Mechanical equipment based on hall three-dimensional structure study on the application of security forces

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Abstract—For informatization under the condition of complex mechanical equipment support difficult problems in our country, absorb method of hall three dimensions structure theory, this paper constructs the mechanical equipment support strength using the architecture, methods on the use of the security forces, security requirements, security tasks, security model, implementation steps and method innovation, scheme evaluation system comprehensive study.

1. INTRODUCTION
With the rapid construction and development of informationization and intelligentization of large mechanical equipment in China more and more new complex intelligent and mechanized equipment is put into use, which on the one hand saves labor cost, but also brings greater pressure to the guarantee of mechanical equipment. In order to further improve the optimization of mechanical equipment support force using methods, hall three dimensions structure theory, this paper, systematic analysis of the influence factors of mechanical equipment support under the condition of informatization, the reasonable design of mechanical equipment support force using architecture, to explore the research method of equipment support in steps, to increase the efficiency of the equipment support to provide theoretical support technique.

2. RESEARCH FRAMEWORK
In the late 1960s, the famous American engineer hall summarized the relevant research experience of system engineering and proposed the hall three-dimensional structure method system, which originated from complex "hard" system engineering and is applicable to benign structural systems [1].

In 2011, li li proposed that hall three-dimensional structure is a methodology to scientifically solve the "hard system" problem of system structure [2].
In 2010, Yang Yang proposed that the hall three-dimensional structure provides a scientific and applicable research method for the study of large-scale complex system engineering [3].

To sum up, aiming at the difficult and difficult problems of equipment support under the condition of modernization, it is an urgent need to improve the support efficiency of mechanized equipment under the condition of informatization to construct the application system structure of mechanical equipment support force by using the hall three-dimensional structure system methodology.

Through to our country current situation and influence factors analysis of the mechanical equipment support, in order to better solve the contradiction in the discovery in the process of equipment support, the hall three dimensions structure and application of equipment support power system, the combination of the whole security forces using the process into the connected time six key elements guarantee periodic, logical dimensions five key security steps and stages of each factor by use of knowledge, according to the logical relation analysis of the mechanical equipment support tasks demand, innovation of equipment support strength using the method, the implementation of the mechanical equipment support force was studied using steps, and testing scheme evaluation. Make the research results more feasible and applicable. See figure 1 for details:

![Figure 1 Hall 3d structure diagram of mechanical equipment support force application](image)

The time dimension mainly includes the key elements in the process of mechanical equipment support, such as operation state, fault prediction, fault diagnosis, fault type, support technology and implementation support.

The logic dimension mainly includes the system analysis of mechanical equipment support, demand analysis, force application analysis, case demonstration, program evaluation and so on.

Knowledge dimension is the theoretical and technical knowledge required by each element in the application of mechanical equipment support force. It mainly includes five aspects: equipment management, equipment support, equipment operation research, equipment logistics and equipment procurement.

2.1. **Time dimension**

The application time dimension of mechanical equipment support force mainly includes 6 aspects, such as equipment operation state, fault prediction, fault diagnosis, fault type, support technology and implementation support. Its status and function are shown in figure 2:
Running state. Under the condition of information technology, with the high speed, high intelligence, high power and other functions of mechanical equipment more and more powerful, in the process of operation has brought direct or indirect security problems. By analysing and studying the equipment operation status, we can quickly understand the equipment operation status and better guide the equipment support practice.

Fault prediction. Equipment fault prediction is to analyze the characteristic parameters of the equipment according to the operation state of the equipment and master the operation state, so as to judge whether it is abnormal, whether it is fault, fault type, etc. and take targeted measures to achieve timely and high-quality equipment support [4].

Fault diagnosis. Equipment fault diagnosis is based on professional detection technology [5], which further analyzes the equipment health state on the basis of status prediction, so as to quickly diagnose the severity of the fault, determine the fault type, provide accurate and reliable data, and improve the precision equipment support efficiency.

Fault type. It is to analyse the fault severity of the equipment according to the parameters of fault diagnosis results, and further determine the fault types, so as to provide reliable basis for the maintenance plan for the equipment support personnel.

Support technology. Mechanical equipment support technology is to carry out technical guidance, data monitoring, data collection, information analysis, measurement and inspection, operation test and other support measures according to the fault type and operation state of the equipment [6] to further improve the accuracy of the support.

Implementation of safeguards. The implementation of mechanical equipment support is to actively explore and innovate the support mode on the premise of adapting to the equipment support task under high-tech conditions, so as to better improve the mechanical equipment support efficiency under information conditions [7].

2.2. Knowledge dimension
The knowledge dimension of the application of mechanical equipment support force is the premise, standard and foundation for ensuring the feasibility of the application of mechanical equipment support force in complex environment, and the theoretical basis for overcoming the problems of modern intelligent, large-scale and complicated mechanical equipment support.

2.3. Logical dimension
The application of logical dimension of mechanical equipment support force is based on various support tasks of time dimension, according to the characteristics of mechanical equipment, fault types,
support characteristics and support methods, the analysis of mechanical equipment support force demand, the support force is reasonably organized, and the combination of a certain type of mechanical equipment for example verification. The implementation process can be divided into system analysis, demand analysis, support force application, case verification, program evaluation and other five stages.

3. THE IMPLEMENTATION STEPS
The implementation of equipment support mainly includes five aspects: support demand, task prediction, support force application, actual case application, and program evaluation. The specific implementation steps are shown in figure 3:

3.1. Guarantee demand
The requirement analysis of mechanical equipment support is the premise of the application of support force. The current situation analysis provides a realistic basis for the demand analysis of mechanical equipment support, and the analysis of influencing factors and equipment characteristics provides pertinence and effectiveness for the research of mechanical equipment support.

3.2. The task to predict
Mechanical equipment support task prediction is based on support demand analysis, equipment operation state prediction, fault diagnosis, fault type and maintenance support technology prediction. To provide a theoretical basis for the use of security forces.

3.3. Application of support force
The application of mechanical equipment support force takes equipment support task as the traction, according to the actual needs of equipment support, the overall support mode thinking is constructed, the support strategy is explored, and the targeted measures are formed. Under the guidance of strategy, the research on task prediction, force demand and force deployment is carried out to form an operational power application case.
3.4. **Real case to use**
Mechanical equipment support force by combining real case application refers to a type of complex mechanical equipment protection using experiment was carried out, using the model test of security forces, after the trial is successful, sum up experience of analysis of the problems to solve at the same time, optimize the equipment support force using the solution at the same time, realize the mechanical equipment support effectiveness maximization.

3.5. **Scheme evaluation**
Mechanical equipment support using the scheme evaluation is according to the different security forces using appropriate evaluation model, using the organization structure on the use of the equipment support force, force deployment, function realization and safeguard task completion process, full range of assessment, It is a complicated system engineering, and mechanical equipment support force is applied using the necessary premise that pattern.

4. **CONCLUSION**
Informatization impact under the condition of large mechanical equipment in China many uncertainty factors, security task, difficult practical issues, such as the hall three dimensions structure and mechanical equipment support strength using the research method of combining to use mechanical equipment support force in our country has carried on the preliminary feasibility study, to build the scientific and rational use of safeguard power, the hall three dimensions structure system framework, analyses the dimensions and elements, the relationship between the clarify the specific content and function of each factor; The key steps and methods of the application and implementation of mechanical equipment support force are emphatically studied. It has effectively improved the support efficiency of large and complex mechanical equipment in China.

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