the actual needs of the miners to escaping from danger in case of accident, and must they be carried out to ensure its practicability and effectiveness. During the mine production, emergency refuge facilities should be adjusted and improved in time with changes in the mine workface. Each year, the chief engineer of the mine should organize an effectiveness assessment of the emergency refuge system to ensure that it is always available and ready for use.

(4) Improving the requirements for emergency evacuation safeguards. The basic facilities or measures to ensure emergency evacuation should include emergency plans, disaster avoidance routes, emergency broadcast system, self-rescuer devices and supply stations, air supply system

and water supply system. All mines must draw up emergency plans; underground mines should have emergency broadcast system; all work places must set up disaster avoidance route information; and mining areas' disaster avoidance routes should set up air supply and water supply pipelines. For the first time, the setting requirements of disaster avoidance route indicators and self-rescuer devices supply station were stipulated. The disaster avoidance route indication should be set in a prominent position which is not easy to be collided. It should be clearly visible under the lamp illumination, and the location should be marked.

(5) Emergency refuge facilities are mainly refuge chambers. In outburst mines, refuge chamber in mining area must be built and temporary refuge chamber or other temporary refuge facilities should be built within 500 meters of mining workface. Other mines should build refuge chambers in mining areas, or a temporary refuge chamber or other temporary refuge facilities shall be constructed within 1000m of the mining workface. Outburst and rock burst coal seam mining workfaces should be equipped with air supply devices, and other mine tunneling faces should be equipped with air supply pipes and valves.

(6) Continuing to adhere to the professionalization, militarization and standardization management of mine rescue teams. All coal mines, including underground coal mines, opencast coal mines and coal mines under construction, each must have a mine rescue team to serve, and the rescue team should arrive at the mine within 30 minutes. Coal mining enterprises should set up mine rescue teams; Coal mining enterprises that do not have the conditions to set up mine rescue teams should set up part-time rescue teams of their underground coal mines; Open-cast mines and under construction mines should designate part-time emergency rescue personnel and sign rescue agreements with nearby rescue teams. The mine rescue team is a professional emergency rescue team dealing with mine disasters, which must be standardized, militarized and on duty 24 hours a day.

(7) Coal mining enterprises shall have emergency rescue equipment and materials reserves. In addition to the mine rescue team should be equipped with rescue vehicles, rescue equipment, exercise training equipment and so on, the coal mine enterprises shall, in accordance with the characteristics of mine disasters and the actual situation of their respective regions, store the necessary emergency rescue equipment and materials, focusing on submersible pumps and auxiliary pipelines, rescue rigs and auxiliary equipment, rapid excavation and support equipment, emergency communication equipment, etc. Emergency rescue equipment and materials shall be examined and approved by the principal person in charge of the enterprise. Accounts for emergency rescue equipment and materials shall be established, and management systems such as storage, maintenance and emergency call shall be established.

(8) Dealing with accidents must ensure the safety of rescue personnel and strictly control the personnel entering the coal mine. In order to ensure the safety of rescue personnel, the

article readjusts the original stipulation that when enclosing a fire area, "the enclosure scope should be reduced as far as possible" to "the enclosure scope should be reasonably determined". The essay stipulates that in dealing with accidents, all personnel in the disaster-stricken areas shall be evacuated, the number of underground personnel shall be accurately counted, and the number of people entering mine shall be strictly controlled. Drawings and technical information for rescue needs must be provided; Relevant departments should organize manpower, deploy equipment and materials to participate in rescue and rescue, and do a good job of logistic support.

7. Conclusion

The "Coal Mine Safety Regulations" is the most important administrative regulation for coal mine safety production in China. The latest comprehensive revision of it has made many changes and adjustments in coal production access, employees, production systems, technical equipment, emergency rescue, etc. It reflects the latest achievements of the advanced productivity level and the development of scientific and technological equipment in China's coal mines. And it shows that China's coal mines safety production adheres to goal orientation and problem orientation. According to the requirements of development, and learning from foreign successful experiences, establishing a continuous improvement mechanism of the "Coal Mine Safety Regulations" has become an important basic work for China's coal mine safety production.

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