Research on the Construction of Modern Equipment Management System for Pumped Storage Energy

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Abstract. Focusing on the main line of pumped storage equipment management, the project systematically analyses the internal and external situation faced by the current pumped storage equipment management, learns from the advanced theories and typical practices inside and outside the industry, and based on the target-oriented and problem-oriented, innovatively researches and designs the modern equipment management system of pumped storage power stations (PSEMS), clarifies the system's "four pillars eight pillars" of the system. The project puts forward the specific objectives of equipment management (safety and stability, quality and reliability, advanced technology and economic efficiency, professional team) and the implementation path (implementation of reliability-centred equipment health management), and gives specific action directions, safeguard measures and suggestions for the implementation of the system. At the same time, a "two-step" programme is planned to support the orderly development of system construction.

Keywords: equipment management, pumped storage, management system, reliability.

1 Introduction

Pumped storage as the most mature technology, optimal economics, the most large-scale development conditions of the power system flexible regulator, to protect the safety of the grid and promote clean energy consumption in the role of more prominent, in the construction of a new type of energy system will play a more important role, and this brings the pumped storage unit equipment will be more frequent start and stop, the management of the unit equipment needs to be more stringent. On the other hand, from the national development planning point of view, the next period, pumped storage power station will still maintain high speed development and construction, in addition to pumped storage tariff policy, pumped storage industry will also face multi-mode development, multi-body investment in the new stage of development, by the above situation, the pumped storage industry in the future will face a profound competition, and do a good job of daily lean maintenance of the equipment for the enterprise business performance is crucial[1].

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2 System Construction of Modern Equipment Management System for Pumped Storage Energy

2.1 General Ideas

Based on the current development situation, from the target-oriented and problem-oriented point of view, in view of "busy manufacturing, weak quality control", "pumped storage status is obvious, the pressure to protect", "large volume of equipment, operation and maintenance power less", "fast speed of electricity reform, high performance requirements" and other situations, combined with the characteristics of pumped storage equipment units, adhering to the "safe and reliable, quality enhancement, technological innovation, economic and efficient" target requirements. In addition, absorbing the advanced theories and typical practices of equipment management inside and outside the industry, we should run through the whole process of quality management of equipment, play a synergistic role of different professional links, establish and improve the concept of reliability-centred equipment health management, give full play to the leading role of technological innovation, implement the differentiated maintenance strategy, accelerate the change of production organisation system, and promote the enhancement of production efficiency management, and the pumped storage facility management to achieve high quality development.

2.2 Institutional Framework

Following the general idea of system construction, focusing on the four core management objectives of safety and stability, quality and reliability, technological advancement and economic efficiency, and taking equipment health management as the implementation path, emphasising on source control, condition detection and scientific governance, the system builds a modern management system for pumped storage equipment (PSEMS), and promotes high-quality development of pumped storage equipment management. The system framework consists of a target layer, a path layer, an action layer and a guarantee layer. The target mainly focuses on five dimensions: safety and stability, quality and reliability, advanced technology and economic efficiency, and professionalism of the team; the implementation of reliability-centred equipment health management as the path of the system construction; emphasis on source control, condition monitoring, and scientific decision-making, and the deployment of safety and security enhancement actions, equipment quality enhancement actions, technology-led enhancement actions, production efficiency enhancement actions, professional support enhancement actions, etc.; and the formation of a complete system construction framework through strengthening organizational leadership, improving organizational division, implementing supporting mechanisms, and focusing on implementation and sound effect evaluation; and through strengthening organisational leadership, improving organisational division of labour, implementing supporting mechanisms, focusing on implementation and sound evaluation of results, a complete system construction framework is formed. As is shown in Fig.1.

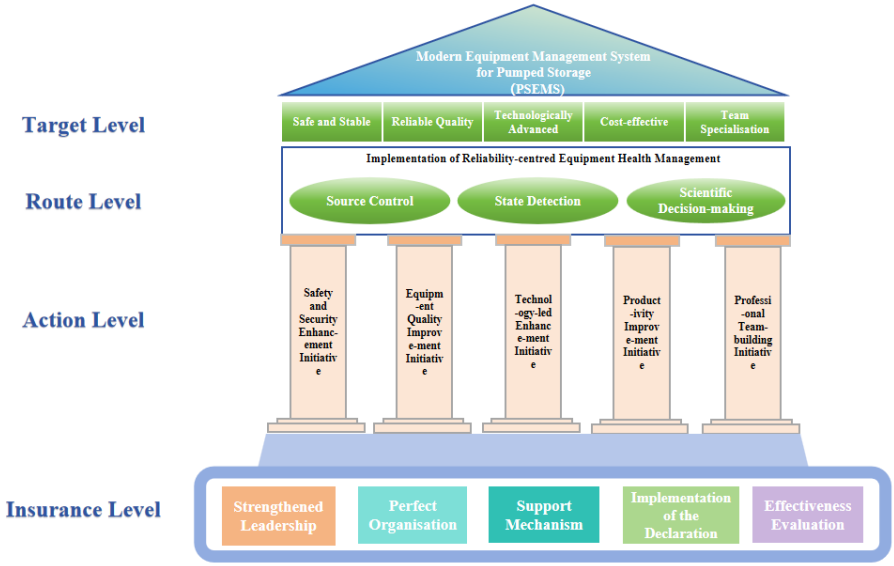

Fig. 1. Framework of modern equipment management system for pumped storage energy

In the system overall goal level, based on the current pumped storage equipment development of the new situation and new requirements, to solve the pumped storage equipment management process problems, focusing on the overall direction, pumped storage equipment management system construction should focus on doing a good job in the five major aspects of safety management and control, quality enhancement, technological innovation, economic and efficient, and team professional.

In terms of safety control, given that pumped storage as a new type of power system in the important flexible adjustment resources, with the current power system "double high" characteristics appear, energy and power supply pressure continues to increase, especially photovoltaic power to make the balance of the evening peak system adjustment difficulties and power to climb the demand for a further increase in the uncertainty of power supply increased significantly. The uncertainty of power supply has increased significantly[2]. The pumped storage unit must always maintain the best state, to ensure a high degree of reliability, to prevent equipment problems caused by the load can not keep up with the power outages triggered by the power grid and other security events, to ensure that the equipment with the transfer of the start, safe and reliable.

In terms of quality improvement, the development of pumped storage project will still maintain high speed development in the coming period of time, and from the historical experience, high-intensity and intensive construction and commissioning of unit equipment will surely bring about a certain degree of high incidence of equipment failures and defects, which will reduce the reliability of equipment operation and bring about safety hazards and even production accidents. It is crucial to do a good job of equipment quality management, need to do a good job of the whole process of manage-

ment, strengthen the technical supervision, to ensure the rigid implementation of standards. To strengthen the source control, enhance the quality management of equipment design and manufacturing links, to ensure that the quality of the equipment factory qualified; to strengthen the construction management, do a good job of equipment infrastructure production handover acceptance, to ensure that the construction and installation of accurate in place; to strengthen the professional support, to strengthen the socialisation of the power of the control, and actively cultivate their own power, and constantly improve the efficiency of the operation[3].

In terms of technological innovation, as a technology-intensive profession, pumped storage equipment management, technological innovation and improvement will bring about in-depth changes in management and realise quality and efficiency enhancement in production. The accelerated integration of the new generation of information technology and the real economy has brought opportunities for the scientific management of pumped storage equipment, and it has become a reality to improve the state control of equipment and the penetration of operation and inspection management[4]. It is necessary to strengthen the use of information technology means, accelerate the intelligent transformation of equipment, improve the digital level of production business, expand the degree of application of condition maintenance, be able to timely and accurately find equipment problems, make intelligent diagnosis, provide analysis and decision-making, and achieve lean management.

In terms of economic efficiency, with the deepening of power system reform, the state has perfected the 'two-part' tariff rules for pumped storage, and will further accelerate the market reform of tariffs in the future, which does not exclude the possibility of pumped storage directly participating in the spot market of electric power and other transactions. Under this circumstance, the market competition among pumped storage enterprises will be intensified, so it is crucial to improve the operation level of unit equipment and enhance the operation efficiency, do a good job in the lean management of pumped storage equipment, improve the availability of unit operation, and enhance the economy of power station operation and maintenance will directly affect the business performance of the whole power station.

In terms of team professionalism, with the pumped storage industry market competition situation gradually formed, the volume of equipment management continues to increase rapidly, the risk of loss of professional skilled personnel continues to increase, the skills of expert personnel training is insufficient, the enterprise equipment management professional team construction continues to be under pressure. In this context, pumped storage equipment management professional ability faces greater challenges, need to do a good job of talent team construction work, to create high-quality equipment management professional team, and consolidate the foundation of professional management.

2.3 Pathways to Realisation

Based on the characteristics of pumped storage equipment units and past practical experience in equipment management, we consider introducing the concept of health management and the idea of reliability-centred management to form reliability-centred

equipment health management. The core connotation of this path includes: adopting whole-process reliability analysis and logical decision-making method, comprehensively considering the importance of equipment classification, risk level and other factors, formulating differentiated maintenance strategies, optimising the allocation of maintenance resources, enhancing the reliability of the equipment, and effectively improving the lean level of equipment operation, maintenance and repair.

Specifically to achieve the path contains: First, we must emphasise the source of control, practice the whole process of management, to move the equipment management gate, according to the relevant statistics show that the management of equipment before commissioning, equipment operation and maintenance management will play a key role in the later stage. This means that in the planning and design, manufacturing and equipment installation and other aspects must be taken into account in the later stages of long-term equipment service management needs, while equipment operation and maintenance personnel that the master of the equipment to be deeply involved in the equipment management work in the early stages of the late management needs, management experience into the early stages of the management to achieve the whole process of equipment management linkage to improve the efficiency and effectiveness of management. Second, we should emphasise condition monitoring and promote the idea of "should be repaired", condition evaluation is the basis of equipment maintenance work, through the collection of all kinds of information and data that directly or indirectly characterize the operating state of the equipment, the process of accurately assessing the health status of equipment operation. "Should" means not only to refer to the regulations and manufacturers' requirements, but also to comprehensively and accurately grasp the health status of the equipment through the comprehensive condition evaluation of the equipment, reasonably formulate the overhaul strategy based on the results of the condition evaluation of the equipment, clearly define the cycle of the equipment overhaul test and the project, and ultimately form the executable overhaul plan. Third, we should emphasize scientific decision-making, implement reliability-centred management, establish and improve reliability-centred overhaul standards in conjunction with the classification and grading management method of pumping and storage equipment, carry out reliability analyses based on equipment health management, analyse equipment failure modes, systematically assess equipment failure risks, formulate differentiated overhaul strategies, and provide guidance for on-site overhaul. In particular, under the limitations of the current technology and management level, the actual overhaul strategy can follow the "reliability analysis results" and "Overhaul of compliance needs" with the depth of the integration of the two models. The reliability analysis results are based on the actual condition monitoring situation to determine the maintenance strategy. The need for compliance refers to carrying out maintenance activities in accordance with the relevant regulations, standards and manufacturer's instructions. Specifically, the above mentioned overhaul strategy mainly refers to overlaying the condition monitoring results on the periodic planned overhaul mode, revising the overhaul cycle, and flexibly adjusting it according to the actual situation to reduce excessive overhaul, etc., and to do a good job of fine management.

3 Operational Initiatives

In order to promote the construction of equipment management system, it is necessary to combine the current actual situation and implement it into each professional work. From the current pumped storage equipment management status quo, the deployment of safety and security enhancement action, equipment quality enhancement action, technology leadership enhancement action, production efficiency enhancement action, professional support enhancement action of five actions, including the following key initiatives.

3.1 Safety and Security Enhancement Actions

Adhere to the safety first, firmly "five most" awareness, the implementation of management responsibilities at all levels, improve the dual prevention mechanism, and strongly guarantee the safe development of the power grid.

First, the responsibility for safety management should be consolidated. To strengthen the top-level design of the management system, combined with the requirements of the vertical management of the grid company business and the needs of lean management of the production business, comprehensively sort out and improve the existing rules and regulations, optimise the management process, and refine the management requirements. Equipment managers at all levels should establish a "strict, tight, fine, real" work style, implement the equipment master system, establish and improve the equipment and facilities file card mechanism, strengthen the equipment and facilities defects and hidden trouble detection and management, focus on key equipment, key links, key professional to strengthen the whole process of technical supervision, optimise the main equipment repair and maintenance strategy. In addition, it is also necessary to do precise input, fine repair and treatment, and enhance the ability of equipment health control. Standardise the operation duty, "two votes and three systems", inspection and other basic work, the plant to strengthen the operation of self-correction, to increase the supervision and assessment, to ensure that the operating personnel strictly abide by the rules and regulations, careful operation, to ensure that the operation of the business is carried out in a stable and orderly manner.

Second, we have strengthened the awareness of serving the power grid. Take the initiative to docking scheduling to understand the system regulation demand, grid assessment requirements and scheduling professional and technical requirements, strictly implement the scheduling instructions, do a good job in the analysis and evaluation of the role of the service grid function, and enhance the level of specialisation of the service grid. Actively strive for favourable policies, strengthen communication, adapt to the regulatory requirements at the same time, and strive for maintenance time window, to achieve a reasonable arrangement, optimise the performance of the unit.

Third, improve the hidden danger investigation mechanism. Adhere to the "full coverage, diligent investigation, early detection, fast treatment", standardise seasonal and special investigation, and improve the management of "one problem, one file". Strengthen the hidden danger management of equipment, focus on key equipment, key

links, key professions to strengthen the whole process of technical supervision, optimise the main equipment maintenance strategy, clear management responsibilities, measures and time limits, strict implementation of countermeasures, so as to achieve precise input, repair and cure the root cause of the problem, and enhance the ability of equipment health control.

Fourthly, we will improve the emergency disposal mechanism, promote the construction of a new-generation emergency command system, strengthen the deployment and application of advanced emergency communication equipment, and optimise the reserve of emergency materials, so as to provide strong support for emergency disposal. We will plan ahead for summer and flood control, improve dam safety management, enhance the accuracy of early warning and timeliness of response, and continuously improve the ability of disaster prevention, mitigation and relief. The company will carry out measures to improve the prevention of heavy rainfall and flooding, continuously enhance the ability of the power station to prevent various types of disaster events, strengthen the communication and coordination with the grid scheduling and local flood control authorities, reasonably arrange the annual reservoir control and operation plan, optimise the reservoir scheduling programme during the flood season, timely and accurately grasp the water condition and flood conditions, and strictly implement the flood control instructions, so as to ensure that the dams are stable during the flood season.

3.2 Equipment Quality Improvement Actions

Adhere to the quality-oriented, strengthen the quality management of the whole process of equipment, enhance the intrinsic safety level of power grid equipment, and promote the high-quality development of the power grid.

First, deepen the whole process of technical supervision, give full play to the role of the technical supervision system, adhere to the standards as the basis, testing as a means to give full play to the role of technical supervision in the planning and research, engineering design, engineering construction, procurement and manufacturing, installation and commissioning, acceptance and handover, operation and maintenance, decommissioning and retirement stages, and to enhance the level of specialisation of technical supervision. It highlights the focus of supervision and effectively implements technical supervision measures by speciality, covering 14 specialities such as electrical equipment performance, metal, protection and control, thermal engineering, electrical measurement, automation, information and communication, power quality, chemistry, energy conservation, environmental protection, water machinery, hydraulic engineering and civil engineering.

Second, we will improve the technical management standard system, further sort out the standard system of hydropower and pumped storage power stations, strengthen the hierarchical management of operation and inspection standards, power station equipment regulations and on-site operation documents, strengthen the identification of cited standards, and promote the company's special countermeasures provisions into the standard into the system. The company has strengthened the embodiment of technical

supervision requirements in operation and maintenance regulations, increased the identification and implementation of the company's corporate standards by design, manufacturing and installation units, and strengthened the control of equipment quality at the source.

Third, it is to strengthen the management of infrastructure transfer of production, further standardise the acceptance criteria for infrastructure transfer of production, strengthen the quality control of infrastructure transfer of production equipment, move the gate forward, and deeply participate in the management of equipment during the preparation period of production, so as to ensure the stable operation of the newly-invested equipment.

3.3 Technology-led Upgrading Actions

Strengthen technological innovation, enhance top-level design, promote intelligent upgrading, build a support platform, and promote the company's innovative development.

First, strengthen the support of information means. Taking "digital intelligent power station construction" as the starting point, the company accelerates the construction of digital infrastructure, speeds up the upgrading of the digital control platform, optimises and improves the unified coding and BIM project implementation management specifications, and strengthens the construction of the digital intelligent power station three-dimensional standard system and data standard system[5]. Optimise the unified HPMS application specifications in combination with the operation and inspection management mode, enhance the application experience of the production real-time system, improve the timeliness, completeness and accuracy of the production data, and ensure that the information system functions are compatible with the changes in the business system. Strengthen the research and application of new digital and intelligent technologies, promote the auxiliary duty system, and explore the application of new technologies such as intelligent equipment, intelligent control, intelligent diagnosis, intelligent decision-making and digital twin[6]. Enhance the ability to collect, monitor and analyse all kinds of data from power stations, as well as the ability to predict equipment failures and abnormalities, and gradually realise intelligent and friendly interactions between people and equipment, and between equipment and equipment, so as to lower maintenance costs and reduce downtime.

Second, it will deepen the construction of regional centralised control centres, sum up the experience of constructing remote control centres, improve the overall technical scheme of centralised control centres, carry out research on centralised dispatching, centralised guarding and other management measures, and gradually carry out pilot work.

Third, we will continue to promote technical support. Continuing to implement the technical support mechanism for the whole process of production preparation, doing a good job of technical support for the strong and weak units within the group, promoting the forward movement of technical support, transferring the production experience to the stage of installation and commissioning and even design selection, and further consolidating the basis for the whole process of equipment management.

3.4 Production Efficiency Improvement Actions

Adhere to the precise policy, deepen the health management of equipment, optimise the operation and maintenance strategy, improve the level of equipment maintenance, and promote the continuous play of equipment efficiency.

First, to enhance the standard operation ability, to no violation of the operation as a leader, vigorously promote the construction of operation standardisation, increase the training of grass-roots personnel, especially the master of the equipment, to improve the standardisation of the operation ability, comprehensively carry out the overhaul of the power supply, physical isolation, operating platform and other operating devices to enhance the special operation, and to strengthen the operation of the scene of the safety risk prevention and control inspections, so as to achieve standardisation of the operating devices, operational processes and operational behaviours.

Second, practice equipment health management. Combined with the standardisation of on-site operations on the basis of further exploring the mode of condition overhaul, standardising the equipment condition monitoring and evaluation, improving the condition monitoring standards, strengthening the condition monitoring of important equipment and key equipment, continuously carrying out the tracking and monitoring of equipment condition and trend analysis, and integrating various technical means such as professional inspection, online monitoring, routine test, diagnostic test, and so on. Based on the hydropower equipment condition evaluation guidelines for evaluation, it accurately grasps the operating status of the equipment, deepens the big data analysis, breaks down the health status of the equipment, and determines the degree of risk of the equipment[7].

Third, optimise the equipment maintenance strategy, combined with standards, regulations and other requirements, comprehensive condition maintenance, reference to risk assessment conclusions, taking into account the requirements of grid development, technological updates, cost investment, etc., to determine the equipment maintenance strategy, clear maintenance categories, maintenance projects, maintenance cycle and time recommendations and other content.

Fourth, to strengthen the management of outsourcing business, strictly implement the rules and regulations that the core business shall not be outsourced, and when implementing outsourcing of other hydropower production technical reform and overhaul projects, daily operation and inspection business, we should strengthen the evaluation of project feasibility study, assist the material department in selecting the best suppliers, strengthen the control of outsourcing process and do a good job of acceptance and evaluation.

4 Guarantee Measures

4.1 Strengthen Organisational Leadership and Ensure Strong Progress in Management System Construction

First, in the group headquarters set up a modern equipment management system construction leading group, comprehensive leadership, overall arrangements for the

deployment of equipment management system construction and promotion work, the leading group office is located in the equipment management department, specifically to grasp the coordination of services, supervision and guidance and other work.

Second, units at all levels must fully understand the necessity and importance of building a modern equipment management system, to put the construction of modern equipment management system in a more prominent position, improve the working mechanism, the implementation of the main responsibility, combined with the actual development of specific implementation programmes and supporting policies and measures, to do a good job of mobilising and deploying the implementation of the necessary manpower, material and financial resources to protect, and to promote the construction of a modern equipment management system in a comprehensive manner.

4.2 Sound Institutional Mechanism to Ensure Efficient Operation of the Management System

First, the organisational system of equipment management has been improved. To implement hierarchical management, the headquarters highlights "strategic leadership", strengthens the top-level design of management, grasps the construction of equipment management system and professional development planning, strengthens the management and control of important equipment, and ensures the efficient development of various businesses. Units at all levels highlight "efficient operation", refine the implementation of equipment management responsibilities and requirements, clarify the division of responsibilities and work interface with relevant departments, strengthen the responsibilities of management positions, and stay close to the equipment and grassroots to ensure the safe and stable operation of equipment.

Second, we have improved the cross-departmental and cross-unit coordination mechanism. A cross-departmental and cross-unit flexible working committee has been set up at the headquarters of the Group to promote the realisation of orderly business connection, effective process integration and organic synergy in management, and to coordinate and solve the problems of equipment and asset management. The committee consists of leaders at all levels and heads of business, functional departments and technical support units under their charge, and the committee office is set up in the Production Technology Department of the company. Regular meetings are organised for discussion, and each department strictly implements the resolutions of the meetings to promote management optimisation and improvement.

Third, sound equipment management assessment and incentive mechanism. The establishment of a scientific and reasonable performance appraisal system, a clear assessment of the objectives and tasks, improve the quality of equipment accountability assessment mechanism, strict assessment procedures, detailed assessment of the implementation, and strengthen the assessment and supervision, to fully stimulate the work of all staff enthusiasm, mobilise staff initiative management initiative.

4.3 Strengthening Factor Inputs and Promoting Optimal Allocation of Resources

First, to protect the personnel element input. Strengthen personnel management training, improve the quality of equipment management skills, and cultivate a personnel team adapted to the company's modern equipment management. Strengthen the construction of talent echelon, improve the talent evaluation mechanism, and build a multi-type personnel team covering equipment management core talent, general talent, auxiliary talent, and so on. Improve the assessment and incentive mechanism, smooth the growth channels of equipment management talents, and stimulate the vitality of personnel. Broaden human resources channels, make full use of external forces, and strengthen exchanges with external experts, equipment manufacturers and partners.

The second is to promote the input of technical elements. Improve the technical level of equipment, enhance the core management capability of equipment, strengthen the key and difficult technology research, focus on independent innovation and joint research for the key technology related to the equipment "neck", and improve the core competitiveness and extreme survivability. We will strengthen the application of new technology innovation, focus on improving the digital perception and intelligent judgement of the whole process of equipment, promote the improvement of equipment management level, and empower the high-quality development of pumped storage business.

Third, the input of data elements is strengthened. Relying on data integration and application, it promotes the effective linkage of various specialities in equipment management and improves the level of lean management. Strengthen equipment data management, establish a unified and standardised data management system, consolidate data quality, and guarantee data circulation and sharing. Deeply explore the potential value of equipment data, improve the ability of data analysis and application, promote the whole process of equipment management, and realise the transformation of equipment management from "experience-driven" to "data-driven".

4.4 Focus on Effect Evaluation and Strengthen Closed-loop Management for Continuous Improvement

First, the establishment of equipment management evaluation standards. It has improved the assessment and evaluation index system for equipment management work, established evaluation standards for the management of modern equipment management systems, organised regular evaluation of the implementation efficiency and work quality of each professional department and each basic unit on the basis of the evaluation index system and evaluation standards, and regularly issued monitoring and analysis reports and put forward assessment recommendations[8].

The second is to carry out dynamic evaluation of the whole process. Relying on the information technology platform, the company has strengthened the analysis and judgment of big data, timely grasped the quality and efficiency of each unit's management work, such as operation and maintenance, equipment quality, cost-effectiveness, etc., and carried out the dynamic evaluation of the whole process of planning, design, material procurement, installation and commissioning, and operation and maintenance, etc.,

and analysed and summarized the weak points of the work in a timely manner according to the results of the evaluation.

Third, it strengthens the closed-loop management of evaluation results. According to the management weaknesses analysed in the whole process of dynamic evaluation, targeted improvement and enhancement strategies are formulated to continuously improve the standardized process of equipment management, effectively enhance the efficiency and effectiveness of equipment management, and guarantee the continuous improvement of equipment management.

4.5 Strengthen the Implementation of Publicity to Enhance the Subjective Initiative of the Whole Staff

First, to create a cultural atmosphere of full equipment management. In-depth work experience exchange, summarise and promote advanced experience, strengthen the construction of modern equipment management system typical publicity, vigorously create a good atmosphere to promote the construction of modern equipment management system, promote the modern equipment management system and the organic integration of the actual work, and promote the cadres and staff at all levels to take the initiative to integrate into the construction of the system, and actively participate in the management of equipment, to achieve the spiral rise in the level of equipment management.

The second is to enhance the awareness of equipment management. Focusing on modern equipment management system concept cultivation, publicity, development of equipment management at all levels to promote the application of programmes and training plans, organise thematic study, through a combination of means of publicity, training and incentive assessment, to enhance the awareness of full equipment management, to ensure that the problem solving, promotion of experience, improve the systematic nature of management, strengthen the main role of grass-roots units, and to strengthen the effectiveness of the concept of modern equipment management and penetrating force[9].

Third, the implementation of the full range of job responsibilities. Follow the principle of "practical, practical, effective", target management oriented, the preparation of staff equipment management manual to achieve the responsibilities, processes, systems, standards, assessment of the "five-in-one" responsibility system is broken down layer by layer and implemented into specific positions. Ensure that each position has a clear goal, specific duties and tasks, evaluable standard basis, clear process interface, and more effectively unify and coordinate the work of equipment management.

5 Conclusions

This research systematically analyses the internal and external situation faced by the current pumped storage equipment management, learns from the advanced theories and typical practices inside and outside the industry, and based on the target-oriented and

problem-oriented, innovatively researches and designs the modern equipment management system of pumped storage power stations (PSEMS), clarifies the system's "four pillars eight pillars" of the system. The project puts forward the specific objectives of equipment management (safety and stability, quality and reliability, advanced technology and economic efficiency, professional team) and the implementation path (implementation of reliability-centred equipment health management), and gives specific action directions, safeguard measures and suggestions for the implementation of the system. At the same time, a "two-step" programme is planned to support the orderly development of system construction. Through the implementation and application of the project, it is shown that the pumped storage modern equipment management system will play a positive role in the management of pumped storage power stations in the future, and that the relevant results proposed in management concepts, methods and ideas, combined with the actual equipment operation, maintenance and overhaul work, will be able to provide a good guide to the daily work.

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