

Study on Safe Activity Activation Based on the Attitude Survey About the Safe Activity of the Employee

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ABSTRACT

The manager must review whether there is not activity developing whether an employee can feel a merit to oneself for current security activity without an employee understanding. Therefore the manager clarifies what kind of thought an employee has for safe activity carrying out now, and it is necessary for dissatisfaction and understanding to grasp whether there is an insufficient point concretely where. And a manager shows the guidance so that activity keeps canceling them smoothly, and it is important that an employee carries it out.

Therefore, in this study, I perform the safe attitude survey to an employee and clarify a thought, consciousness for the safe activity of the employee. And I plan activation of the safe activity based on it. For example, I suggest the action guidance that aimed to improvement of the quality of the example that felt a chill and at understanding to safe activity and the improvement of the will. I grasp it about the consciousness in the depths of the employee who is not cooperative with the basic problem and activity that are not seen only in one investigation versatily by carrying out plural attitude surveys, and putting the result together and allow you to show the action guidance that met the present conditions more on this occasion. (see Figure 1)

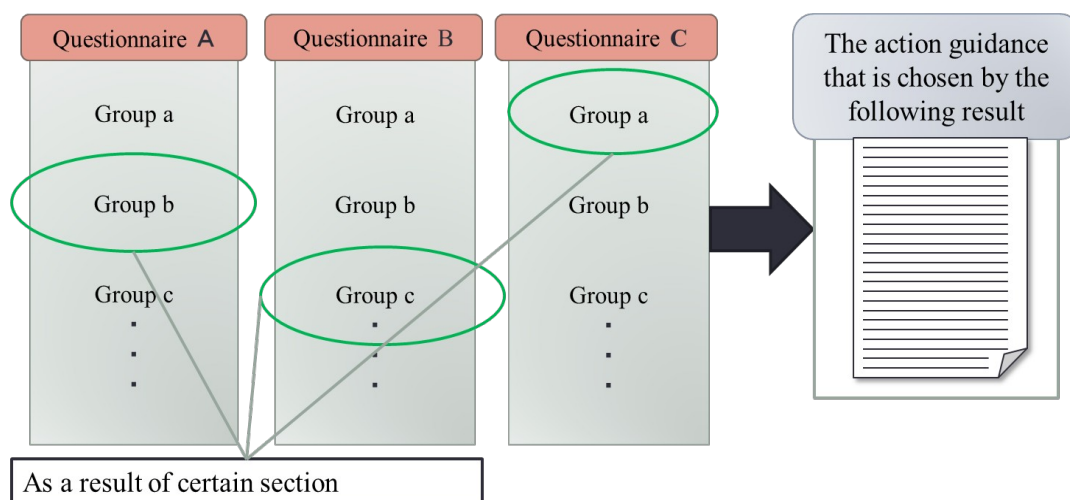


Figure 1 Image of the action guidance choice process

INTRODUCTION

When an accident occurs in a chemical plant or a factory, the influence may give you in the production of products and the trust of the organization. Therefore, in the company, they work on various safety activity such as the study of a past workmen's accident, accident, collect the example that felt a chill, pointing and calling activity, danger foresight training, other various security are active to prevent an accident. However, the safe manager of the company has the problem that an accident does not decrease to at all even if they carry out those activities. Therefore, in this article, I focus on "sense of values about the safe activity" and consciousness about the safe activity of the employee such as "the basic understanding about the safe activity" and study it.

If it is understood, and an on-site employee does not understand activity even if I plan effective activity to a cuttlefish, and a manager draws it up, the company cannot expect an essential effect. In other words a safe manager reviews current safe activity; of the activity it is important that "transparence measures making it it". A merit of the activity comes to be felt, and an employee is that understanding deepens, and the distrust of the employee of safe activity fades, and cooperation comes to be in this way got adversely. Various kinds of measures come to function well only after it becomes in this way.

However, the measures that the manager went for may not be going to show the effect that a company expects when a manager does not grasp the present conditions of the human error management of own organization precisely. In other words, a manager investigates a state of understanding, the consciousness of the employee about the safe activity in the organization and improves distrust, a dissatisfaction element concerned with underlying security activity of the consciousness carefully, and it is thought that it is one of the keys necessary for it to perform security activity smoothly to raise understanding, the will of the employee for the security activity.

ENFORCEMENT OF THE SAFE ATTITUDE SURVEY

Summary of the investigation

I collected the following questionnaire survey and reports to grasp consciousness about the safe activity of the employee in this study. (see Figure 2)

Summary of the target company		
Seibu Oil Co., Ltd. Yamaguchi refinery		
industry type : Oil refining business		
employee number : 422 people		
Summary of the investigation		
name	post	number of cases
① Questionnaire about pointing and calling (2013 beginning enforcement)	8section	300
② Report of having felt a chill (collected every month from 2010)	17section	About 6500
③ Investigation about the security awareness (2011 and 2013 beginning enforcement)	22section	422

Figure 2 Summary of an investigation company and the investigation that I carried out

I carry out the entry of a questionnaire and the report to all employees of the post which it came to apply to not an option. Using the result of these questionnaires, I analyze problems in the safe activity and consciousness of the employee from different angles.

Questionnaire about pointing and calling

A questionnaire about pointing and calling (see Table 1) is the questionnaire that I carried out to grasp the enforcement situation, the consciousness of pointing and calling of the employee in the post pro-production. In addition, I made this questionnaire in cooperation with the safe manager of the company.

About 14 following question items, I had them reply it in a choice form.

Table 1 Question items of a questionnaire about pointing and calling

Question item of the questionnaire
Q1 Do you understand the significance about pointing and calling? — (understand , generally understand , do not understand)
Q2 How do you think about the need of pointing and calling? — (necessary , not necessary , not necessary at all)
Q3 Do you have resistance to do pointing and calling?—(no , yes)
Q4 How do you go pointing and calling? —(perfect, only pointing , only calling , perform when there is a person , not doing , etcetera)
Q5 DO you change to do pointing and calling by operation and work?—(decide , almost decide , not decide , do not know where I should perform)
Q6 What is the enforcement rate of pointing and calling? — (100% , 80%~100% , 50%~80% , 0%~50%)
Q7 When you were in charge of a panel in the production spot, at the time of key operation, do you carry out pointing and calling and a repeat in at the time of radio correspondence at the time of alarm outbreak? — (doing , not doing , have not been in charge of panel)
Q8 Do you continue to call the "stand lock OK" in the bicycle parking lot? — (doing , not doing)
Q9 May you perform pointing and calling at the place except the refinery? — (may perform , not at all)
Q10 Have you thought that you did not feel a chill at that time if you performed pointing and calling? — (yes , no)
Q11 Raise a mistake even if I do pointing and calling if there is belief, is there the thing which is effective as these preventive measures?
Q12 When you forget to do pointing and calling by chance and did not carry it out, do you accept him obediently if warned from another person? — (accept , mock , do words and an excuse)
Q13 Do you instruct pointing and calling for a younger student? — (instruct , do not instruct , do not have a younger student)
Q14 Watch a senior, and how do you think? — (carry it out well , want senior to carry out a little more)

In addition, about department name and age, there is a point to reply.

Report of the phenomenon that felt a chill

I grasp the tendency every post and safe activity, the consciousness of the employee to work in this study. Therefore, among the items of the report, I aimed at "a way of the work" and "the problems that resulted in the phenomenon that felt a chill" for the analysis.

Safe attitude survey of questionnaire and the past study on safe activity

The questionnaire about the safe activity investigates (see Table 2) the consciousness of the employee for various kinds of safe activity carried out in a company now. Therefore, about 9 following five items questions, I had replied it with a description type.

Table 2 Questionnaire about the safe activity

Question item of the questionnaire
Q1 About activity about security such as HH, OKY, KYT
①The activity that should be improved
②The activity that you should stop
③Activity to want to carry out newly
Q2 About work
①Feeling that it is "dangerous"
②It is troublesome or feeling that it is useless in business formalities of the work
Q3 Unpleasant work
Q4 Feel work worth , Think that it was good to work in us
Q5 About violation of rule
①Please hold three rules that it is said that you should certainly observe it in your section
②When you break the rule, do you think that you should inflict some kind of penalty in a section?

In addition, the column which describes the post in the generation exists.

Furthermore, in addition to the investigation mentioned above, I extracted an item about consciousness from a security attitude survey performed in the past to the security activity of the employee and analyzed it. It features the safe attitude survey of this the past study to be the whole investigation for all employees belonging to the organization. I have an employee answer the questionnaire of the attitude survey consisting of 55 questions. And it is the system which evaluates the actual situation of the safe activity of the organization by adding up the result. I used other attitude surveys and the findings about 21 relative items considered to be strong for analysis in this study among 55 question items. (see Table 3)

Table 3 Question item of the safe attitude survey of the past study

I think that oneself does not do human error
I think that it is generated because the human error has low skill
When I raised human error, I want to cover it if I can do it
I think the cause of the human error to be the fault of the person who failed
I think that it is the responsibility of the person darkly carelessly
When I did human error, I think that it was unlucky
Because it is trouble that write the report of human error and the trouble, I want to write only a minimum
I think that it is not necessary to write it until the report of the mistake that does not get into trouble
It is a waste of time and does not want to do the investigation about the human error if I can do it
I do not understand the purpose of the analysis of the human error
I do not do the diagnostication of the human error
If preventing it performs a recurrence, it is enough
Prevention of going human error activity is enough now
It is not necessary to manage human error as an organization
There is not the atmosphere that is easy to report that I failed
The cause pursuit of failure and the trouble may become "the pursuit of the responsibility" to the person
When check it, and confirm it, only attach one-character-inversion mark; is checked
A list of check confirmation does not become the appropriate quantity, and is periodical; do not manage it
There is the difference of the skill by the person who I check it, and confirms it
Remain in the investigation into direct factor; and to an indirect factor, a potential factor cannot investigate it
I cannot collect the examples that felt a chill
A trouble example and the example that felt a chill cannot penetrate well

The questionnaire respondent evaluates it for a question item by acquiring six phases of scores. The meanings of the rating are as follows. (see Figure 3)

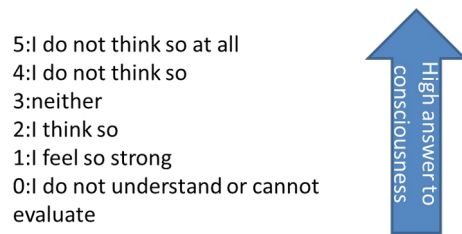


Figure 3 Meaning of the rating of the questionnaire answer

I considered the person who evaluated rating 0~3 to be the class of people of low consciousness and let I did a heaviness charge account depending on the lowness of the mark and add it. I assumed it an index indicating the heaviness of the person of low consciousness among organizations. A calculation method of the person of low consciousness score is

$$("I do not understand or cannot evaluate" + "I feel so strong") \times 1 + "I think so" \times 0.6 + "neither" \times 0.2$$

It becomes ideal so that 0 is near.

AN ATTITUDE SURVEY RESULT AND TENDENCY ANALYSIS EVERY POST

Analysis of the questionnaire about pointing and calling

About answer to 14 provided questions data, I added up a post unit and all employees. The following is example. (see Figure 4)

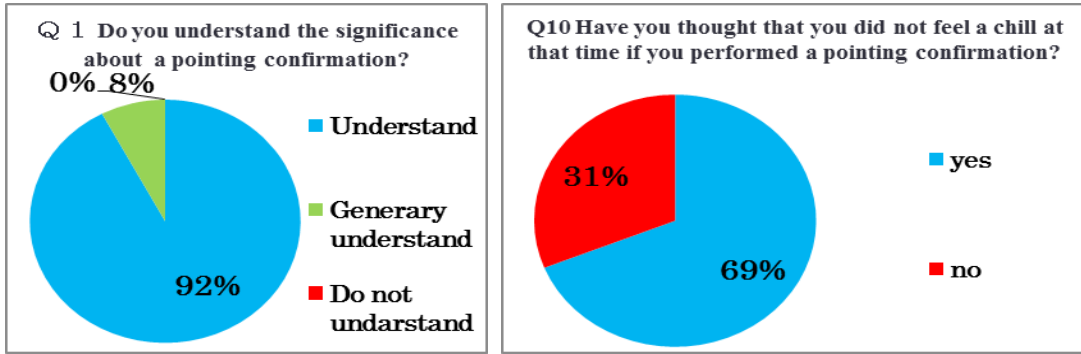


Figure 4 A part of all employee count results of the questionnaire about pointing and calling

Because the questionnaire is subjectivity of the respondents, I do not completely express the real pointing and calling enforcement rate at the post. However, I was able to grasp the difference every post about an enforcement situation and understanding degree of pointing and calling. However, by the enumeration of a large quantity of circle graphs, it is hard to grasp the tendency of the post instantly. The explanation of the analyst is necessary from this result what kind of characteristic one an own post is. Therefore I settled the answer result about nine items except the item where an answer was inclined to either choice in two elements using three kinds of quantification. And it was easy to image it even if I plotted the result, and anyone looked at the tendency every post. It is the result that summarized nine questions in two factors as follows.(see Figure 5)

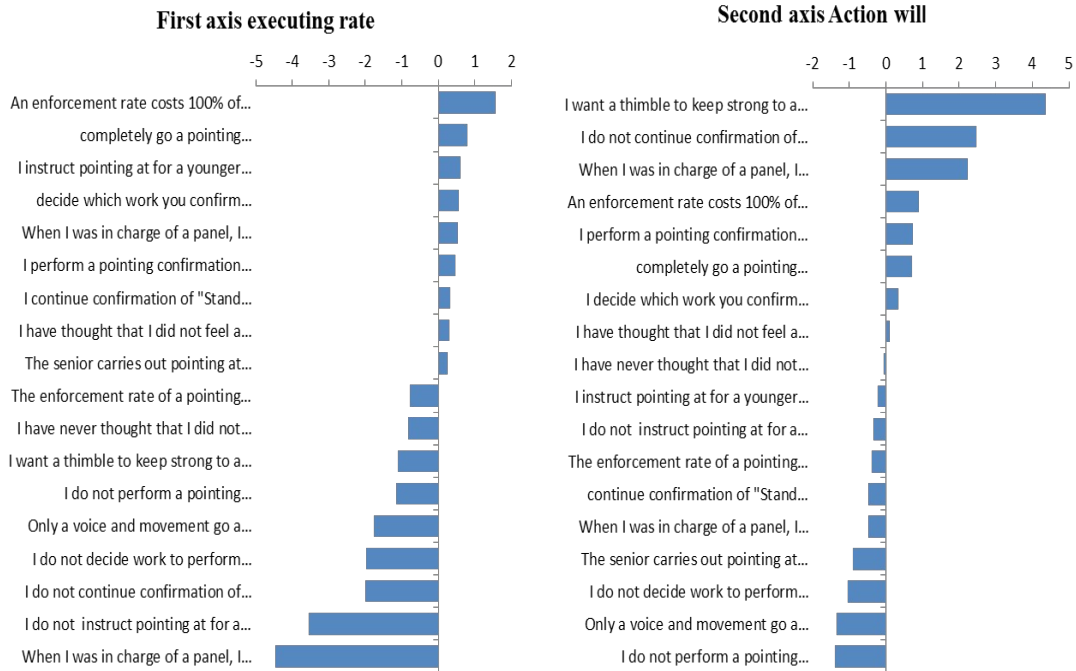


Figure 5 The first and the second axial category amount that was extracted by three kinds of quantification.

As for the contribution ratio, first axis 23.72%, the second axis became 12.98%. I do not consider it from the figure

from 2 axes mentioned above and understand a tendency by referring at first to image the tendency every post. I assume that I use the circle graph of the answer to each question rate about the consideration of accurate result and problems in the details.

The item which was remarkable in the first axis is “An enforcement rate costs 100% of pointing and calling “,” When I was in charge of a panel, I do not carry out a pointing confirmation and a repeat”,” I do not instruct pointing at for a younger student”

The item which was remarkable in the second axis is “I want a thimble to keep strong to a senior a little more”,” I do not perform a pointing and calling at the place except the refinery”

Therefore I interpreted the first axis as "an enforcement rate of pointing and calling" and the second axis as “action will of pointing and calling in the post” here.

Furthermore, a plot (I reverse plus or minus to be easy to image a tendency about the action will from the figure) did an answer result in 2 axes of the "enforcement rate" "action will". It was easy to in this way grasp a tendency for pointing and calling activity every post more. (see Figure 6)

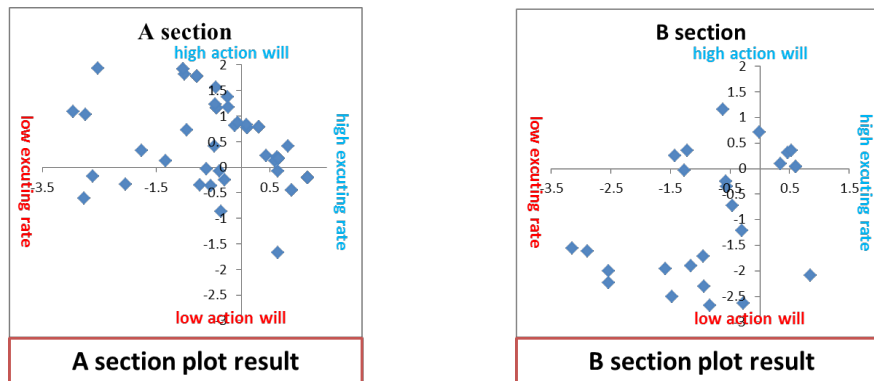


Figure 6 Plot result of the respondent in 2 axes

For example, the A section relatively looks in all departments and the enforcement rate of the pointing and calling , the action will of the post are high together and know that the B section is low together. Refer to the above mentioned circle graph based on this and combine it with the analysis of other attitude surveys. They can consider it by doing so it why the action will of pointing and calling of the B section is low.

Analysis of the report of the phenomenon that felt a chill

In two items that I added up, I added it up about an answer considered that the improvement in the post was necessary about the item of "the way of the work" so that a ratio was high.

The following is the example of the count result. (see Figure 7)

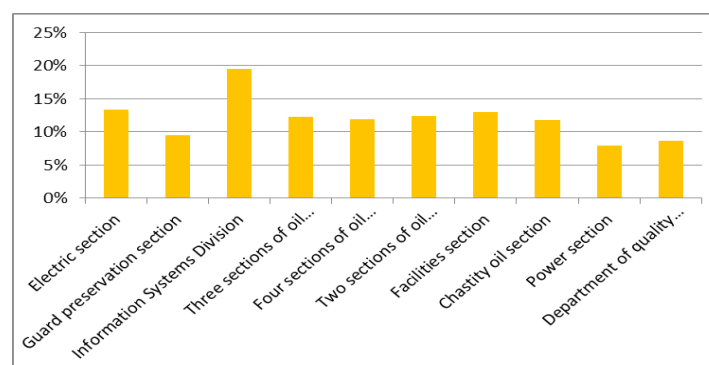


Figure 7 The answer ratio that, "yes," I answered for a question whether "had a place and an unclear place to lose in a way of the work" of each section

About the item of "the problems that resulted in the phenomenon that felt a chill", I added up an answer to six choices rate and clarified the tendency every post. (see Figure 8)

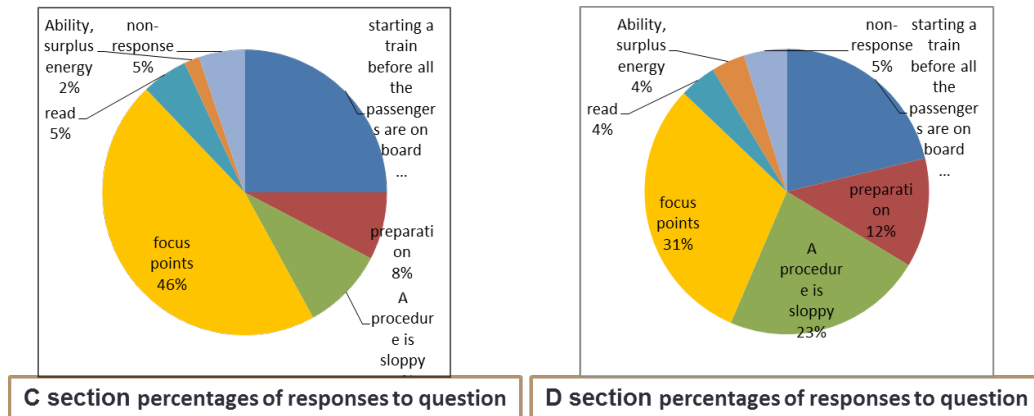


Figure 8 percentages of answer to " the problems that resulted in the phenomenon that felt a chill" at each post

Analysis of the questionnaire about the safe activity

The safe attitude survey did an answer rate with an index of the consciousness for the safe activity not answer contents about nine questions. I added up even distinction in addition to a post unit in the generation. I divided an answer result into three items of "reply it positively", "Word degree answer", "no response" on this occasion. It is the example of the count result of all employees as follows.(see Figure 9)

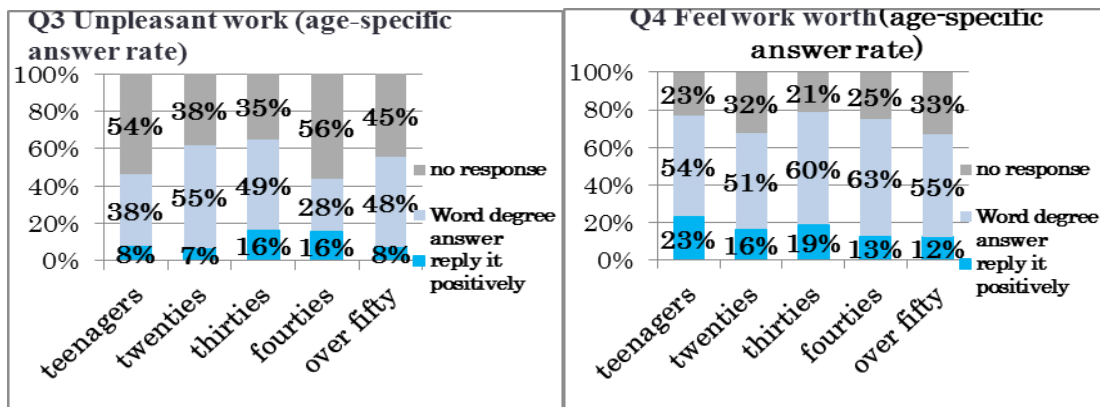


Figure 9 Example of all employee count results of the questionnaire about the safe activity

I made the graph mentioned above at 22 posts about all items. Every post was able to grasp the difference every generation about consciousness and a thought to safe activity.

However, by the enumeration of a large quantity of graphs, it is hard to grasp the tendency of the post instantly, and the explanation of the analyst is necessary from this result what kind of characteristic one an own post is. Therefore I summarized an answer to Q1~Q4 result about the question item in two factors using three kinds of quantification and was easy to image it even if I plotted a result, and anyone watched the tendency every post. It is the result that summarized eight questions in two factors as follows.(see Figure 10)

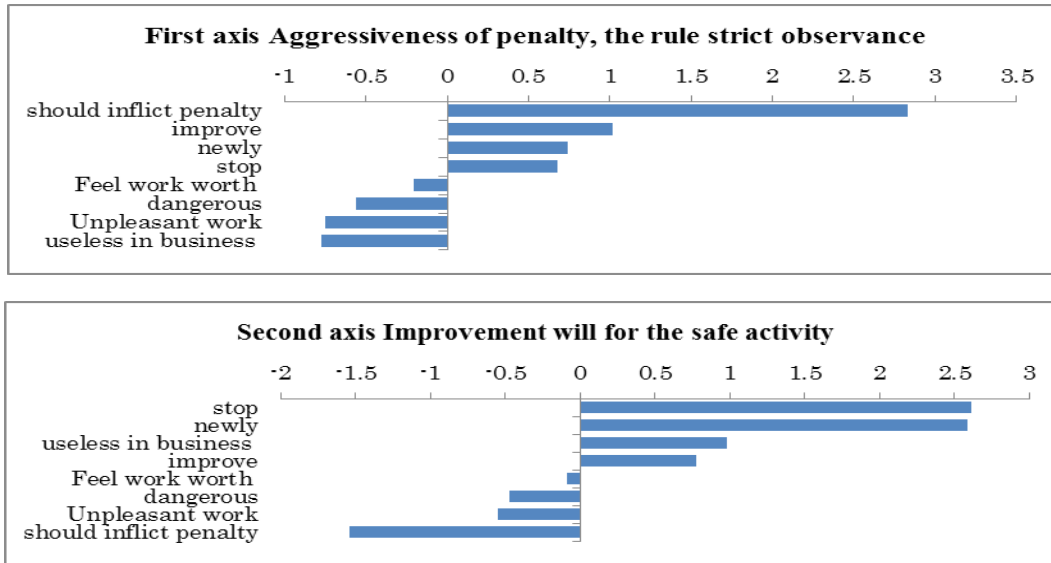


Figure 9 The first and the second axial category amount that was extracted by three kinds of quantification.

As for the contribution ratio, first axis 21.98%, the second axis became 18.53%. I do not consider it from the figure from 2 axes mentioned above and understand a tendency by referring at first to image the tendency every post. I assume that I use the circle graph of the answer to each question rate about the consideration of accurate result and problems in the details.

The item which was remarkable in the first axis is “should inflict penalty”

The item which was remarkable in the second axis is “stop”, “newly”

Therefore I interpreted the first axis as "It is affirmative for penalty, or is denial" and the second axis as “It is an improvement mark or hold for safe activity” here.

Furthermore, a plot did an answer result in 2 axes of the "It is affirmative for penalty, or is denial" " It is an improvement mark or hold for safe activity ". It was easy to in this way grasp a tendency for pointing and calling activity every post more. (see Figure 10)

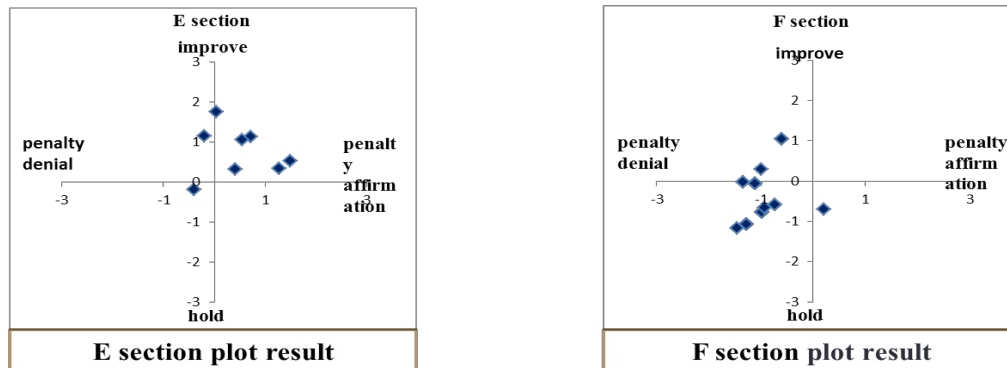


Figure 10 Plot result of the respondent in 2 axes

For example, the E section relatively looks in all departments and it is negative for penalty and hold about the safe activity. It is affirmative, and the F section understands that it tend to be improvement-like for safe activity for penal regulations.

Furthermore, about the past security attitude survey result, I made the data of each section.(see Figure 11)

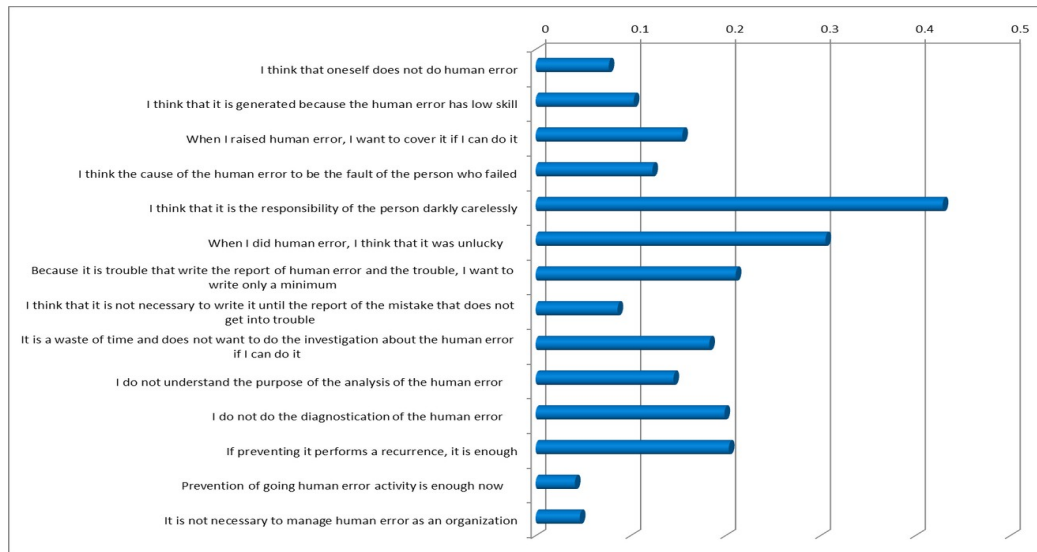


Figure 11 Example of the safe attitude survey result of the past study

When the graph mentioned above is exhibited at a stretch, the safe manager of the company is hard to image it where is problems. In addition, only with the tendency of the post by three kinds of quantification, they do not understand it until the psychology of the detailed problems and employee. However, I can grasp a tendency and the problems of a rough post by analyzing in combination two. I can know it until the psychology of a more detailed employee afterwards.

THE CHOICE OF AN ACTION GUIDANCE BASED ON FINDINGS

List of action guidances

Based on a result provided by each questionnaire, I show an action guidance to become the advice for safe activity activation every post.

This action guidance uses a list of action guidances of the past study. In the list of this action guidances, they catch production things with a life cycle until an end stage (daily life use) from an initial stage (basic design) . In each stage, they removed PSFs as the error-induced factor beforehand and, for the purpose of various guidelines on solution to the problem type that, as a result, could prevent outbreak of the human error and the suggestion of the manual, was made from the Institute of Electrical Engineers of Japan.

In this rear factor mainly...

- | |
|--|
| 1)Caused by a human being (Man) such as ability or the physical situation. |
| 2)Caused by facilities (Machine) such as placement of work environment and the apparatus. |
| 3)Caused by a medium, environment (Media) such as an instruction manual and procedure book |
| 4)Caused by management (Management) such as an organization and administrative provision |

There include so-called 4M as things mentioned above. Therefore, as basic thought of the guidelines making, they classify the problems in the company where the committee belongs to in 4M which mentioned above every stage of the life cycle.

And, for each problem, they arrange it from following three points. And they show measures as measures guidance of guidelines.(see Figure 12)

- 1)The role allotment of an organization and the system and the person concerned and clarification of the field.
- 2)Clarification of will, the decision policy of the interconnection system (instructions, transmission, confirmation) of the information and the person concerned.
- 3)The education of the solution to the problem type and systematization of the training system.

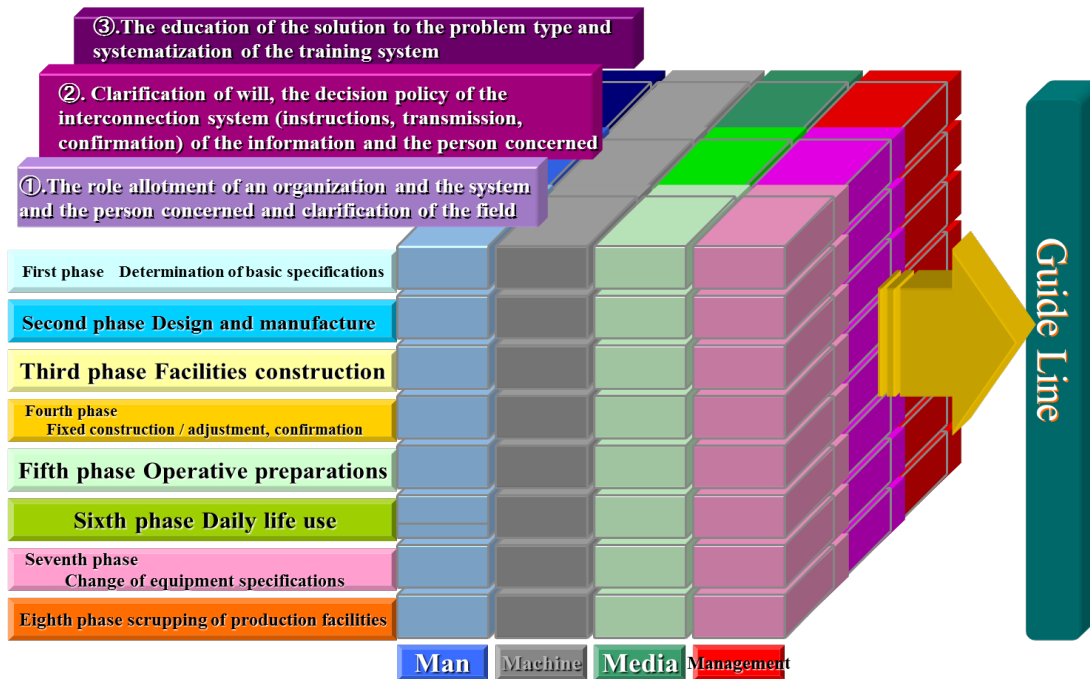


Figure 12 Life cycle model

The choice of the action guidance based on the questionnaire about pointing and calling

I perform the grouping between the similar posts of the questionnaire result to choose an action guidance. As a method, I used the first axis of each employee who was sometimes provided using three kinds of quantification, the median of the sample score of the second axis, the mean for a questionnaire result.

I made nine groups based on (The negative median subtracts it together), (the median subtracts it, and the mean adds it),(the median adds it, and the mean subtracts it) and thought that the exhibition of the different action guidance was necessary for each.(see Figure 13)

Grouping result of each post			Example of the action guidance for the group of "High enforcement rate low will "
	operational situation	Action will	
Electric section	Low	Low	When a management post and the enforcement post which are in a position to perform the changes of the drafting of preventive measures against before the fact of the trouble in the user and recurrences and the management method are different, as a result, (by lack of consciousness), in the case of a particularly end enforcement post, it is with a passiveness state, and the effectiveness of measures may not be accompanied. Therefore, when the management post of the user draws up measures and change plans to affect prevention of trouble, I let the person concerned of the enforcement post participate in it beforehand and do it and breed "person concerned consciousness" and perform "a briefing session and a discussion meeting" after the decision thoroughly again at an enforcement post, and it is desirable that common knowledge is thorough if "a difference is will be in the prevention of trouble consciousness" between both sides.
Four sections of oil manufacture	Low	High	
	Low	Low	
	High	Low	
	Low	Low	
	Low	Low	
	High	Low	
	Low	High	
Power section	High	High	

Figure 13 Example of the action guidance for the group of "the high enforcement rate low will"

The choice of the action guidance from the report of the phenomenon that felt a chill

I did not perform the grouping of the result and chose a direct action guidance from a tendency to answer to post. (see Figure 14)

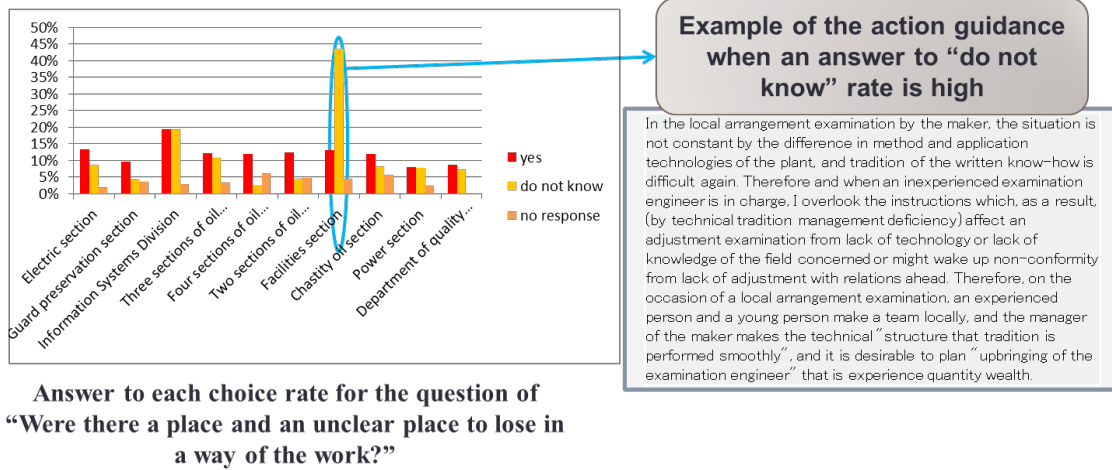


Figure 14 The choice of the action guidance from the report of the phenomenon that felt a chill

The choice of the action guidance based on a questionnaire about the safe activity

I made 16 groups about the questionnaire about the safe activity. Furthermore, from a grouping result and a past safe attitude survey result, I choose an action guidance.(see Figure 15)

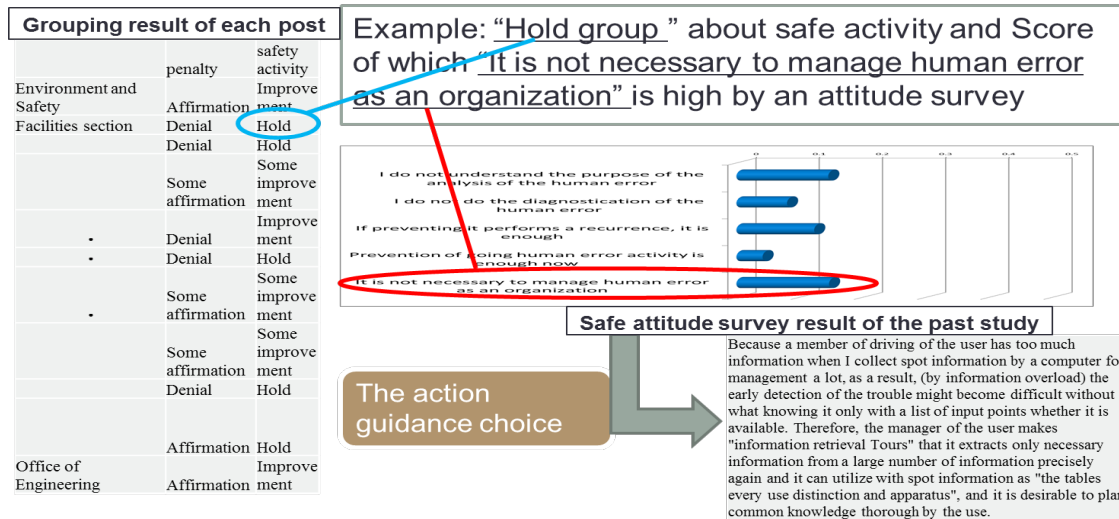


Figure 15 The choice of the action guidance based on the count result of the questionnaire about the safe activity and a past safe attitude survey

There is a reason not to perform an action guidance and enchainment only by a grouping result like the questionnaire about the indicating name. For example, it is thought about both when it is distinguished from a "hold" group about safe activity when the present safe activity does not have dissatisfaction when I think that I cannot afford to be active safely. Therefore it becomes easy to identify a problem more in pinpoint by matching it with the result of other attitude surveys. The grouping result of the questionnaire about the safe activity is a tendency of the posts simply and does not know "low consciousness and the problems that it was said only by grouping indicating name activity" in this way. Therefore, I perform the enchainment with the action guidance in conjunction with other

attitude surveys.

Activated evaluation of the security awareness

I applied to 11 posts of the oil factory for the investigation and showed the improvement policy plan that I suggested in the managerial class of each post. As a result, the characteristic between posts became clear, and an opinion to be useful for future guiding principles was provided from the person of the managerial class. About the again safe activity

- A young person faces each other for activity for human error from the front and handles a problem seriously
- No, an opinion to feel that the attitude toward action became considerably forward was obtained.

About the collection activity of the phenomenon that felt a chill

- The number of contributions increased in comparison with the same period in last year.
- About the kind of a factor given from a report, I increased than double in comparison with last year.

CONCLUSIONS

In this study, it allowed you to grasp a tendency and the problems every post about various security activity that assumed indicating name activity and the collection of phenomena activity that felt a chill Maine based on the attitude survey of the employee about activity such as a rule in the company, an indicating name, the collection of phenomena that felt a chill versatilely. From these results;

- At the post where a manual is clear, I point, and the enforcement rate of the rules such as rules is high, but the suggestion of the improvement plan is weak, and the analysis tendency for the phenomenon is weak.
- At the post which a manual is hard to prescribe, I point, and enforcement rate such as rules is relatively low. However, the tendency to analysis for the phenomenon is strong, and there are many ratios of staff performing various suggestion positively. The difference in the post of the participation will for the safe activity is big.

Such a tendency was provided. In addition, as a result of having shown consideration such as a tendency and the above of the post in the managerial class of each post about other posts, the characteristic between posts became clear, and an opinion that I was useful for future guiding principles was obtained.

Furthermore, based on a combination of these characterization result, I chose the factor group to reduce participation will of the employee and made an action guidance for those factors group based on the study of a past security attitude survey.

As a result, participation in safe activity will improved led by a young person, and a change such as the kinds of an extracted factor increasing was seen.

REFERENCES

- Azusa Yokomizo, Yoshihiko Mori and Yusaku Okada(2008), "An Analysis of Human Error Management Data on Organizations - Tendencies and Features of Organizational Human Error Management, 2nd International Conference on Applied Human Factors and Ergonomics"
- Shigeru Yoshiga (2001), "There is not the human being who does not make a mistake (study of the human error)"
- Toshiaki Miura, Etsuko Harada (2007), "Accident and the security Psychology"