Research on the Teaching Reform of Equipment Guarantee in Special Environment

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Abstract. The special topic of equipment guarantee under special environment is one of the special topics in a certain course of a major in the college. Combined with the characteristics of the project, the problems in the teaching of the project are analyzed. In view of the existing problems such as the thin teaching content, the limited teaching resources and the single teaching methods, this paper puts forward the specific teaching reform measures for the special equipment guarantee topic in the special environment from four aspects: reconstructing the teaching content system, improving the teaching methods, enriching the teaching resources and improving the teachers' teaching ability.

1. Introduction
The special topic of equipment guarantee under special environment is one of the special topics in a certain course of a major in the college. In the current teaching, due to the lack of case support, for the impact of plateau, high temperature, humidity and other special environment on the equipment, it has been staying in the abstract concept explanation of various influencing factors, students lack of perceptual knowledge, which is not easy to understand and grasp; in addition, in the specific protective measures and methods of equipment, the same reason is the lack of case support of specific equipment safety protection, classroom explanation It's difficult to go deep and discuss the problem thoroughly. In view of this, this paper first analyzes the research status and existing problems of the special topic of equipment support under the special environment, and then gives the specific teaching reform measures, and organizes the teaching practice inside and outside the hospital, which provides a reference for the further teaching reform of a course.

In order to carry out the research on the teaching reform of equipment guarantee in special environment, it is necessary to define the concept of "special environment" in teaching, that is, the connotation of "special environment". In terms of a certain equipment, "special environment" refers to extreme climatic environment such as high temperature, low temperature and humidity, as well as special geographical environment such as plateau and desert.

At present, in addition to colleges and research institutes, the institutions that carry out the research on "equipment support in special environment" are mainly some representative factories. Few papers have been published in this field. The author searched the papers of the above journals from 2010 to 2019 and found 38 papers related to "equipment support in special environment". These 38 papers mainly discuss the effects of high temperature, humidity, low temperature and sand on the equipment. Among them, 10 discussed the impact of high temperature on equipment; 8 discussed the impact of humidity on equipment; 12 discussed the impact of low temperature on equipment; 6 discussed the
impact of sand on equipment. Of the 38 papers, 8 have discussed the specific protective measures based on the analysis of the influencing factors. In the 38 relevant documents that have been retrieved, no specific examples have been given, and no in-depth measures have been taken to solve the problems encountered by specific equipment. In addition, in the retrieval of the above-mentioned journals, no relevant literature on equipment support in special geographical environment such as plateau, desert and Gobi was found.

According to the existing literature search results, the research on the special topic of equipment support in special environment has not been comprehensive and systematic at present, and has not formed a complete system of research results. It is urgent to carry out extensive and in-depth investigation and research, study the impact of various special geographical conditions and climate environment on the equipment, comprehensively and systematically sort out the equipment protection measures under various conditions, and finally in order to enrich the teaching system of a course and guide the equipment guarantee work better, we should sum up the experience and lessons.

2. Problems

2.1. Too Little Teaching Content

2.1.1. The Impact Analysis of the Special Environment on the Equipment is not Comprehensive and Covers a Wide Range. In the original textbook, the analysis of the influence of special environment on equipment is not complete. In the aspect of special geographical environment, only the impact of plateau environment on equipment is discussed, but there is no discussion on the environment of mountains, deserts, Gobi, etc.; in the aspect of special climate environment, there is no discussion on the impact of saline alkali environment on equipment.

2.1.2. The Pertinence of Protective Measures is not Strong Enough, and the Summary is not Systematic and Comprehensive. In the original teaching materials, for the protective measures and methods of equipment in various environments, only general protective measures are given, which are not targeted enough, and the induction and summary are not systematic and comprehensive enough.

2.1.3. The Teaching Content Lacks the Support of Guarantee Examples, which is not Conducive to Understanding and Mastering. In the original textbook, for the discussion of equipment support in special environment, there is no specific support example, which is not easy for students to understand the impact of hazards in depth, and to learn and master the measures and methods, and is not conducive to guide the implementation of equipment support practice.

2.2. Limited Teaching Resources

The special topic of equipment support in special environment needs to collect the working conditions of equipment in extreme climate such as high temperature, low temperature and humidity, as well as in special geographical environment such as plateau and desert. Due to the large area covered by the special environment, involving many provinces and cities in the country, such as the southeast coast, northwest, northeast, etc., the investigation cycle is long, teachers can not get all the information in the first time, plus teachers themselves are difficult to follow up the equipment guarantee and maintenance work in the whole process, resulting in the lack of teaching resources, and the understanding of specific measures and methods of equipment guarantee under the special environment is not deep and thorough.

2.3. Too Few Teaching Methods

The teaching method of this topic is mostly teaching method. In combination with PPT, blackboard writing and other forms, teachers show the impact and harm of special environment on equipment guarantee through words, pictures and other contents. The teaching content is flat and straightforward, lacking in-depth interactive discussion, and students' learning enthusiasm is not high. In addition, due
to the lack of equipment guarantee cases and detailed guarantee scheme, it is difficult to carry out case and discussion teaching, and the teaching method is single.

3. Reform

3.1. Reconstruction of Teaching Content System
In order to solve the above problems in teaching, in the past three years, the members of the teaching group have combined with the actual work, went deep into the front line, understood the work practice of equipment support in various special environments, mastered the first-hand information of equipment support work, and summarized the experience and lessons in the equipment support examples. On this basis, the teaching content is sorted out and the block diagram of teaching content is reconstructed.

The adjusted framework of teaching content, closely around the plateau, Gobi, alpine, coastal and other special geographical environment, as well as high temperature, low temperature, humidity, salt and alkali and other special climate environment, has carried out in-depth research, including three teaching content modules of impact hazard analysis, guarantee measures and methods and guarantee examples of equipment guarantee under each special environment.

The modules of each teaching content are designed as follows:

1) module design of "impact hazard analysis" teaching content. A comprehensive and systematic analysis of the impact and harm of various special geographical and climatic environments on the equipment is carried out. For example, in terms of "the impact and harm of low temperature environment on equipment", the new teaching content is summarized as the following aspects according to the in-depth investigation of the subject group: a. low temperature environment will reduce the reliability of electrical equipment work. b. low temperature environment will change the characteristics of metal parts, which is easy to cause serious wear and seizure of parts. c. low temperature environment will lead to lubricant deterioration and mechanical failure.

2) module design of teaching content of "safeguard measures and methods". Combined with the actual situation, the specific protective measures are given. For example, in terms of "protective measures taken for equipment against low temperature environment", the new teaching content is summarized as follows according to the in-depth investigation and understanding of the research group: a. prepare the equipment anti freezing plan and carry out the protection work regularly to ensure that the protection work falls. b. strengthen the professional training of technical personnel, so that they can master the work flow, organization and implementation methods and technical operation essentials of equipment support under the condition of low temperature and freezing. C. strictly implement the anti freezing plan, do a good job in anti freezing preparation of the equipment, and improve the reliability of the equipment. d. pay attention to the collection of equipment failure information, and put forward suggestions for improvement of equipment anti freezing.

3) the module design of the teaching content of "guarantee case". According to the investigation, 2-3 specific support examples are given for each special environment. For example, in the case of "equipment support in low temperature environment", the new teaching content gives an example of equipment support for a unit to cope with cold wave and low temperature weather.

3.2. Improving Teaching Methods
In teaching, the special teaching topic of equipment guarantee in special environment can be carried out in two professional organizations, involving undergraduate and graduate education. At present, the teaching mode is too single. According to the characteristics of students of different levels and specialties, we can explore a variety of teaching modes.

3.2.1. Case Teaching Method. Case teaching refers to teaching by organizing students to discuss the actual equipment guarantee cases, guiding students to put forward solutions to problems, selecting and compiling examples containing practical problems and practical contradictions before class, designing various links of case introduction, individual learning, group discussion, class discussion, summary and evaluation in advance, and through throwing problems, pushing the plot, leading contradictions
and raising difficulties. In order to improve the ability of analyzing and solving problems, we should gradually carry out classroom promotion, such as confused, organizing classroom discussion, etc.

For example, the case teaching mode can be adopted to organize teaching according to the characteristics of the undergraduates with a certain major, such as strong curiosity, high interest in practical problems and large number of classes.

3.2.2. Discussion Teaching Method. Discussion teaching is a problem-solving centered teaching method. Through the creation of problem situations by teachers, and then teachers and students jointly search for information, research, discussion, practice, exploration, and propose solutions to problems, students can master knowledge and skills. Discussion teaching should focus on "guidance", set up problems close to equipment guarantee, require teachers to have comprehensive, profound and original opinions, and require students to have certain knowledge base and ability level.

For example, for the graduate students of a certain major, the students at this level have solid foundation, some work experience, and a small number of classes, so the small class discussion teaching mode can be adopted to organize teaching.

3.3. Enriching Teaching Resources

3.3.1. Establish a Long-term Mechanism of "Long-term Cooperation" to Provide the Basis for Collecting and Ensuring Experience and Enriching Teaching Resources. Under the "long-term cooperation" long-term mechanism, members of the teaching team can participate in the equipment support work of the corresponding units. In combination with the current equipment support work, they can carry out regular and in-depth research every year to understand the actual equipment support work, and obtain relevant information such as special environment equipment support experience, teaching and training, so as to better enrich and update the teaching resources.

3.3.2. Establish a Long-term Mechanism of Integration of Teaching and Research to Provide Guarantee for Exchange Learning and Enrichment of Teaching Resources. Under the long-term mechanism of integration of teaching and research, the research and design personnel or equipment support technical experts of the production plant can be hired to give special lectures. The research and design personnel of the production plant mainly analyze the influence of special environment on the equipment from the perspective of equipment design and the measures adopted in the design stage. Equipment support technical experts, mainly in the form of case analysis to interpret the experience and lessons of equipment support in special environment. On the one hand, it can enhance the communication and learning between teachers and equipment developers, as well as equipment technology experts. On the other hand, on the basis of understanding and absorbing experts' teaching content, teachers can enrich it into the special teaching content. At the same time, this kind of special teaching can broaden students' horizons and expand their knowledge.

3.4. Improving Teachers' teaching Ability

In teaching, the role of teachers is very important. In the special environment of equipment guarantee teaching, teachers are required to integrate theoretical teaching with practical problems. Facing some practical problems raised by students, teachers should also be able to deal with them. All of these are based on the high level of teachers' teaching ability and practical ability to organize teaching well and achieve good teaching effect.

At the same time, in the process of organizing teaching, the interleaving of various teaching modes and means requires teachers to enhance their ability to control the classroom. For example, when organizing case teaching, the positive response of students is a key link to the success of case teaching, but whether students can respond positively is not only related to students' own quality and learning attitude, but also related to teachers' professional level and ability. In the whole teaching process, teachers should be good at guiding students, helping students to summarize experience and exchange experience. This requires teachers to learn to deal with students, have interpersonal communication ability and skills, and be able to gain students' respect and trust.
4. Teaching Practice

4.1. Teaching Practice in a Graduate class
"Equipment guarantee in special natural environment" is one of the teaching topics of a course. Our teaching object is graduate students of a certain specialty. Although some graduate students come from the units, they usually only know about the equipment support related issues of the original unit's environment, but they lack of knowledge about the impact and harm of other environment on the equipment, as well as specific support measures.

In a certain teaching work, the teacher integrates the revised teaching content of the subject into the teaching of a certain course for a master's degree graduate student. In the teaching of this special topic, through the analysis and explanation of guarantee cases in different environments, we can deepen their understanding of various environmental impacts and hazards, as well as the understanding of specific guarantee measures and methods. For example, when teaching the impact and harm of high temperature and humidity on equipment, first ask the students to talk about the practical problems encountered in the work. The teacher comments one by one, and then leads to the knowledge point of "the impact and harm of high temperature and humidity on equipment", which is taught from the simple to the deep and from the point to the surface. This not only improves the initiative of students, but also helps students to understand the knowledge.

4.2. Teaching Practice in a Course Undergraduate Class
In addition to the relevant contents of the topic of "equipment support in special environment" in the postgraduate course, this part of the content is also involved in the topic of "equipment maintenance" in a undergraduate course.

In the autumn of 2016, in a certain course teaching of a professional class, the teaching group applied the revised and improved teaching content to the teaching of the subject, and received better teaching results. After class, they communicated with the students' representatives, and the students generally reflected that through the study of this topic, they had a deeper understanding of the impact and harm of various special environments on the equipment. In particular, in the teaching content, the teacher was able to explain the impact and harm of each special environment on the equipment with specific equipment guarantee examples, as well as the adopted impact and harm of each special environment The countermeasures are easier to understand and master.

5. Conclusion
Based on the analysis of the current research situation and existing teaching problems of equipment support in special environment, this paper puts forward the teaching reform measures of reconstructing the teaching content system, improving the teaching methods, enriching the teaching resources and improving the teaching ability of teachers. Through the teaching practice, the teaching effect is better, which provides guidance for equipment maintenance support, and the response effect is better The teaching reform of a certain course provides reference.

6. References
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