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# The Research on the Construction of Lean Project Culture

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**Abstract**— In this paper, we introduced the definition of lean culture and the project culture. We summarized the cultural characteristics of China's railway project construction. We took advantage of lean thinking in the project culture. We also put forward the concept and significance of lean project culture construction as well as the implementation. The connotation of lean project culture construction expands the connotation of lean thinking largely.

**Keywords**—lean project culture construction, lean culture, project culture, the characteristics of project culture

## I. INTRODUCTION

In recent years, China's central government pays great attention to railway construction. The railway construction industry which lives in a cutting-edge market economy will face increasingly fierce competitive environment. The railway construction industry with distinct characteristics will take advantage of lean thinking in the project culture. It strengthens enterprise lean project culture construction in order to realize sustainable development and get sustained profitability for a long-term.

## II. THE MUTUAL RELATIONSHIP BETWEEN THE CORPORATE CULTURE AND PROJECT CULTURE

### A. The Corporate Culture

In the book of "corporate culture", Deal and Kennedy who is American scholars described the culture as the way of doing things in such an environment. They believe that each enterprises as well as organizations have a culture. The culture has a strong effect on the organization and everything. Corporate culture is made of five elements, such as, corporate environment, ceremonies and rituals, values, heroes and cultural networks. And the values are the core of the corporate culture [1].

Edgar. Schein (1984) has more representative definition on corporate culture: Corporate culture is the specific business which is dealing with problems of the process about the external environment and internal integration. Corporate culture also creates and develops the norms of the basic assumptions. So such norms are running a good efficiency in the enterprise. Therefore, it is the right way for new staff to observe and think deeply about the issue.

The professor G • Hofstede whose major is anthropology of the Netherlands Organization and international management said that different cultures have different characteristics, despite in the different times, but its general

structure is consistent in his book "Crossing the obstacles to cooperation: multi-culture and management".

The structure of corporate culture includes 4 levels, the material level, system level, behavior level and concept level. We can sum up the corporate culture into the material, behavior, system and values in short.

Material level refers to corporate visual identity system (CIS) and aims to build corporate culture transmission to become the material carriers of a business idea. CIS is not a corporate culture. It just is the publicity and explicit of corporate culture. System level of business operation requires a system as the assurance and support. The enterprise should establish a sound scientific management system to form positive corporate culture, business customs, and unique management model. Behavior level has these aspects. Such as the company's products should be presented to customers on time and ensure their qualities, the customer service should be warm and thoughtful, the relationship between employees is harmonious and whether the department's cooperation is sincere or not. This level has a direct relationship with the core of corporate culture. It is a manifestation of the enterprise spirit and corporate values. Concept level includes business philosophy, management philosophy and entrepreneurial spirit. It aims at fostering the enterprise's core values. Values are the fundamental beliefs and codes of conduct which is formed in long-term organization development. It is the standards for judging their behaviors, the meaning of their existence and development, organizational purpose and organizational objects. Values are the core of enterprise culture. At the same time, it is the most stable factor in the structure of enterprise culture [2].

### B. The project culture

The project culture is the combination formation of several organizations and the organizational cross-organizational culture. The project culture is the formation of organizational culture and the project construction. It contains cultural values, ethics, and valuable standards. It also contains other forms of ideological and material construction. These are recognized in the project by all members of the organization [3].

### C. The Mutual Relationship Between the Corporate Culture and Project Culture

At the same time, the project culture and enterprise culture have a mutual relationship with each other. The project culture is different from the enterprise culture. Enterprise culture is a culture within the organization. The

project culture is the sub-culture of corporate culture. The project culture was conceived in the corporate culture. So the project culture is an important part in the enterprise culture and the main manifestations. The construction of enterprise culture depends on the infrastructure of project culture. To a large extent, it can develop and innovate in accordance with the law of enterprise's development. The positive result of enterprise culture construction must follow project culture to realize its target. The project culture is a subordinate branch of the mainstream culture within a specific cultural background and project management environment. The project culture and micro-project management practices culture are the whole integration of application-oriented culture. In the project management, the construction of project culture is an important guarantee to improve project management level and the competitive forces of enterprise team.

### III. CONNOTATION OF LEAN CULTURE AND LEAN CONCEPTS

#### A. The Lean Thinking

Japan's Toyota Motor Corporation created the Toyota Production System at the 20th century. The U.S. Massachusetts Institute of Technology (MIT) got further research and development by academia and the business community. To the mid-90s, it has become a new management concept - "Lean Thinking". "Lean thinking is the integration of people, process and technology [4]."

#### B. The Lean Management

The lean management is a generalized conception of the lean production. In the book "the lean management - a standard management model in the 21st century", the author describes that the lean management enables the enterprises to meet needs which is multifarious, individual and changing rapidly. The implement of lean management needs some measures. The measures include a strategic thinking of people-oriented, team-tissue cells, the implementation of JIT (timely, appropriate, proper material), use of concurrent engineering and determining product value structure from the customer [5]. At last, the lean management can eliminate waste ultimately. The result of the lean management will get access to huge profit.

#### C. The Lean Construction

When the projects are going on, the lean construction helps the customers to make the target which is maximizing the customers' value and minimizing the waste. The basic framework of lean construction system has shown in Figure 1. First, the lean construction implements internally lean concepts in the project's participating units. Secondly, each activity implements the lean construction in the project construction. The lean thinking activities can be derived to the lean design, the lean supply and the lean execution in the construction project. Thirdly, the enterprise implements the lean construction among the various activities and the overall perspective [6].

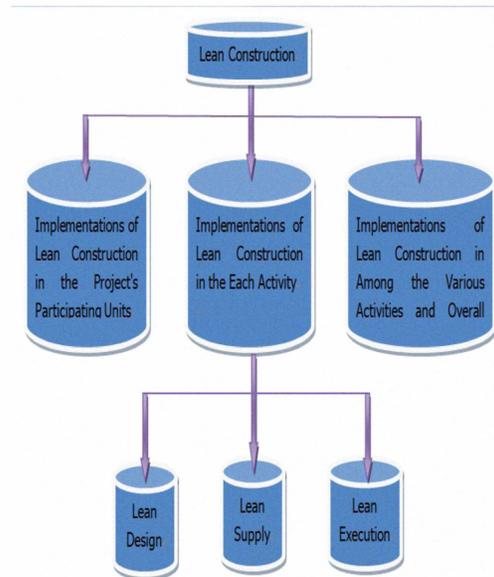


Figure 1. The basic framework of lean construction system

#### D. The Lean Culture

Lean culture includes three dimensions: organizational dimension, function dimension and time dimension.

- Organizational dimension. From corporate decision-making layer to the bottom of the lean production culture, it cannot stop at the enterprise employees' level only. From the decision-making layer to front-line workers, all personnel in corporate should have a lean sense. Only in this way can we take root sprouting into the enterprise.
- Function dimension. From the expansion of production, design and sale of the entire process to lean production, the surface is the emphasis on "production", but actually lean production leans to play a better role in the whole production. It has other links with some stages, such as how to ensure the efficiency of product design in the design development stage. And it is in line with market requirements, designing time and small difficulty of craft production in short.
- Time dimension. It emphasizes that the progress of lean culture should also be gradually improved. Lean culture has some relatively stability, but does not have the absolute stability. The contents and manifestations of lean culture should be gradually richly and perfectly adjusted. Because the corporate form, the new management concept and management methods, the market environment and social environment are gradually changing. The System of Lean Culture Train has shown in Figure 2 [7].

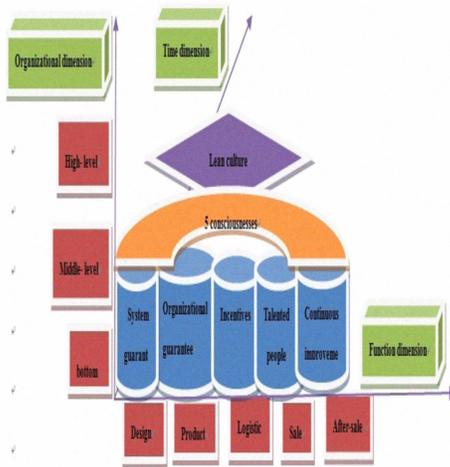


Figure 2. The System of Lean Culture Train

#### IV. CHARACTERISTICS ON CHINA'S RAILWAY CONSTRUCTION PROJECT CULTURE

##### A. The Analysis of the Railway Construction Project Characteristics

In January 2004, the State Council approved and promulgated the "long-term railway network plan." One of its objectives is the railway mileage increased from 73,000 kilometers in the end of 2003 to 10 million km in 2020, and an average annual growth rate is about 1600km. After the implementation of the "long-term railway network plan", the investment needed in railway construction will reach 2 trillion RMB in the next 10 years. This means annual average of more than 1,000 billion RMB will be invest in the expansion of the railway infrastructure. With the growing number of railway construction projects, railway construction project has some salient features ,such as a long construction period, a huge investment, a variety of professional and technical cross-cutting, integrated applications ,high-risk sexual and so on.

The railway leap-forward development strategy calls for the rapid expansion of the railway network construction scale and the qualitative leap in management standards and levels. Therefore, the Leap-forward development strategy not only launches the height of the railway construction, but also gives the new features of China's railway construction projects. In a near future, the goal to expand the size of the railway network, optimize the road network structure and improve the quality of road network can be achieved by accelerating pace of project construction, expanding the investment scale and increasing technology content.

There are some good conditions for changing the external environment of China's railway construction projects, such as the larger investment scale and higher construction speed, the quick upgrade of the technology content and the technical merit of the project. But this also produces new factors which will inevitably increase the risk of rail construction projects [8].

There's prevalently risk and variability of Railway construction project. They show a complex and changing trends. In consequence, the systematic and effective railway projects cultural construction is essential in the whole process of the railway construction project. This is helpful to meet the pressure on the railway construction project which is brought by the railway Leap-forward development and the desire on upgrading the railway construction project management level.

##### B. The Analysis of the Railway Construction Project Culture Characteristics

The project culture characteristics of China's railway construction have some concepts. Because the construction project management produced late in China, the applications of project culture in railway developed slowly. We don't pay great attention to the systemic and effective construction of railway project culture. Railway construction has special natures, so security and cultural construction is a prerequisite in the rail project culture construction [9]. The railway construction was implemented in stages. If a project was not completed on time, it will certainly affect the next project. Therefore, the culture of railway construction project can't have a detailed and accurate plan to ensure finishing the project on time.

The railway required a long time from building (or transformation) to operation. This process also needs a large number of additional investments. So the railway construction project culture must require that the employee have good coordination and execution, etc. Rail project culture construction should have goals, the links between upper and lower, measures and inspections. This will form a strong culture construction system which has an execution.

#### V. THE OVERVIEW OF LEAN PROJECT CULTURE CONSTRUCTION

##### A. The Significance of Lean Project Culture Construction

Corporate culture includes the project culture. The lean culture is the expansion of corporate culture. The project culture cuts across and advocates lean thinking, lean management and lean construction, etc. This means that all thoughts and actions must follow the principles of lean management. Because China Railway Six Group Co., Ltd (CRSG) implemented lean construction mode and established the culture of lean construction, the project culture has become a part of CRSG corporate culture. It will integrate lean thinking into the project culture construction effectively. And it has formed the lean project culture eventually. China's railway construction project is an extensive mode. This condition has last for a long time. It wastes a lot of raw materials such as iron, steel, and so on. Thinking for corporate interests, resource recycling, and the long-term consideration of economic benefits, while combined with the harmonious development, railway construction project culture should be integrated into lean thinking [10].

### *B. The Role of Lean Project Culture Construction*

The lean project culture construction can enhance competitiveness and cohesion. Lean project culture can improve the corporate culture internally. Through the lean project culture construction, it may establish more positive corporate mechanisms and encourage their employees to establish the correct values, ethical standards and the overall belief. And the enterprise will produce a strong belonging sense in this process. Creating some good organizational climate, the lean project culture ensures achieving the staff's self-value and forming a competitive and cohesive team. It also can improve the economic efficiency. The biggest target of lean project culture construction is maximizing the value of the customer. Because the lean management and lean thinking has been integrated into the design, the lean project culture construction will meet the market needs better [11]. The project culture, team work, concurrent engineering and lean construction in China Railway Six Group Co., Ltd also aim at the eradication of construction waste. Lean project culture construction is a pursuit of eliminating waste. This will lead to maximum economic benefits.

### *C. The Connotation of Lean Project Culture*

There are five aspects in the lean project cultures, i.e. the sense of crisis, the sense of problems, the consciousness of human, the pursuit of excellence and the cumulative consciousness.

The basis of business is always has a sense of crisis. The sense of crisis in the lean project cultures means that we should recognize the need for carrying out the lean production methods. In addition, we should create a crisis culture. We should cultivate the problem awareness in our employees. Then they will have the ability on thinking from the surface to the intrinsic. The lean project cultures aim to achieve sustained improvement. This will benefit projects. The "lean" means "sustained improvement". The key of business development is people-oriented. The human consciousness of the lean project cultures will make us realize that employees are the company's most valuable resource. The employee is the resources that can't be imitated. The core of lean production is to eliminate waste and reduce costs. In the competitive environment of product surplus, the cost control ability becoming the key to win. The lean project culture is conducive to the control of product quality and quality. Improving enterprises is a long-term task. This is a "snowball" effect. Lean project culture requires enterprises to adopt measures to encourage employees to make the improvement from their around. No matter the effect of improve is significant or not, the important thing is make employee develop the attitude of self-improvement.

### *D. The Structure Implementation of Railway Lean Project Culture Construction*

The first is the physical layer in lean project culture. The physical layer of lean project culture also named the lean material culture. It is made up of variety products and materials facilities which are produced by all the staff of the project. It is the surface culture of the project which is

apparent by material form. The physical layer of lean project culture will inosculate a variety of substances.

The second layer is the behavior layer in lean project culture. The behavior layer of lean project culture also named the lean behavior culture. It is a cultural generated in the process of lean activities. It shows the work style, work methods and interpersonal skills of lean project staff. It reflects the teamwork and their values. In the lean project management, the behavior of lean project manager is the focus of the lean project behavior cultural construction. It plays a leading role. The advanced model characters are the project's solid power. They have an important role in the process of lean project behavior culture construction. They embodied the value of the project and make the project value personified. They become a model for their staff. The project staffs are the project's main part. Employee's behavior embodies the entire spirit and civilization level of the project team. So training the acts of all staff is an important part of lean project cultural construction [12].

The third layer is the system layer in lean project culture. The system layer of lean project culture also named the lean system culture and also been identified as the lean project system. The idea integrated into the evolving course of a project code of conduct, interpersonal relationships and information exchange methods. It includes the project organizational structure, project rules and regulations. It has a common code of conduct and mandatory requirements. The establishment of a certain system will make the people choose new values. The lean system culture has become the carrier and basis of the new spiritual culture. Lean project culture will continuously develop, enrich and improve by following route of "spiritual culture-system culture-the new lean spiritual culture".

The fourth is the spirit layer in lean project culture. The spirit layer of lean project culture also named the lean spirit culture. Refer to the lean material culture and lean behavior culture, the lean spirit culture is a deeper cultural phenomenon. The lean spirit culture is the core of the lean project culture system. The lean spirit culture is the sublimation of the lean material culture and lean behavior culture [13]. The spirit culture of lean project clearly reflects the pursuit of project manager's career, the main direction and the basic guiding ideology of mobilizing the enthusiasm of staff's. It can better carry out the lean thinking.

The fifth is the innovation layer in the lean project culture. Innovation is the individual's cognitive and behavioral activity. Taking advantage of all the existed knowledge, it can create new and valuable results of spiritual, social and material. The key of cultivating the corporate culture is persistence. And the innovation is its soul. The construction of the lean project culture is the escalation phase of the corporate culture work. And it is the forefront of corporate culture. It not only has a large framework requires, but also has distinctive characteristics. To some extent, the culture of the lean project also is a practical culture. The lean project work is "soil" and it is the basis of the project culture construction [14]. The culture which only penetrates into every aspect of project management plays its good role through entering into the work of its staffs, live and learning.

In the construction of lean project culture, China Railway Six Group Co., Ltd (CRSG) also should be done with the characteristics, sizes, operating environment, staff quality and other practical situations. Therefore, the core of the lean project culture construction should take "innovation" as the basic ideas. If CRSG did continuous improvement, it will maximize the corporation profits.

## VI. CONCLUSION

China Railway Six Group Co., Ltd (CRSG) applied the lean philosophies in the project culture construction. In the construction of the project culture, CRSG combine the culture construction, party building work and the lean concept. Namely, it enhances the combination power of the party building work and the lean concept. It expanded the form and content of project culture construction so as to achieve harmony and complementary effects. The construction of project culture and lean ideological construction can develop hand by hand. CRSG will strengthen every aspect of the project culture construction. At the same time, it can upgrade the lean thinking. So that they will become a unified body and form a virtuous circles to promote each other.

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