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APPLICATION OF SAFETY MANAGEMENT
A STUDY ON CURRENT ATTITUDES OF HONG KONG CONTRACTORS

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IN the past, many accidents that occurred in construction sites were due to tight working schedules, long working hours, hot weather, limited working space, poor house-keeping, complicated sub-contracting system, profit-oriented attitude, insufficient enforcement of labor ordinance, lack of training and management attention, etc. All these factors revealed that there was an absence of safety culture within the construction industry, resulting in both the workers and the management not paying any attention to safety issues. Recently however, with much effort being taken by the Hong Kong government, this situation has somewhat improved because of the increased awareness of safety and safety management in the construction industry. This is evidenced by the fact that some major contractors and clients are adopting a managerial approach to construction site safety. This paper investigates the attitude of the contractors to safety management concepts and principles in the Hong Kong construction industry. The result of the application of safety management is encouraging.

Background

Owing to the frequent construction accidents, construction safety has become a serious concern. According to the statistics of accident rates on construction sites from 1990 to 1998, the accident rate per 1000 workers per year was well over 200.

In order to develop good management tools for improving the situation of construction safety, firstly we should investigate the reasons that cause such a high number of construction accidents. According to a study commissioned by the Hong Kong Occupational Safety and Health Council in 1990, it was found that labour not using safety measures, lack of training or education, and lack of top management involvement were the major causes for the high accident rates. The study concluded that any construction site could be safer with the full cooperation of all parties concerned. For the government, legislation needs to be continuously reviewed because it ensures effectiveness on the compliance of safety measures. For the employers, they should take more responsibility in providing a safe working environment and instruct their employees towards safety practices. Besides, the employees also have the responsibility of abiding by safety rules and using safety equipment provided for them.

After the roles have been established, each party should participate in the upholding of site safety. Efforts should be organized and managed with a common view of achieving high standards of safety results. John Anderson and H.K. Lee (1991) concluded that safety management should consist of the following elements: Policy, Organizational Structure, Planning, Measuring Performance, Auditing and Reviewing, as well as Training and Awareness.

In Hinze's (1979) research, it was concluded that safety performances were better for those projects

of companies that employed a full-time safety officer; those which exhibited stronger top-management support on safety; those which conducted safety meetings and those which monitored safety performances through their supervisors based on their company size, company-level safety policy, project level safety policy, project coordination and economic pressures.

Similar studies and researches by Samelson (1982), Levitt and Parker (1976), and Hinze and Gordon (1979) conclude that top management, policies, safety training and leadership can affect project safety to different extents.

The review of the above mentioned literature reveals that if safety is managed in the same way as cost and programming, safety performance will be improved. Based on this platform, this paper intends to investigate the situation of safety management in Hong Kong, in particular the correlation of safety management measures and safety performance in the local construction industry, and what and how safety management is handled at construction sites.

Background of Legal Provisions related to Safety in Hong Kong Construction Industry

Safety is regarded as everyone's responsibility including the government. The government will control health and safety for the construction industry by enacting and enforcing laws and regulations, whilst the employers, or more specifically the contractors engaged in construction works, besides the costing and humanitarian concerns, must comply with the legal requirements implemented by the government. As such, a good knowledge of the legal provisions in safety is essential before coming to the topic of Safety Management.

The Factories and Industrial Undertaking Ordinance (FIUO) under Chapter 59 of the Laws of Hong Kong is the main law governing the safety and health at work. Besides, there are other ordinances that are also relevant to construction safety, i.e. the Dangerous Goods Ordinance, the Electricity Ordinance, the Fire Services Ordinance, the Waste Disposal Ordinance and the Shipping and Port Control Ordinance.

The main theme of the Factories and Industrial Undertaking Ordinance is to empower the Commissioner of Labor to enact regulations and enforce the Ordinance. Under the FIUO, there are 26 sets of subsidiary regulations as of 1993. The following subsidiary regulations are relevant to construction works:

- Factories and Industrial Undertakings Regulations
- Factories and Industrial Undertakings (Confined Spaces) Regulations
- Factories and Industrial Undertakings (Blasting by Abrasive) Regulations
- Factories and Industrial Undertakings (Notification of Occupational Diseases) Regulations
- Factories and Industrial Undertakings (Woodworking Machinery) Regulations
- Factories and Industrial Undertakings (Safety) Regulations
- Factories and Industrial Undertakings (Cargo Handling) Regulations
- Factories and Industrial Undertakings (Abrasive Wheels) Regulations
- Factories and Industrial Undertakings (Work in Compressed Air) Regulations
- Factories and Industrial Undertakings (Spraying of Flammable Liquids) Regulations

- Factories and Industrial Undertakings (Cartridge-Operated Fixing Tools) Regulations
- Factories and Industrial Undertakings (Protection of Eyes) Regulations
- Factories and Industrial Undertakings (Electricity) Regulations
- Factories and Industrial Undertakings (Asbestos) Regulations
- Factories and Industrial Undertakings (Safety Officers and Safety Supervisor) Regulations
- Factories and Industrial Undertakings (Carcinogenic Substances) Regulations
- Factories and Industrial Undertakings (Dangerous Substances) Regulations
- Factories and Industrial Undertakings (Noise at Work) Regulations
- Factories and Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations

These regulations stipulate safety and health requirements in technical details. They require the proprietors of industrial undertakings to do or not to do certain acts in order to avoid accidents. Failure to comply with these requirements is an offense and will be subject to prosecution. Inspectors from the Labor Department will inspect work sites from time to time to see if there are any breaches of the regulations.

The FIU Ordinance together with its subsidiary regulations impose requirements on the proprietors and workers in the belief that if they comply with the regulations there will be a safe working environment. Currently, the Labor Department is the authority to enforce this Ordinance. They will send out their officers to inspect construction sites at regular intervals. Once the safety and health conditions of sites are unacceptable or any offense is being found, prosecution will be conducted. This type of control is considered as a reactive measure whereby action is taken only after unsafe act arises. Also, the complicated and rigid rules and regulations do not encourage contractors to take any initiative for the design of a safety system to suit their own conditions. Under this situation, most contractors or industrial undertakers may think that safety only means to comply with the rules and regulations imposed under the Ordinance.

To improve the above situation, additional clauses were added to the FIU Ordinance in 1989, i.e. Sections 6A and 6B of the FIU regarding the imposition of duties of reasonable care related to safety and health on proprietors and workers. The general duty provisions are designed to encourage proprietors and persons employed to take a wider view of their roles and responsibilities with respect to the safety and health at work. This in fact would encourage contractors to use a self-regulation approach in handing safety rather than strictly complying with the detailed statutory requirements. To comply with these legal provisions effectively, the proprietors need to apply managerial techniques such as planning for safety, assessing hazards, enhancing safety organization, providing control measures and training, and motivating their employees to observe safety. With the increase in the complexity and scale of construction works, the need for safety management to enable the contractors to comply with the general duty provisions is inevitable.

Objective

In Hong Kong, the concept of safety management is relatively new. With the view of the poor safety record in the construction industry, participants of this industry including contractors, consultants and employers become more and more concerned about safety. Some major clients and large contractors have already geared themselves up and implemented their own programmes to manage

site safety. It is therefore worthwhile to study the attitude of Hong Kong contractors towards safety management and how safety is managed in their company so as to improve safety performance.

Methodology

A survey in the form of a questionnaire was conducted to study and collect 10 selected contractors' views about safety management, and their policies and plans to implement safety management.

Contractors of various sizes and background were surveyed. The contractors were selected based on such classifications as their company size, country of origin and project's background.

The questionnaire is designed with the purpose of obtaining information from the selected contractors regarding safety management. In particular the following aspects were probed:

a) Planning

- ✍ Participation of top management in safety programme
- ✍ Safety Policy
- ✍ Safety Programme

b) Organizing

- ✍ Set-up of site safety organization
- ✍ Set-up of site safety committee
- ✍ Authority of safety personnel

c) Control

- ✍ Implementation of safety plans and its control
- ✍ Cost-effectiveness of safety programme

d) Training

- ✍ Training given to staff of various levels

e) Motivation

- ✍ Incentive schemes adopted to motivate staff, contractors and sub-contractors to observe safety

f) Cost and Benefit

- ✍ Expenditure on safety as a percentage of project sums
- ✍ Accident Rate

g) Development

- ✍ Future plans for improving safety

A sample questionnaire is attached in Appendix 1.

Analysis of Results

Background of the Contractors

The contractor's background, such as size, country of origin and types of projects they undertook, will have influences on their attitudes towards safety management. As such, the questionnaire firstly asked for their background. Using Works Branch's categorization system, 7 out of 10 is Category C Contractors (those who can bid for projects regardless of cost), 1 out of 10 is List 2 Contractors (Overseas Contractors) and 2 out of 10 is Category B Contractors (those who can bid for projects up to HK$50 million). No response is from Category A Contractors (can bid up to HK$20 million projects).

This result is in line with the fact that majority of the large contractors in this territory have been engaged in large government infrastructure projects of which the requirements for safety are more stringent. It is not surprising to learn that no response is from Category A contractors as they are not as active as the other two categories and they always play the role of sub-contractors. Moreover, the small scale of the works they undertake do not encourage them to implement a structured safety management system.

Written Safety Policy

Managing a safety operation starts with a written safety policy. The contractors were asked whether they had written safety policies. Nearly all respondents (8 out of 10 respondents) stated that they had written safety policies.

Safety Target

The contractors were asked whether they had set up safety targets and if so, to state their targets. Their targets range from 65/1000 to 210/1000 yr/yr with 120/1000 yr/yr as the mean figure. The targets quoted by the respondents are all well below the industry's average, i.e. 300/1000 yr/yr but a bit higher than the government target of 60/1000.

Top Management Involvement

Top management participation is highly important in operating the safety programmes. Companies in which top management has a strong concern for safety and communicate their concerns to employees by word and deed have better safety records than companies for which this is not true. The contractors were asked how their top management were involved in the safety affairs. The following responses were received:

a) 100% indicated that their top management was involved in the formulation of incentive scheme for safety.

b) 80% indicated that their top management would give speech to staff about safety.

c) 80% indicated that their top management would study and comment on safety statistics.

d) 80% indicated that their top management would inspect site safety.

e) 70% indicated that their top management would chair/attend company's safety committee.

The more the items taken up by the top management, the greater the top management's involvement is assumed. However, most of the top management would tend to pay medium efforts in safety.

As regard to the correlation between top management involvement in safety and safety performances, the figures support the statement that contractors with greater top management

involvement in safety will have better safety records. From the survey, those contractors whose top management takes up all five items have an average accident rate of 144/1000 yr/yr. For those taking two items have an average rate of 230/1000 yr/yr.

Safety must be a Criteria for Selecting Sub-contractor

The majority of contractors in Hong Kong engage sub-contractors to carry out works; therefore selecting sub-contractors is an important process in their business. If the safety performances of the sub-contractors are considered during the selection process, there would be a definite effect on the sub-contractors when they are planning and executing their work.

In this survey, the contractors were asked whether safety performance was one of the criteria for the selection of sub-contractors. All responses were positive. This is an encouraging result that implies that safety is regarded as an influential parameter in the selection process of sub-contractors. However, the result does not indicate how important this parameter is when compared with other factors.

Formal Setup of Safety Organization

- **Safety Department**

  In this survey, 7 out of 10 of respondents stated that they had formal safety departments within their companies. All those who have set up safety departments are Category C or List 2 company. It is sensible to note that only companies having large jobs are justified to set up safety department.

- **Safety Committee**

  In Hong Kong, most of the major contractors are required to set up safety committees to plan, discuss and monitor safety as part of the contractual obligation under the conditions of the contract. In response to a question on the setting up of safety committee within their business establishments, 7 out of 10 responses were positive. It is not surprising to have 70% of the respondents reporting that they have their own safety committees as most of the respondents are involved in government projects and they form safety committees under contract requirements.

  However the returned figures for this question do not suggest that there will be an improvement in safety performance with the use of safety committees. Those contractors who have set up safety committees have an average accident rate of 132/1000 yr/yr, whilst, for those who have not done so, their average accident rate is 173/1000 yr/yr.

- **Safety Officers and Safety Inspection**

  There are two questions about safety officers, one is concerned with whether the safety officers of the contractors are delegated the authority to suspend works in case an unsafe act occurs on site. 40% of the respondents stated that they had done so. Another 20% delegated such authority only to some of their senior safety officers. The remaining 40% did not delegate such authority to their safety officers. Delegation of such authority to safety officers implies that these safety officers, to a certain degree are assured the responsibility of line-managers, i.e. the project manager, site agent, foremen etc. and the safety professionals are to monitor safety, advise and support the line managers to fulfill the responsibility of safety. However, survey data do not suggest that safety performance will be better when the contractors have delegated such authority to safety officers, i.e. for those who have such delegation, the average accident rate is 149/1000 yr/yr, but for those not, the average accident rate is 138/1000 yr/yr, perhaps the sample size is small and cannot reflect the actual situation.

Besides the responsibility of safety officers on site, the number of safety officers is also a concern. The survey questioned the contractors about the criteria for the employment of safety officers on site. The response is that 100% of the respondents will comply with the ordinance in this aspect. The result is considered to be understandable.

Systematic inspection is the basic tool for maintaining safe conditions and checking unsafe practices. For this purpose, a checklist is essential during the inspection. The questionnaire here further asked whether a checklist is provided for the safety officers when they conducted safety inspections. About 70% of the respondents stated that they do provide such checklist to the safety officers. The remaining do not do so.

Expenditure on Safety

Expense on safety, e.g. salary for safety professionals, investment on safety equipment, etc. directly influences safety performance. The amount of expense or investment should preferably be determined based on a cost-benefit analysis. However, the result of the survey indicates that 70% of the respondents do not carry out a cost-benefit analysis for safety measures.

With regard to the amount of money spent (in term of the percentage of the sums of works they undertook) for safety measures, the following figures are returned:

- Below 0.25% 60%
- 0.25% - 0.5% 10%
- 0.5% - 1.0% 20%
- 1.0% - 2.0% 10%

These figures indicate that the majority of the contractors will invest below 0.25% of the values of work on safety. Basically the greater the expenses on safety the lower the accident rates.

Accident Rate

The accident rates of these companies range from 100/1000 to 230/1000 yr/yr. The average of the surveyed figures is 144/1000 yr/yr. Overall, they are well below the overall construction site accidents as recorded to be 248/1000 yr/yr in the year 1998.

Training

Training is an important tool in safety management. 70% of the respondents stated that they conducted safety-training courses for their staff with frequencies ranging from once a year to 4 times a year. Regarding tool box training, 70% of the respondents stated that they imparted tool box training on site weekly, monthly or quarterly.

However, it is noted that the provision of safety training may not affect the safety performances. For this survey, the average accident rates for the two groups of company (one group provides in-house training while the other one does not) are 138/1000 and 160/1000 yr/yr respectively. The result is positive.

Motivation for Safety

Both incentive schemes and punishment are the tools to motivate sub-contractors/workers to follow safety procedures. 50% of the respondents state that they have implemented incentive schemes to encourage and promote safety. Of these respondents, 20% consider incentive

scheme very effective, 60% quite effective and 20% not effective. For those who do not have incentive scheme, 0% considers it very effective, 60% quite effective and 40% not effective. Figure 1 shows the comments on incentive scheme. It is noted that incentive schemes are considered only "quite effective" by majority of the contractors. Accident figures also support this statement as for those contractors having incentive scheme they have an average accident rate of 123 yr/yr, whereas for those contractors having no incentive scheme they have an average accident rate of 166 yr/yr.

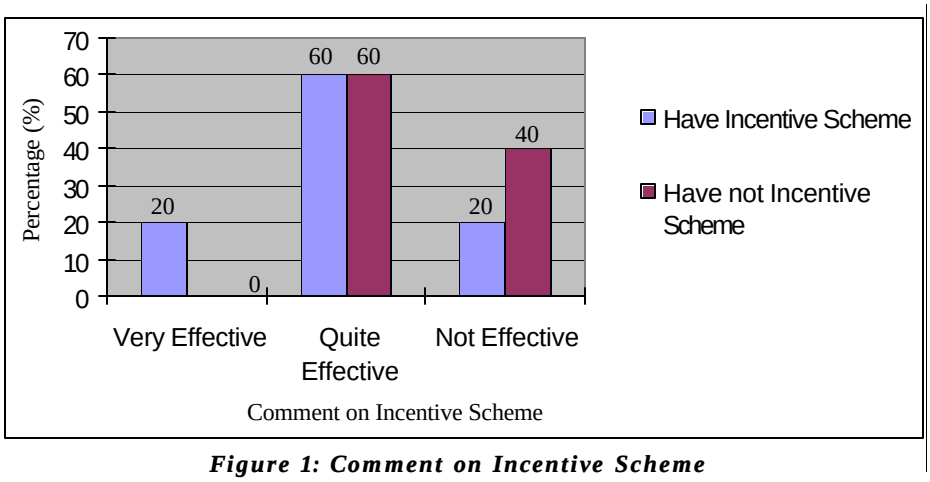

Figure 1: Comment on Incentive Scheme

Punishment, on the other hand, is a negative motivator. 70% of the respondents stated that they will punish those sub-contractors who fail to observe safety on site. The use of punishment has a positive effect on safety performance, though not remarkable. The survey data suggests that contractors who do or not do so will have a similar average accident rate of 143 yr/yr.

Factors Contributing to the Achievement of Safety

Contractors were asked to compare the importance of a list of 9 factors that contributed to achieve safety, with "1" being the most important and "9" being the least important. In this return, 10 respondents provided their comparisons. The scores of the factors are illustrated in Table 1.

Table 1: Factors Contributing the Achievement of Safety

	Factor	***Total Scores***
(1)	A well prepared safety plan	47
(2)	Training	74
(3)	High Level Involvement	48
(4)	Better planning and design of works	36
(5)	Safety inspection	60
(6)	Enforcement of Ordinance by Labor Department	43
(7)	Safety committees and meetings	36
(8)	Incentive schemes	65
(9)	Punishment	31

The less the score, the greater the importance. The responses from the contractors indicated that they consider punishment, better planning and design of works, and Safety committees and meetings as the most important factors. Incentive schemes and training are considered as the least important factors. It appears that the contractors are of the opinion that planning for safety is more important than control whilst motivation is the least important.

Conclusion

The results of this survey provide a collective view of how the contractors who have answered to our questionnaires manage safety. The responses from medium and small contractors share very little proportion.

The survey shows that the large contractors in Hong Kong are gradually, in various degrees, adopting managerial approaches in handling safety. They manage safety like any other company function. Their management direct the safety effect by settling achievable goals and by planning, organizing, and controlling to achieve them. The outcome of managerial approach is successful.

With the accident statistic data supplied by the respondents, it is possible to investigate the effectiveness of various management functions in the upholding of safety performances. The results of this investigation correlation were compared with the established safety management practices and theories contained in various esteemed publications and other researches from overseas institutions and industries. The outcomes of this survey are not 100 percent agreeable with other research results and theories. The authors do not see safety committee, safety training and incentive scheme very much helpful in upholding safety. These discrepancies may be due to:

a) These management techniques are very new in the Hong Kong construction industry. Broadly speaking, HK is in an early stage in implementing safety management and is still in a learning curve. Therefore the effectiveness of some of the management technique may not be so apparent in such an early stage.

b) Quite a large portion of the contractors engage safety management not at their own initiative but under pressure of their clients. For some of the techniques, such as safety committees, the contractors perform them just to fulfill the requirements of the contract. Before the benefits of these techniques come out, the contractors may firstly resist this change of attitude towards safety and will have a biased view that it is a waste of resources or not cost effective. Under this situation, the effectiveness of safety management cannot be seen.

c) Nearly all the contractors in Hong Kong engage sub-contractors to carry out works and the sub-contractors further sub-let the works to other smaller sub-contractors. This imposes difficulties for the top management to pass safety messages to a worker, not to mention safety training. Moreover, tight schedule of work and the high turnover rate of labor also limit the benefits of some of the safety management techniques.

References

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Appendix 1: Survey on the Attitude of HK Contractors towards Safety Management

Contractor Background

Name of Contractor : _____

Have your company participated in construction projects either as a main contractor, a joint venture partner or a sub-contractor?

- ✍ Yes ( )
- ✍ No ( )

1. Is there any written safety policy in your company?
   - ✍ Yes ( )
   - ✍ No ( )

   (If the answer is No, ignore Q.2)

2. What is the target of safety performance under your safety policy?

   Target _____ Unit _____

   (unit such as reportable accident /100,000 man-hours or accident per 1000 labor per year)

3. How does your management involve in ensuring safety ?

   (You may select more than one of the followings)

   Attend or chair safety committee ( )

   Conduct safety inspection on site regularly ( )

   Formulate incentive scheme to encourage staff and the sub-contractor to observe safety ( )

   Promote safety by giving speech ( )

   Study and comment safety statistics ( )

4. Will safety records be one of the criteria for your company to select contractors/ sub-contractors?
   - ✍ Yes ( )
   - ✍ No ( )

5. Is there any safety department or safety unit to coordinate safety in your company?
   - ✍ Yes ( )
   - ✍ No ( )

6. Is there any safety committee for monitoring the safety?
   - ✍ Yes ( )
   - ✍ No ( )

7. Are your safety officers delegated the authority to suspend work if there are unsafe acts?
   - ✍ Yes ( )
   - ✍ No ( )

8. The number of safety officers delegated on a site will normally depend on:
   - ✍ The requirements of the law / the contract ( )
   - ✍ The hazards and complexity of the site ( )
   - ✍ The accident records ( )

9. Is there any checklist for use by the safety officers to inspect site safety?
   - ✍ Yes ( )
   - ✍ Upon the request from clients ( )
   - ✍ No ( )

10. Does your company carry out a cost benefit analysis for safety measures?
    - ✍ Yes ( )
    - ✍ Upon the request from clients ( )
    - ✍ No ( )

11. What percentage of contract sum do your company spend for safety?
    - ✍ Below 0.25% ( )
    - ✍ 0.25 – 0.5% ( )
    - ✍ 0.5 – 1.0% ( )
    - ✍ 1.0 – 2.0% ( )
    - ✍ More than 2% ( )

12. What is the average accident rate of your company in the year of 1999??

    ✍ Rate _____ ✍ Unit _____

13. Does your company provide safety training programme for supervisory staff?
    - ✍ Yes ( )
    - ✍ No ( )

    If Yes, how frequent the training course is for a year? _____

14. Does your company provide toll box training to the workers on site?
    - ✍ Yes ( )
    - ✍ Upon the request from clients ( )
    - ✍ No ( )

15. Does your company operate incentive schemes for safety (e.g. monetary rewards)?

- ✍ Yes ( )
- ✍ No ( )

16. Do you think incentive schemes are effective tools in promoting site safety?

- ✍ Very effective ( )
- ✍ Effective ( )
- ✍ Quite effective ( )
- ✍ Not effective ( )

17. Will your company punish those workers or sub-contractors who fail to observe site safety?

- ✍ Yes ( )
- ✍ No ( )

18. What factors do you think to contribute the improvement of site safety?

(Pls. Put the nos. 1-9 into the bracket to indicate the relative importance of those factors.)

- ✍ Better planning and design of works ( )
- ✍ Enforcement of safety law by government ( )
- ✍ Safety inspection ( )
- ✍ Punishment ( )
- ✍ Incentive schemes ( )
- ✍ Training ( )
- ✍ Safety committees and meetings ( )
- ✍ Management involvement ( )
- ✍ Well prepared safety plan ( )

Appendix 2: Analysis of Returned Questionnaires

			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Company No.	Main Contrac-tors?	Cate-gories?	Written Safety Policy?	Safety Target?	Top manage-ment Involve-ment?	Safety as a criteria for selec-tion of subcontra-ctor?	Formal setup for safety?	Formal safety commi-ttee?	Authority of SO to suspend work?	No. of SO depends on?	Checklist for site Inspec-tion?
1	Yes	C	Yes	65/1000 yr/yr	1,3&5	Yes	Yes	Yes	No	As required under law	Yes
2	Yes	C	Yes	150/1000labour/yr	All	Yes	Yes	Yes	Yes	As required under law	Yes
3	Yes	B	Yes	150/1000labour/yr	2,3,4&5	No	Yes	Yes	No	As required under law	Yes
4	No	C	Yes	130/1000labour/yr	All	Yes	Yes	Yes	Yes	As required under law	Yes
5	No	C	No	210/1000labour/yr	1&3	Yes	No	No	Yes	As required under law	No
6	Yes	List 2	Yes	100/1000labour/yr	2,3,4&5	Yes	Yes	Yes	Yes, but limi-ted to SO senior	As required under law	Yes
7	No	C	No	140/1000labour/yr	All	No	No	No	No	As required under law	No
8	Yes	C	Yes	80/1000labour/yr	2,3&4	Yes	Yes	Yes	Yes	As required under law	Yes
9	Yes	C	Yes	100/1000labour/yr	All	Yes	No	No	Yes, limited to senior SO	As required under law	No
10	No	B	Yes	70/1000labour/yr	All	Yes	Yes	Yes	No	As required under law	Yes

Analysis of Returned Questionnaires (Appendix 2 - Cont'd)

	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
Company No.	Cost benefit analysis for safety measure?	Expense of safety against cost of works	Average accident rate?	In-house safety training progra-mme?	In-house tool box training	Incentive scheme for safety?	Comments on incentives scheme for safety?	Imposing punish-ment for non-comp-liance of safety rules?	Factors contributing the achieve-ment of safety?
1	No	Below 0.25%	100/1000 yr/yr	1 times a year	Weekly	Yes	Very effective	Yes	9-2-6-1-8-5-3-4-7
2	Yes	1.0-2.0%	180/1000 yr/yr	3 times a year	Monthly	Yes	Not effective	Yes	3-7-8-5-4-9-1-4-3
3	No	0.25-0.5%	180/1000 yr/yr	No	Yes	No	Quite effective	Yes	1-3-4-5-8-9-6-7-2
4	No	Below 0.25%	150/1000 yr/yr	No	No	No	Quite effective	No	1-4-5-2-9-8-6-7-3
5	Upon request from client	Below 0.25%	230/1000 yr/yr	2 times a year	No	No	Quite effective	Yes	2-3-4-5-8-9-4-5-6
6	No	0.5-1.0%	113/1000 yr/yr	4 times a year	Quarterly	Yes	Quite effective	Yes	5-8-6-2-9-7-4-1-2
7	Yes	Below 0.25%	170/1000 yr/yr	2 times a year	Yes	No	Not effective	No	3-7-8-5-4-9-1-2-6
8	No	0.5-1.0%	100/1000 yr/yr	3 times a year	Weekly	Yes	Quite effective	Yes	8-1-5-3-7-2-4-9-6
9	Yes	Below 0.25%	120/1000 yr/yr	Once a year	Once a month	Yes	Quite effective	Yes	1-6-8-2-7-9-3-4-5
10	No	Below 0.25%	100/1000 yr/yr	No	No	No	Not effective	No	3-2-6-1-8-9-4-5-7