

Principal Research Results

Development and Practical Applications of the Safety Ensuring System – Proposal of a Monitoring Method for the Safety Level of an Organization –

Background

Recently, various accidents and troubles have been continuously occurring following the JCO critically accident due to problems originating at the organization itself in this country. It was insisted that revealed root causes are classified into organizational factors such as management issues, and confirmation system, etc. How to escape from the occurrence of organizational accidents should be periodically reviewed by checking the safety aspect of daily activities and monitoring the healthy level of existing barriers, from the aspects of organization, workplace, and individuals. Discovered deficits should be removed corresponding to the workplace situations. Under such circumstances, CRIEPI was requested to propose an effective measure to create the organizational culture and climate that protects and avoids the occurrence of organizational accidents

Objectives

To develop the “Safety ensuring system” consisting of the “Safety assessment system” to evaluate the healthy level of safety issues including organizational factors, and “Safety proposal system” to imply the comprehensive strategic enhancement plan and to offer suitable practical measures to overcome the pointed deficits (see Fig.1). And to validate and verify this system by applying actual industrial factories and plants.

Principal Results

1. Development of the safety assessment system

The developed safety assessment system, which make it possible to assess the safety level of organizations, workplaces and individuals, has been applied to various industries including chemical, foods, fabrics, vehicle parts production and steel. As a result, applied factories and plants were 286 bodies, and collected samples were over 20,000 cases (see Table1 and Fig.3). Organizations assessed with a high safety level have significantly lower frequencies both of labor accident rate and facility failure rate. The reliability coefficient of questionnaire survey in actual uses indicates 0.98, which shows enough applicability.

2. Development of the safety proposal system

The above safety assessment results points out several weak points, and this system shows areas that require improvement out of 18 groups of crucial safety factors. The proposed system contains rich examples of actual safety administrations and activities collected through visiting and researching of superior factories. This system offers wide varieties of practical countermeasures against identified problems.

3. Applying the safety ensuring system and extending to practical usage

The standard flow procedure of how to apply this system composed of the safety assessment and proposal system was prepared based on many actual applications of those systems (see Fig.2). Among them, several factories and plants have shown reasonable advances in ensuring safety level (see Fig.3). These facts imply that it is possible practically to quantitatively evaluate the organizational safety level, which until now could not be measured, to use as an effective and rational self assessment tool in ensuring safety.

Future Developments

The requests from user to apply this system will increase hereafter, then the automatic program to deal collected data without much time and efforts will be developed. Continuously as much application data shall be collected from further different industries than present categories.

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Reference:

K. Takano, et al., 2005, “Development of the safety ensuring system”, CRIEPI Report Y04005 (in Japanese)

1. Socio-economy - Clarification of socioeconomic trends

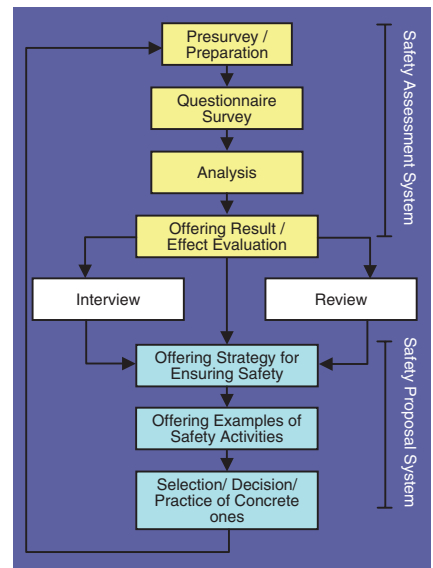
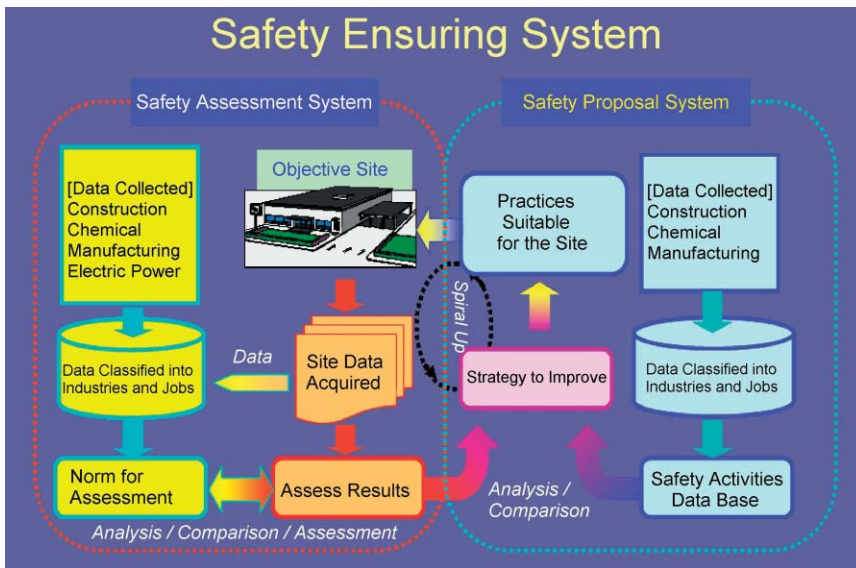


Fig.1 Configuration and application of safety ensuring system (safety assessment + safety proposal)

Fig.2 Procedural application flow of this ensuring system

Showing the safety level as a self assessment among various industries quantitatively and pointing out the weak aspects of the organization in 18 kinds of important safety issues

Based on quantitative results, all employees discuss how to overcome weak points from the aspects of organization, management and consciousness.

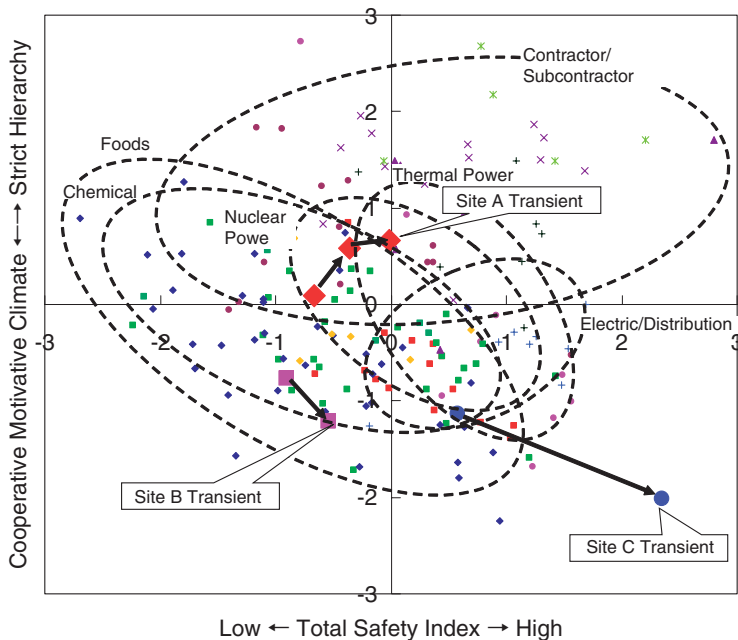


Fig.3 Application results of this system and its effect seen in several factories (Yearly transient of representative 3 sites)

Right hand side in the figure shows higher safety level, then moving toward right hand side means improving the safety level of the organization. Assessing the level between 1-2 years periodically, staff can get the self assessment results indicating the trend.

Table.1 Applicational achievement of this system

Industry	Number of Sites	Number of Samples	
Electric Power Industry	• Nuclear Power	13	1538
	• Thermal Power	14	487
	• Branch (Transmission / Distribution / Engineering / Operation)	16	4338
	• Construction	2	62
	• Contractor	61	992
• Sub-contractor	55	1120	
• Food	42	5099	
• Chemical	29	7762	
• Fabrics	5	243	
• Automobiles	14	857	
• Steel	12	982	
• Metal Manufacturing	5	264	
• Mechanical	8	339	
• Electronics	10	455	
	286	24538	