CHAPTER 6

DISCUSSION AND RECOMMENDATIONS

Work accidents are considered one of the major health problems in many countries. The work accident rate has increased sharply in countries with rapid industrialization. Work accidents resulting in death and disability, including organ loss, give rise to an impact on employees, employers, and social economy, considered as the loss of human resources. This study is aimed at estimating the economic loss from work accidents and determinants of work injury rate in Thailand, in order to provide information to related organizations to be attentive and give higher priority in work accident prevention.

In 2000, there were 179,566 work injuries, comprised of 620 deaths, 16 permanent total disabilities, 3,516 permanent partial disabilities and 175,414 temporary disabilities. Among all injuries, 44,068 cases occurred in Bangkok and 75,092 cases occurred in Bangkok's surrounding vicinity. The statistics from WCF reveal that most of the injured workers are at the age ranging 20-24 years, followed by those at the age ranging 25-29 years, representing 25.57 % and 24.75%, respectively.

6.1 Conclusion and Discussion

6.1.1 Economic loss from work accidents in Thailand, 2000

This study applies the Human Capital Approach to estimate the earning losses from premature death, permanent total disability, and permanent partial disability, as well as temporary disability from work injuries. The study obtains data on direct loss in the form of medical treatment and rehabilitation costs from WCF.

The technique of abridged life table and working life table are applied to obtain the number of working years lost keeping in mind that if workers have not died or become totally disabled, they would have been

able to work and earn money until the end of their working life. Earning growth rates of 6% and 8% are applied based on the expected economic growth rates ranging 4% to 5 % with inflation rates ranging 2% to 3%. Earning growth rates of 10% and 12% are the average NI growth and the average growth of compensation of employees. The present value of expected future earning is estimated by applying a discount rate of 5%. Considering the difference in earning levels of private employees in different regions, earning loss is thus estimated based on data of the respective regions.

The study reports that the present values of earning loss from 620 premature death cases are 1346.6 million, 1787.6 million, 2419.8 million and 3335.9 million baht, depending on income growth rate and discount rate. The average earning loss per death are 2.17 million, 2.88 million, 3.90 million, and 5.38 million baht, when earning growth rates of 6%, 8% 10% and 12% are applied respectively.

Earning loss from 16 permanent total disability cases are 37.2 million, 49.6 million, 67.2 million and 92.7 million baht, varied on earning growth rate and discount rate. The average earning loss per case are 2.32 million, 3.10 million, 4.20 million and 5.79 million baht, when 6%, 8% 10% and 12% of earning growth rate are applied respectively.

Economic loss from 3,516 permanent partial disabilities is calculated based on the similar concept to that of total disability. The proportion of loss at 6.43% is applied. Earning loss from permanent partial disability accounts for 624.5 million, 830.9 million, 1132 million and 4577.8 million baht, with an average of 0.18 million, 0.24 million, 0.32 million and 0.49 million baht per case when 6%, 8% 10% and 12% of earning growth rate are applied respectively.

The earning loss from 48,338 cases of temporary disability for longer than 3 days is 211.8 million baht, accounting for 4,382 baht per

case. The earning loss from temporary disability for not longer than 3 days is 56.2 million baht or an average of 442 baht per case.

Direct loss from work accidents in 2000 accounts for 458.79 million baht, comprised of medical treatment cost of 456.92 million baht, and rehabilitation cost of 1.86 million baht.

Indirect loss amounts to 2276.29 million, 2935.96 million, 3887.41 million and 5274.35 million baht, accounting for 5.96 times, 7.4 times, 9.47 times and 12.50 times greater than the direct loss when 6%, 8% 10% and 12% of earning growth rate are applied respectively.

Comparing with the WCF compensation payment, the indirect loss is 4.3 times to 9.0 times greater, depending on the assumption of earning growth rate.

Comparing with the earning of private employees, the total economic loss ranges between 0.70% and 1.46% of the average annual earning.

Total economic loss from work injuries in 2000 varies from 2735.08 million to 5733.16 million baht, accounting for 0.056% to 0.117% of Thailand's GDP. The average total economic loss from work accidents varies from 15,232 to 31,928 baht per injury case, and 505 to 1,058 baht per worker covered by WCF when 6% - 12% of earning growth rate are applied respectively.

The economic loss in the range of 0.056% to 0.117% of GDP seems small according to an article of The Canadian Centre for Occupational Health and Safety (n.d) which mentioned that an economic loss may amount to 10-20% of GNP in some countries. However, the difference might occur depending upon the completeness of data, different method of estimation, as well as components of loss, which are taken into estimation.

One issue that should be considered is that WCF covers only workplaces with 10 or more workers. The WCF does not cover workers who are temporarily or seasonally employed in the agricultural sector, private school teachers, and staff in government offices, state enterprises and non-profit organizations. It is estimated that the actual figures of work injuries in Thailand could be far higher than the reported ones. According to Bird's Accident Triangle, most accidents are incident with no visible injury or damage; to be followed by property damage accidents. The tip of the triangle represents minor injuries and, serious or disabling injuries. (Bird, 1974 cited in Heinrich et al. 1980) It is implied that if all work injury and loss were reported, the estimated economic loss would be much greater.

Regarding the estimation method, this study applies the Human Capital Approach that omits non-market returns individuals might receive from other activities. The estimation does not include losses from other aspects, such as damage of machinery and property; spoilage of materials; loss due to interference with production; loss from time spent by other workers and supervisors; loss that occurs in consequence of the excitement or weakened morale due to accidents.

Indirect loss in the range of 4.30 to 9.0 times greater than direct loss is different from De Codes (1979 cited in Boonyahotra, 1987), Heinrich et al. (1980), Klen and Tapio (1989). It may be caused by the different components of loss used in each study.

Sensitivity analysis of economic loss reveals that a minimum economic loss is 1,444.17 million baht when 6% earning growth rate and 15% discount rate are applied. The economic loss would increase up to 5,733.14 million baht when 12% earning growth rate and 5% discount rate are applied. The results indicate that higher discount rate lead to lower economic loss. The figures give the impression that higher discount rate has more effect when high earning growth rate is applied. In conclusion,

the discount rate should be less than the earning growth rate and 5% discount rate is suitable.

6.1.2 Opportunity loss for family members

The study calculates the opportunity loss for family members based on an assumption that in Thai society, family members always take care of their injured members. The study calculates the number of workdays lost by family members based on a ratio of 1:1. The study reports that the opportunity loss for family members is 218.56 million baht.

6.1.3 Determinants of work injury rate

Work injury rate from 1981 to 2000 lies between 32.32 and 46.65 per 1000 workers, with an average of 39.0 per 1,000 workers. The model specifies that work injury rate is the function of economic growth, proportion of nonagricultural GDP, proportion of workers in manufacturing and construction industries, budget allocated to safety promotion, safety inspection coverage, and WCF coverage, and, three dummy variables. The dummy variables are the presence of notifications on employees' work safety and safety committee, and the presence of economic crisis. The ordinary least square (OLS) is applied to obtain the effects of dependent variables on work injury rate. However, only observations during 1987 – 2000 are included in the study due to incompleteness of data during 1981-1986.

The results show that non-agricultural GDP has significant positive effect with coefficient in the range of 3.06 to 3.19. This means that one percentage increase in the proportion of non-agricultural GDP may lead to an increase in work injury rate by 3.06 to 3.19 per 1000 workers, holding other factors constant. This finding agrees with an article of the ILO, which presented that the rate of work accidents increased sharply in countries with rapid industrialization and high injury rate relates to such rapid industrialization, and introduction of new technology, changes in

work method and new work environment. (ILO, 2002) Other reasons are the fact that Thailand's industrial development fails to implement safety measures since the initial stage, and adopts new technology without sufficient knowledge, especially when a large number of labour force migrates from agricultural sector to industrial sector. (MOLSW, 1995; Thanachaisetthawut, 2001)

Dummy variable of economic crisis (D3) has significant negative effect with coefficient in the range of –8.91 to –8.67. This means that the economic crisis reduces the work injury rate by 8.67 to 8.91 per 1000 workers, holding other factors constant. On the contrary, in the absence of such economic crisis, the work injury rate would increase by 8.67 to 8.91 per 1000 workers. This explains that during the economic crisis, many manufacturing companies keep workers, but working hours, operation, and overtime are reduced.

GDP growth rate has negative effect with coefficient in the range of -0.57, meaning that, holding other factors constant, one percentage increase in GDP growth rate may reduce the work injury rate by 0.57 per 1,000 workers. The finding disagrees with the hypothesis, probably caused by the results of economic development, such as higher education, and higher levels of safety awareness.

Dummy variable of the presence of notification on safety committee (D2) has non-significant negative effect of –0.17 on work injury rate. This means that law enactment can reduce the work injury rate by merely 0.17 per 1000 workers, holding other factors constant. The reason is that although the law has been declared, but it is impractical and incompetent. (ILO and Asian and Pacific Regional Centre for Labour Administration [ARPLA], 1992; Sirirattanapruk, 2000) resulting in noncompliance with the requirements of the relevant occupational health and safety laws and regulations. (MOLSW, n.d.)

The coverage of safety inspection (INS) has positive effect on work injury rate with coefficient of 0.62, but not statistically significant. This is opposite to the expectation. However, the positive relationship may be caused by a lack of proper strategies for workplace inspection (MOLSW, n.d.) and legal proceedings are relatively few even though more than half of workplaces fails to comply with the law. (ILO and ARPLA, 1992; Mashida, 2000)

Budget allocated to safety promotion has non-significant negative effect on work injury rate. This means that an increase of every 1.0 million Baht spent in safety promotion may reduce the work injury rate by 0.07 per 1000 workers, holding other factors constant.

WCF coverage has non-statistically significant negative effect on work injury rate. The coefficient of −0.40 means that one percent increase in the percentage of workers covered by WCF may reduce the work injury rate by 0.40 per 1,000 workers. This gives the impression that more WCF coverage improves risk-sharing resulting in the reduced work injury rate.

6.2 Limitations of the Study

a) The estimation of economic loss exclude losses from damaged property, production interruption, the intangible costs such as pain, suffering and loss from psychological aspects caused by work accidents, as well as the time loss of other colleagues and supervisors.

b) The estimation is based on secondary data of approved work injury claimants from WCF in 2000 to represent the work accident injury cases. This might affect the precision of the study results due to the fact that some work injury cases are not caused by work accident, and the number of claimants is considered underestimate due to the limited WCF coverage.

c) The estimation of economic loss is based on an average earning of all workers in each region, regardless of age, which generally increases due to higher knowledge and experience.

d) Direct loss is compensated by WCF payment for medical treatment and rehabilitation, which may be underestimate for those cases where medical treatment costs exceed the ceiling.

e) The opportunity loss for family members is estimated from the cases of total partial disabilities, and temporary disabilities. The cases of deaths and permanent total disabilities are not included due to the unavailability of data relating to the number of workdays actually lost.

6.3 Recommendations

a) This study addresses negative effects of industrial development without sufficient awareness of occupational health and safety, directly on workers who are the main production input. This type of loss turns into productivity costs incurred by reduction of work effectiveness or output after a work accident occurs. Therefore, employers should pay more attention to reducing this kind of costs by way of implementation of preventive measures. The loss incurred to employers in terms of reduction of work effectiveness also affects the resource allocation and gives rise to the opportunity loss to other production units, and eventually turns into social costs. The government and related organizations should give higher priority to improvement of efficiency of work accident control and prevention to accommodate our industrial development and minimize such economic loss.

b) The economic loss accounts for 4.30 to 9.01 times greater than compensation payment. This gives the impression that the WCF compensation payment criteria may needs to be adjusted in order to meet the earning loss of injured workers. The rate of earning loss, in the range of 0.698% to 1.46% of the average annual earning of employees, is higher than the existing WCF contribution rate at 0.2% −1% of the employees' earnings. Therefore, WCF may need to reconsider increasing the WCF contribution rate to cover the economic loss from work injury.

c) Related organizations should be aware, alert and pay more attention to factors that may have negative effects, such as budget, expansion of WCF coverage,

law enforcement to ensure more proper compliance with work injury prevention and control requirements.

d) The presence of economic crisis (D3) is significant variable with large effect on the work injury rate. When Thailand's economy recovers, the expansion of non-agricultural sector and the absence of D3 would increase the work injury rate by 9 per 1,000 workers.

6.4 Suggestions for Future Study

a) Due to the underestimated WCF coverage, it is essential to estimate work injury rate in informal sectors, and other workers who are not covered by WCF, or the number of unreported cases, in order to identify the actual figures of work accidents. If such data is made available, the economic loss analysis should be conducted based on gender due to different death and work patterns, directly resulted in life expectancy and working life expectancy.

b) The number of work injuries and the work injury rate do not reflect the actual figures of work accidents. Further study should identify the actual number of accidents in terms of "Frequency Rate," the number of accidents per total number of work hours. Another alternative indicator may be "Severity Rate", the total number of workdays lost per total number of work hours.

c) For the complete estimation of the economic loss and to ensure more accurate results, it is necessary to record details of each work accident and covers all losses, such as damaged machinery and property at workplaces.

d) There should be more observations included in the multiple regression analysis in order to achieve more accurate results in respect of the effect of determinants on work injury rate. Dummy variable of economic crisis may require other quantitative variables reflect industrial production output or man-hour of work, or industrial capacity utilization.