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Research on the Maturity of Real Estate Enterprises Safety Culture

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Abstract: Safety culture plays an important role in enterprise safety production. The paper analyzed the factors of real estate enterprise safety culture construction and then designed the questionnaire and did research on real estate enterprise safety culture. The questionnaire consists of workers' information and seven safety culture dimensions, including safety management system level, publicity and education training level, security issues and management participation level, employee safety consciousness level, staff safety knowledge and skill level, co-workers behavior influence level, as well as responsibility, rewards and pulishment level. Through analyzing the data of the questionnaire and combining it with the safety culture maturity model, the paper concludes that real estate enterprises safety culture is in the second gradient, with the safety culture in a primary stage. Enterprises need to encourage employees to participate in construcing and improving the level of enterprise safety culture. The article puts forward some measures for the improvement of the safety culture construction and some suggestions from the perspective of material, system, spirit and culture.

Key words: Real estate, safety culture, maturity model

INTRODUCTION

Today, with the rapid development of real estate industry, real estate developers pursue the economic benefits and have gradually realized the importance of corporate environmental health and safety in terms of company development. On one hand, currently enterprises enhance the safety of company technically; on the other hand, more and more attention has been paid to the exploration of factors like people, organizations or other non-physical aspects. Enterprises attach great importance to the construction of enterprises safety culture. The concept of safety culture was firstly proposed in 1986 (Chen, 2005). After that, lots of researches have been done on the safety culture issue.

Hinze and Human (1981) investigated the relationship between the attitude of construction staff members and the safety performance and pointed out that there is a possibility of significantly reducing the accident. Hislop (1998) studied the importance of owners' participation in building safety culture. However, he just mentioned it instead of conducting in-depth researches and not to mention putting forward certain systematic construction approaches. Blair (1996) studies the responsibility every relevant participant takes for safety, from the perspective of comprehensive safety culture. For TSC, Griffiths (1994) puts forward the ten principles that "safety culture should be used, rather than legislation and promote the development of occupational safety and health". Gilkey's (2012) research indicates that managers appraised the overall safety culture at a higher level than workers and they perceived a higher level of management commitment to safety and health than workers as well. Luo (2002) studies the origins, development and the concept of safety culture, proposes the framework of safety culture system, object system and field system; analyzes the relationship between cultural science and safety culture, as well as the relationship between enterprise culture and safety culture. Xu (2006) has reviewed the history and progress of safety culture construction in China and puts forward efficacious approaches of safety culture construction. This paper, based on the questionnaire survey of safety culture of real estate enterprises in Wuhan city, utilizes the safety culture maturity model to study safety culture status of real estate enterprises and puts forward well-arranged and effective construction approaches.

THE ANALYSIS OF THE FACTORS OF REAL ESTATE ENTERPRISES SAFETY CULTURE

Enterprises safety culture is the sum of everything, such as the staff inherit and security system, idea, behavior patterns, as well as sense of value. It embodies in each employee's attitude towards the security and sense of responsibility; it improves and get better under

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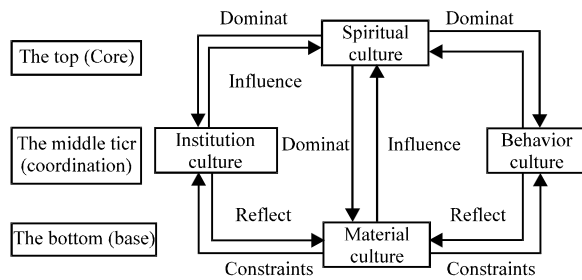
Fig. 1: Diagram of factors of safety culture construction

the influence of mutual osmosis and communication. The potential impact of culture improves enterprises' innovative capacity, imagination and core-competitiveness and it leads the enterprises to have a qualitative leap (Xianwei Gao, 2009).

For real estate enterprises, the elements of safety culture building can be divided into the following four aspects:

Material aspect: (Safety material culture is material existence), including conditions, environment and facilities with the purpose of guaranteeing the safety of people's life and safety of production.

System aspect: The formulation and implementation of systematical culture construction mainly includes system making, performing improving and supervising.

Spirits aspect: Security culture requires various activities, like safety educational training, safety knowledge contest or safety performance, to spread the safety knowledge and skills and strengthen employees' safety consciousness, so as to make the security concept deeply rooted in the heart of people.

Behavior aspect: Security behavioral culture is the combination of people's living or working style with the guidance of safety culture and system culture; it is also a reflection of the effect of the safety culture construction.

All these aspects mutually complement, permeate and restrict each other and jointly constitute the whole structure of safety culture. It is shown in Fig. 1. The safety material culture is the basic and fundamental guarantee, as well as the core of safety culture; Safety system culture stands between safety material culture and spirit culture, it is at the intermediate level of safety culture and it takes effect in coordination, security, restriction and promotion; safety behavior culture and system culture, as intermediary, is the bridge and the link of safety material culture.

SAFETY CULTURE MATURITY MODEL (SCMM)

In regard to the analysis and evaluation towards system safety, due to the difference of the production system, working environment and research objects, scholars both at home and abroad have proposed dozens of analysis and evaluation methods of system safety. Considering the multifaceted nature of culture, safety culture of employees involves many factors, such as the characteristics of enterprise employees, the qualitative factors and other characteristics, so the security maturity model has been used to evaluate the safety culture of enterprise employees.

Safety culture maturity model displays several repetitive stages; it indicates that organization goes along the gradient step by step. The method is aimed to strengthen the power and remove the weak links of the previous gradient. At the same time, it is generally not recommended to try to skip a gradient to promote the safety culture of the organization (Mark, 2000) as is shown in Fig. 2:

- The first gradient: the initial level
- The second gradient, the management level
- The third gradient: full participation level
- The fourth gradient: full cooperation level
- Fifth gradient: continuous optimization level

PRESENT SITUATION ANALYSIS OF SAFETY CULTURE IN REAL ESTATE ENTERPRISES

The design and preparation of the questionnaire: This study divides the safety culture into seven dimensions, including safety management system knowledge, publicity and education training, safety and management participation, staff safety awareness, staff safety knowledge and skills, co-workers behavior affect safety, responsibility and disciplinary punishment. Questionnaire items are divided into two categories: one is information questions aimed to collect the basic information of the sample and analyze the factors of employees' safety culture later (Lu *et al.*, 2008); the other is the scoring question, according to the type of questions in the questionnaire, we adopt Likert's 5 score method. At the same time, the reliability of the questionnaire will be verified based on dimension principal component analysis and the reliability validity inspection. Parts of the questionnaire are shown in Table 1.

At last, we use the convenience sampling method and take employees from project department of real estate enterprises in Wuhan as respondents. During 2-week research, 230 questionnaires are released and 210

Table 1: Parts of the questionnaire

4 Employee safety consciousness level					
14. While working what does safety means to you?	Most important	More important	Generally important	Less important	Not important
15. Due to various and complicated safety risk in construction. How familiar with safety risk of all kinds.	Very familiar	Familiar	But mot comprehensive	More familiar the majority	Not familiar utterly
16. How much do you know safety notes in work.	Completely	More	Generally	Less	Absolutelynot
17. How do you think most safety accident in work could be avoided?	Completely could	Partly could	Possible	Less possible	Impossible

Table 2: Scores in total and in each dimension about safety culture of frontier employees

Item	Score (x±σ)	Ranking	Min	Max
Total score	4.012±0.248	-	3.777	4.318
1 Safety management system level	3.777±0.209	7	3.466	3.912
2 Publicity and education training level	3.852±0.082	5	3.788	3.995
3 Security issues and management participation level	3.801±0.131	6	3.658	3.974
4 Employee safety consciousness level	4.196±0.211	2	4.140	4.503
5 Staff safety knowledge and skill level	4.052±0.277	4	3.736	4.497
6 Co-workers behavior influence level	4.044±0.066	3	3.979	4.135
7 Responsibility?rewards and pulishment level	4.318±0.105	1	4.202	4.415

Table 3: The top three and the last three in rankings about safety culture of frontier employees

Item	Dimension	Score(x±σ)	Max	Min
Top 3				
17. I think a lot of safety accident in construction process can be avoided.	4 Employee safety consciousness	4.503±1.173	5	0
21. Have you set obstructs and put up warnings in sites with potential security issues?	5 Staff safety knowledge and skill level	4.497±0.914	5	1
30. On my site, the manager harshly criticize workers who don't operate in a safe way.	7 Responsibility?rewards and punishments	4.415±0.856	5	0
Last 3				
1. The company's safety management system often ask for your opinion.	1 Safety management system	3.466±1.254	5	0
12. Do you often put forward suggestions to improve the safety of construction here?	3 Security and management participation	3.658±1.103	5	0
19. Do you think if this program offers all the safety protective equipment needed ?	5 Staff safety knowledge and skill level	3.736±1.135	5	0

recovered. The questionnaire recovery rate is 91.0% and there are 193 valid questionnaires, which mean that questionnaire recovery efficient rate is 92.0%.

Safety culture present situations of real estate employees: Through the analysis of data processing, safety culture of employees' total score and each dimension score are shown in table 1 in an order from high to low. The highest and the lowest three entry summaries are shown in Table 2.

Table 2 shows that in the questionnaire of all seven dimensions, the fourth dimension- employee safety consciousness, the fifth dimension-staff safety knowledge and skill level, the sixth dimension-workers behavior affect the security level, the seventh dimension-responsibilities and rewards and punishment level, all score more than four points, respectively 4.196, 4.196, 4.044 and 4.318 points. Other dimension scores are below 4 points. The highest scored dimension get more 0.541 points than the lowest scored dimension and the standard deviations of dimensions are different, the largest and the least standard deviation differ by 0.211; According to the principles of the Likert 5 rating method in the design of questionnaire (doesn't meet at all for 1 point, barely meet for 2 points, uncertainly meet for

3 points, almost meet for 4 points, totally meet for 5 points and some reverse entries to reverse transformation), statistics fully reflects the overall situation that safety culture of employees in real estate enterprises is below the average level.

The six highest and lowest scored items selected from above seven safety culture dimensions are analyzed. And the items which get the lowest and highest score are shown in Table 3.

Table 3 shows that employees' comments about themselves and enterprises level has positive as well as negative answers, neither all good nor all bad, it dialectically suggests that in the construction of safety culture of real estate's employees, employees and the enterprises both take their responsibility to work hard and constantly learn in order to enhance safety culture atmosphere.

Besides, we group the workers according to three questions in basic information, analyzing the safety cultural differences in different groups and finally find ways to strengthen the employees' consciousness of safety culture.

The analysis of whether to participate in safety training (safety meetings, lectures, lessons).The result is shown in Fig. 3. Figure 3 shows employees who have
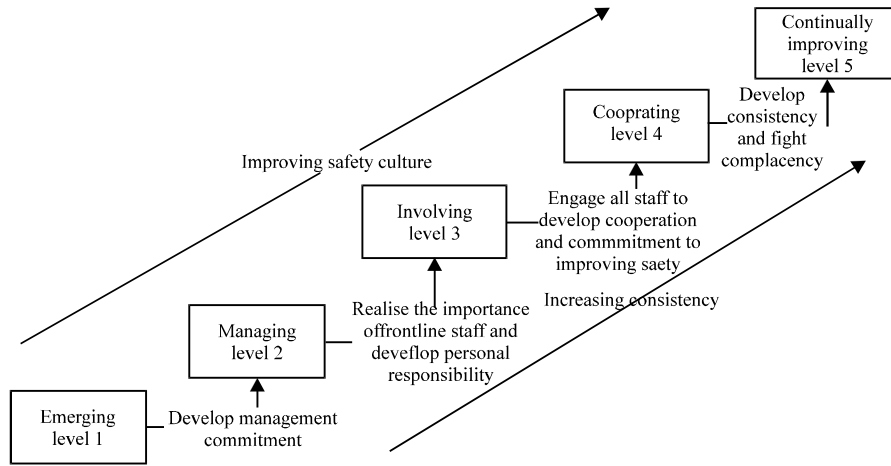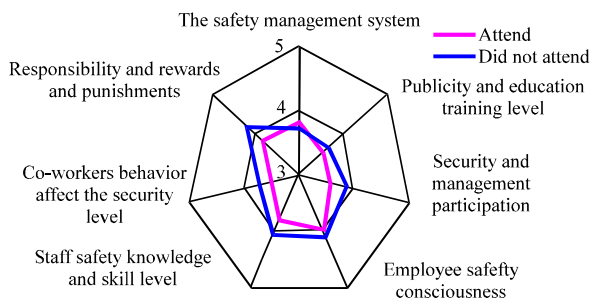
Fig. 2: Safety culture maturity model

Fig. 3: Radar of distribution of whether they will participate in safety training

taken part in safety training such as meetings, lectures and classes can easily perceive the safety atmosphere better than workers who have not attended. Those employees' safety knowledge and skills, safety issues and participation in the management of workers participated in the safety training get higher scores. So strengthening safety training can improve the safety of the workers' safety knowledge, skills and enthusiasm to participate in the company management.

The result that the analysis of whether to attend safety skills training is shown in Fig 4. Figure 4 shows workers involved in safety skills training have better safety consciousness, safety knowledge and skills, safety responsibility consciousness, compared with those who are absent for security training. It suggests that strengthening security skills training can effectively improve the safety consciousness of workers.

The result of the analysis of work seniority is shown in Fig. 5, which shows workers working for less than 3 years and more than 10 years have great safety culture
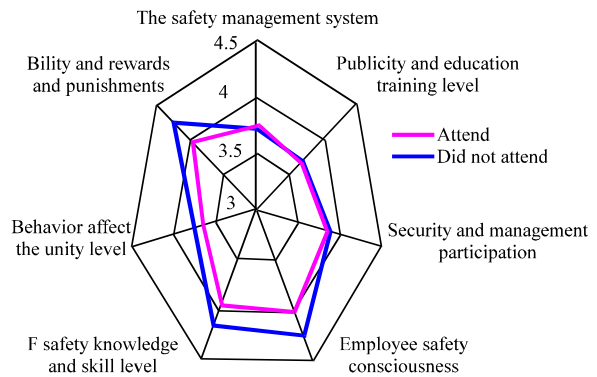

Fig. 4: Radar of distribution of whether they will participate in safety skills training
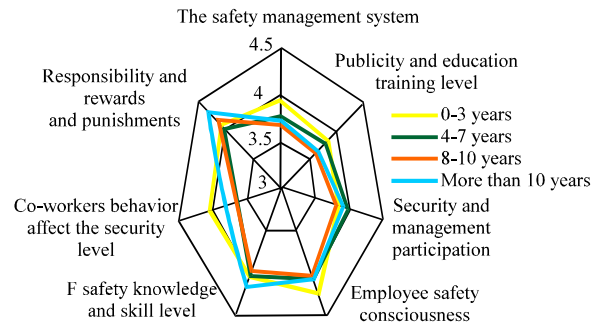

Fig. 5: Radar of work seniority

consciousness. The reason is that workers working for less than 3 years belong to a younger generation, most of them have received education and their abilities to accept new things and new knowledge is better, so their safety consciousness is higher. Workers working for more than

10 years have rich work experience and are more familiar with the security system, consequently have the strong sense of responsibility.

Safety culture maturity evaluation: Through the above data analysis, according to the safety culture maturity model, this paper argues that the current situation of the safety culture of employees in real estate enterprises consists of the following features:

The safety culture of the research objects is in the second gradient, which belongs to the primary stage. Obviously, here is a huge development space. It requires all levels of employees in the enterprises to concert effort to improve the enterprises' safety culture.

Frontline employees' overall present aging, low education, low job satisfaction. These characteristics have negative effects on enterprises' safety culture construction. Thus, enterprises' management needs to improve the frontline staff's material and cultural life, etc. Managers' communication with frontline employees is deficient. Good communicative channels haven't been established.

The security system established by management hasn't been well perceived by employees, (because they think management hasn't taken the employee's personal security requirements into consideration. Instead the management just develops safety system from their perspective.)

Although the score in each dimension is high, the standard deviation of multiple dimensions is large, which implies that employees' awareness of these dimensions (have relatively great differences from each other, then these differences often turn into a safe hidden trouble.

MEASURES TO IMPROVE SAFETY CULTURE OF REAL ESTATE ENTERPRISES

The above analysis indicate that the current safety culture is at the middle and upper level as a whole, the staff's safety evaluation is between the stages of "uncertainly" and "almost meet". Based on the problems reflected in the questionnaire, according to their respective situation, this paper will determine the corresponding solutions and illustrate from the following four key elements of safety culture construction:

The institutional culture construction suggests that safety production management involves people, material, machine, method and environment. It involves the entire process, all aspects and all elements; including operation, management and leadership. So enterprises should guarantee the improvement of the supervision mechanism's construction, form a vertical transverse to the edge of the security network system.

Safety material culture construction demands the efforts to assure that frontline staff will have the access to the "five risks insurances". Ensure the quality of the rest they can get and avoid safety accidents caused by fatigue execution. And construction site must be equipped with safety protection products, so as to make sure that the frontline staffs are able to obtain more safety in production.

Safety behavior construction advices strengthen the security training of management layer. As the responsible subject for the leadership of executing construction, Management layer's safety awareness should achieve a relatively higher level. Only in this way can they quit the unsafe behavior of the employees and correct the unsafe behavior of production in time. Employees' safety training should be conducted regularly to improve and strengthen employees' safety knowledge and skills. The unsafe behaviors of employees should be normalized and corrected

Safety spirit cultural construction needs to enrich the spiritual and cultural life of employees, especially the safety cultural life. According to every year's security activity plans, the related exhibition, prize quiz, security model comparison should be carried out. It can make the staff gradually set up the consciousness of safety first and put safety into a very important position in their spirit. We can use the typical cases and true stories to activate interactions and lead employees to discuss all aspects of safety production and make them realize the importance of safety to themselves and take safety as faith.

CONCLUSION

Research shows that real estate enterprises currently dominate the safety culture in the management level and safety culture is at lower levels; real estate enterprises need to strengthen the construction of safety culture by aksing all stuffs participation unceasingly. In the meanwhile, the security of enterprise behavior and safety culture construction level should be focused on during the process of safety culture construction, construction level from behavior and consciousness strengthen employee safety concept, eventually reach the level of enterprise safety culture improving gradually.

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