

# CHAPTER VII

## DISCUSSIONS AND CONCLUSIONS

Based upon data analysis and findings, this final chapter will first discuss about research conclusion. Next implication for research and implication for practice will be presented followed up by the research limitations and suggestions for future research.

### 7.1 Research Conclusions

#### 7.1.1 Consider Current Supervisors' Behavior on Safety Actions

The statistical results demonstrate the current issue of construction accident; site supervisors have moderately accomplished their safety obligation. The most frequently task performed is correcting hazards if the accident has happened. Some other tasks related to investigating accident to determine causes are sometimes applied. Site supervisors are not pay attention enough on coaching their worker to perform work safety or motivating worker's aspiration for being safe. Therefore, coaching and motivating responsibility should be improved in supervisor safety role.

According to the statistical results, it is obvious that supervisor still not fulfill their entire obligations. In order to create the safely working environment in which workers are guarantee, supervisors' obligations are apply all four issues related to safety responsibilities as discuss above whole working time. In practice, among four main necessary functions of a safety supervisor at construction, they just passable accomplice two of them which are "investigating accidents to determine cause" and "inspecting their area to identify hazards". Two other important liabilities to ensure the safety status at the site are coaching their worker and motivating them. These two safety action are rarely performed in their job.

The reasons for supervisors' lack of safety obligations were considered. The first reason was from construction managers and company vision. Most of respondents perceived that their managers viewed safety as a cost in the real practice. Company vision were not consider safety as an important target as quality, duration and budget. They thought safety conflicted with production and budget. So, they usually take little direct interest in safety, and rely on the site supervisor to manage safety. The second reason was from supervisor themselves. They responded that they didn't have enough time to finish their job, so they needed to focus on others targets as schedule, quality and budget first.

Moreover, some of them perceived that keeping safety was not their job and they could not control worker working safely. In the previous research from Holt (2001), supervisor also responded that "There are not enough staff on site to do the job properly and my attention has to go to production", or "I don't have enough time to do my job properly", "It's not my job to spot other people's mistakes", "I can't stop them doing that, because the progress of work would suffer".

From the analysis results, investigating the accident causes and correcting hazards were the most frequently task performed because of the obligation from law. As position of site supervisors, they takes full legally responsibility for any accident happened at construction site. Consequently, they must to investigate accident to determine causes and write report. In accordance with the law, supervisor needs to correct the hazards and gives recommendations to prevent a similar accident. This is the reason why two first issued are applied by supervisors quite frequently. Two last reliabilities, coaching and motivating, are bring latent benefit in reducing accident rate. They are rarely applied by supervisor because of limitation resources.

The results point out the supervisors' behavior lack of coaching and motivating on safety action. This lack will influence their workers' behavior in a long-term. A research from Anderson and John (1999) showed that lack of education and training workers is one of seven factors that cause high accident rate in construction industry. Thus, it is very important to require supervisor fulfill their four obligation to ensure safety at site. The current status of supervisors' behavior pointed out that they just perform what they are exactly required according to the law or company regulation. Supervisors give the first priority on job completion that affects their work performance. They don't care about latent benefits of coaching and motivating worker safety. The reason may be lack of time and experience of safety. Understanding supervisors' behavior in keeping safety is essential to improve their practice. As their current behavior is not satisfied, it is required to explore the causes of lacking on safety action behavior. The understanding of factor affecting supervisors' behavior on safety action can help project manager to change it effectively.

### 7.1.2 Factors Influencing Supervisors' Behavior

The results of this research indicated high significant level of variables influencing supervisors' behavior on safety action. These factors were "Organizational and Management Influence", "Project Characteristics and Work Assignment", "Project Stakeholder Influence", "Personal Background and Safety Knowledge", "Social Influence" and "Supervisor Habits". In the factor point of view, the first and the second

important factor influencing supervisors' behavior are personal background and knowledge and organizational management influence. In the item point of view, supervisors' behavior is affected from their safety knowledge, safety management system, safety regulations and procedures, their experience, and company safety vision. These five items are the highest ranking within twenty items which studied in this research.

In generally, Supervisor's behavior can be influenced by several levels of factor from social level, organizational level, project level and individual level. Different level of factor influenced supervisor's behavior in different way and different intensity. The following section will discuss about these influences.

At social level, the analysis results discovered and highlighted the influence from family awareness about safety, coworkers, age, salary satisfaction and community influence. The influence from coworkers and age were found and supported from some previous research (Holt, 2001; Zhou, Fang et al., 2008). Family influence, salary satisfaction and community influence were interesting results of factor analysis. There is no doubt about family role in supervisors' behavior. Supervisor should keep safe for themselves and their worker because they are very important to their family. This concept should be applied in the safety training in order to improve supervisors and workers behaviors. Furthermore, satisfaction of salary can influence on supervisors' behavior. If supervisors did not satisfy to their salary, they may not have organization commitment. Therefore, they may neglect on safety practice while they supervised the construction work task. Next is the influence from community as government, law and neighbours. Community conception believes that construction site accident is evident truth, there is no-site can get the zero-accident. The most common responses of supervisors to questions on safety practice is "Construction work is dangerous, so people have to look out for themselves" (Holt, 2001). This concept not only impacts on supervisors' behavior but also creates a fulcrum for unsafe behavior.

At organizational level, the result emphasizes the organizational role in creating a safety environment in which employers can work safely. Organizational and management should consider comprehensive view. It included safety system, safety regulation and procedures, safety vision, financial supports, environment and training. This finding adds further support to earlier researches on health and safety about the role of organization and management such as Jannadi (1996), Holt (2001) and Mearns (2003). This research gives additional evidence about the way that organization can impact on the worker safety through the middle level, supervisors who direct influence on workers daily.

At project level, the result indicated the influence from project schedule, workload, project scale and project owner on supervisors' behavior. The different scale and project owner causes different interest of supervisor about safety. Real practices at small construction site demonstrate supervisors usually negligent and leave workers unsafe working. In the great scale or main important project in which the safety has a strong influence to their successful, the supervisors are remarked about their safety role. In that case, their safety behavior is improved. These are normal psychology but they should be changed. Supervisors' behavior in safety should be fulfilling their obligation in any situations because the damages caused from accident are not different no matter how project size is.

At individual level, result pointed out supervisors' behavior was influenced strongly by experience, knowledge, training and learning. Training was found as the most important in improving supervisors' behavior. Three levels of training are needed to improve safety in construction industry such as craft and skills training, training by employer to new employees upon joining, and training on-site induction process. It is also found that three conditions for successful safety training are the active commitment, support and interest of management, necessary finance and organization provide the opportunities to learn. Training construction safety aims to improve knowledge, skills and awareness in order to ensure supervisor can keep construction site at the basic safety level. Additionally, it was interesting from the results of factor analysis that supervisor behavior may be influenced by some of their habits such as drinking and smoking.

By understanding the group of factors, manager can change and improve the supervisor behavior. The changing supervisors' behavior can directly influence on the safety culture and workers because supervisors are the key persons who works in between senior managers and workers. The intensity and direction of these impacts on changing supervisor behavior were significant considered in order to help the top manager has a good orientation in selecting and training their supervisors.

#### 7.1.3 Supervisors' Behavior Model, the Difference between Their Perception and Practice

Two models for explaining supervisors' behavior were developed. One is based on their perception and another is based on actual practice on safety issue. Statistical techniques including exploratory principal component factor analysis (EFA), factor reliability (Cronbach's alpha) were used for model grouping (factor analysis). Structural equation modeling (SEM) was then performed to test the research model and the significant

interrelationships between the factors retained from EFA and behavior. The following paragraphs furnish some conclusions from SEM analysis.

Based on the results of both models, behavioral intention was found have a strong influence on Supervisors' behavior. As expected, this is positive relationship. It suggests that improving their behavioral intention may directly impact to change their behavior on safety action.

According to SEM results from supervisor perception, among six factors from EFA only organizational and managerial influence directly impacted supervisors' behavior. Other three factors which include project characteristics, superior pressure and worker, safety knowledge and learning, indirect influence supervisors' behavior through intention. Unexpected result is the negative affected by superior pressure on intention. Normally, we expect that supervisor may constantly concern with safety if they received higher aware from superiors level such as top manager, project manager, community and worker. But the output is reverse direction. The pressure may influence behavioral intention in negative direction. This result is an interesting outcome. The negative relationship indicates the way that superior impact to improving supervisor on safety is counterproductive.

The next results from practice model indicated the interrelationships between behavior and the factors retained from EFA which explored from practical parameters. There are four factors directly impact to behavior such as organization, safety knowledge and learning, project stakeholder and family influence and weather conditions and control ability. One unexpected result is the negative affected by work assignment and project schedule on intention. Normally, we expect that supervisor may constantly concern with safety if they did not stress from schedule and work assignment but the output is reverse direction.

## 7.2 Contribution to Research

This research has several implications for theory, methodology and practice related to safety at construction site. The results of the current research support this view and suggest that it would be more beneficial for safety researchers to engage in a systematic organizational diagnosis. The practical implication of safety research is predominantly concerned with highlighting courses of action that will reduce the risk of incidents. In recent years there has been a move away from relying on retrospective analyses of accidents and incidents, towards a more proactive approach (Flin et al., 2000). These more predictive measures enable the monitoring of the safety condition of an organisation so that remedial action can be taken prior to an incident occurring (Flin, 1998). This

research is a supplementation in safety behavior studies system. The previous researches had already focused on top manager and worker, until this research, behavior of middle level was explored to cover all three levels at construction site.

This research contributed new models to explain behavior of supervisor at construction site in both perception and practice viewpoint. These models add further support to earlier researches on health and safety about the role of organization and management such as Jannadi (1996), Holt (2001) and Mearns (2003). Holt (2001) pointed out the key elements of successful safety management are policy, organizing, planning and implementing, measuring performance, reviewing performance and auditing. Jannadi (1996) also found that roles and functions of safety management system, or safety management system to control risk can be essential factors. Both perception and practice model in this research, the role of organization and management were stressed with high significance. In addition the role of knowledge and learning, project characteristics, pressure from superiors was reminded from the results. Moreover, some additional key factors for current research were found as community and social influence, smoking or drinking habits during working time. Additional factors were discussed above could impact behavior directly or indirectly through intention; however all of them had significant influence in general.

The third point is that these perception and practice model shows the significant contribution to current research. It was found that the perception model can help to understand on what supervisor perceives on factor influencing safety behavior. On the other hand, the practice model helps researcher understand the real practice of supervisors on their safety action. These two models are also significant in different aspects. Therefore, following research focus on behavior should be concerned about both perception and practice concurrently to understand what they perceive and how they practice.

In practice, the current study can contribute to the improvement of safety approach at construction site. It can help the project parties more understand about one significant part – supervisor. By understanding on supervisor current behavior and factors influencing them, manager can change and improve their behavior. The changing supervisors' behavior can directly influence on the safety culture and workers because supervisors are the key persons who works with senior managers and workers.

The first results showed the current status of supervisor's behavior on safety action at construction site. The lack of responsibility awaked party of construction project. In order to achieve a good safety system and reduce accident rate, they should take interested in

supervisor action. Selecting, training, controlling, supervising and speeding up supervisor are significant as a key person.

As their current behavior is not satisfied, it is required to explore the causes of lacking on safety action behavior. The understanding of factor affecting supervisors' behavior on safety action can help project manager to change it effectively. The intensity and direction of these impacts on changing supervisor behavior were considered in this study by explaining model from both opinion and practical parameters. The perception model can help top manager understand "what supervisors are thinking about factors influencing them". Understanding supervisors' perception is important and can help the top manager have a good orientation in selecting and training their supervisors. In another way, the practice model contributes to manager's awareness. Supervisors' practice model indicates how current practice factors impacted on supervisor behavior. From these results, the top manager can realize their company current system, what advantages with positive impact should be developed, what disadvantages with negative impact should be changed. From the significant and direction of each factor influencing supervisor behavior, company can select to improve safety approach in limited resources. The stronger positive influence, the top priority must be focused.

### **7.3 Limitations and Directions for Future Research**

The first limitation is time sampling limit. Because of time limitation, the sample used in this study consisted of supervisors from different sites of Hochiminh city in Vietnam only. The lack of sampling from supervisors in others country may affect the results. So it is highly recommended for future research in this context to use larger sample to determine factors affecting behavior on safety system.

The next limitation is method for assessing behavior. This study used indirect observation involves using interviews, questionnaires and rating scales to obtain information on the safety behavior from supervisor. The use of self-report measures for all variables is also a methodological issue in this research as these measures may not correspond with objective measures of performance. For example, self-reported errors may not reflect the actual number of errors in the workplace. The responses depended on people's memories and current emotion. In addition, the people providing information may not have been trained to observe the target behavior and may not have noticed all the occurrences of the behavior. However, theoretical descriptions of the links between factors and behaviors also lend support to the use of self-report measures in safety research (Ajzen, 1991). Anyhow, direct observation is recommended in future for more accurate in assessing behavior.

Finally, other factors influencing supervisor behavior may exist. Further testing and expansion of our model may include factors not contemplated here. These limitations suggest ways in which the research can be extended and validated and do not reduce the importance of the aims of this series of studies.