

Original Article

Occupational Injury Statistics in Korea

Seong-Kyu KANG and Oh-Jun KWON

Occupational Safety and Health Research Institute, Korea Occupational Safety and Health Agency, Incheon, Korea

Objectives: The occupational accident rate was officially reported to be 0.77 per 100 workers in 2001 and 0.70 in 2009. The stagnant decrease in accident rate raises a question about the effectiveness of prevention activity because there have been active prevention efforts in the past 10 years. It is also necessary to know the exact status of occupational injuries to direct a prevention strategy.

Methods: The author re-analyzed occupational injury statistics to find the reason for stagnant decreases in occupational injuries. Compensated occupational injuries cases were used to calculate fatal and non-fatal injury rates. Injuries from commuting accidents and sports activities were excluded as well as occupational diseases. The number of workers was adjusted to that of full time equivalent employees.

Results: The fatal injury rate excluding injuries associated with commuting accidents, sports activities, and occupational diseases decreased from 12.59 in 2001 to 8.20 in 2009. In 2007, 67.5% of accidents that involved being caught in objects, which are mostly caused by machines and equipment, occurred in the manufacturing industry; this type of incident has decreased since 2001. The fatal and non-fatal injury rates in the manufacturing industry have continuously decreased while the rates in the service industry have not changed from 2001 to 2009. Non-fatal injuries might not be reported in many cases. The number of insured workers was underestimated as long working hours were not adjusted for in the reporting system.

Conclusion: The occupational fatal injury rate has decreased and the non-fatal injury rate might have decreased during the last 10 years, although the statistics show stagnancy. The decrease of the injury rate was counterbalanced by various factors. Hence, the current accident rate does not reflect the actual situation of accidents in Korea. Korea needs to develop an improved system to more accurately calculate occupational fatal and non-fatal injury rates.

Key Words: Occupational injury rate, Fatal injuries, Non-fatal injuries, Compensation, Prevention effectiveness

Introduction

The occupational accident rate and fatality rate were officially reported to be 0.77 per 100 workers and 26.0 per 100,000 workers, respectively, in 2001 when all paid workers engaged in a workers' compensation system. Since then, the accident rate has not decreased even though preventive activities have been

actively performed by the government and employers. In 2009, the accident rate and the fatality rate were 0.70 and 15.71, respectively [1]. However, the accident rate in Korea covers all injuries as well as occupational diseases, which are not included in most countries. The non-fatal injury rate and fatal injury rate after excluding occupational diseases were 0.63 and 10.1 in 2009, respectively. In 2003, Hämäläinen estimated fatal injuries and the fatal injury rate of Korea as 2,514 cases and 11.4 per 100 workers, respectively, and non-fatal injuries and the non-fatal injury rate as 2,363,219 cases and 11.7 per 100 workers. Fatal injuries of 1,533 and the fatal injury rate of 14.5 in 2003 were similar to the estimation by Hämäläinen of 2,514 fatalities and the rate of 11.4. However, non-fatal injuries of 84,261 and the non-fatal injury rate of 0.79 in 2003 were quite low

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Correspondence to: Seong-Kyu KANG

Occupational Safety and Health Research Institute

Korea Occupational Safety and Health Agency

34-4, Gusan-dong, Bupyeong-gu, Incheon 403-711, Korea

Tel: +82-32-510-0710, **Fax:** +82-32-510-0863

E-mail: skk@kosha.net

compared with the Hämäläinen's estimates of 2,363, 219 non-fatal injuries and the rate of 11.7 [2].

Korea has used workers' compensation data for occupational injury statistics as many European countries have done. Injuries which required more than 3 days of medical treatment are accepted for compensation in Korea while more than 3 days of absence is used in European countries [3]. Thus, the number of occupational non-fatal injury is expected to be higher in Korea than in European countries if the accidents occur at the same rate. However, the injury statistics in Korea were very different from reports by European countries. The current injury reporting system in Korea reported that the fatal injury rate was higher than those of EU countries while the non-fatal injury rate was lower than those of EU countries. In 2007, the incidence rate of non-fatal injuries in EU15 countries was 2.9 per 100 employed persons and the mean fatal injury rate was 2.1 per 100,000 employed person [4]. The non-fatal injury rate in Korea was one fifth of the average in EU15 countries, while the fatal injury rate was 5 times higher. This phenomenon of high fatal and low non-fatal injury rates was found in the occupational injury statistics in other Asian countries like Japan, Taiwan, and Singapore. This may be caused by various factors which might influence the numerator and denominator needed for the calculation of non-fatal and fatal injury rates in Korea.

This study aims to evaluate the factors that affect the fatal and non-fatal injury rates by re-analyzing the current occupational injury data and to clarify whether the non-fatal injury rate has been stagnant or decreasing during the last 10 years.

Materials and Methods

The occupational accident data in Korea were obtained from the Korean workers' compensation database for this study. Employers have a responsibility to give a report to the local office of the Ministry of Employment and Labor (MOEL) when an occupational accident occurs. The responsibility is exempted if a compensation claim is filed to the compensation agency, the

Korea Workers' Compensation and Welfare Service (COMWEL). The filed data are sent to the Occupational Safety and Research Institute (OSHRI) in the Korea Occupational Safety and Health Agency (KOSHA). OSHRI analyzes the COMWEL data along with the MOEL cases submitted by employers. Data that came from COMWEL comprised 98% of the database for occupational injury statistics [5]. Injuries associated with commuting accidents and sports activities were excluded because they were compensated as the dimension of social-welfare rather than as occupational incidences. Occupational diseases were also excluded in calculating the fatal and non-fatal injury rates.

Due to the lack of a direct count of construction workers, the number of construction workers was estimated based on the number of manufacturing workers and its ratio to the number of construction workers reported in the Economically Active Population Survey (EAPS) [6]. The number of full-time equivalent (FTE) workers was derived from the number of workers multiplied with the average number of working hours divided by the legal hours according to the size of the enterprises.

Results

The fatal injury rate excluding deaths due to occupational diseases decreased from 14.66 per 100,000 workers in 2001 to 10.09 in 2009. The fatal injury rate declined by 34.9% from 12.59 in 2001 to 8.20 in 2009 when commuting- and sports-related incidents were also excluded in the analysis. When adjusted with FTE employment, the fatal injury rate in 2009 was 7.28 per 100,000 FTE instead of 8.20 (Table 1). When the non-fatal injury rate excluded commuting- and sports-related incidents, it decreased by 14.5% from 0.69 per 100 workers in 2001 to 0.59 in 2009 (Fig. 1).

When the injuries are divided into their respective events, accidents that involve being caught in objects have prominently decreased while falling from heights, falling from the same

Table 1. Occupational fatal injury rates in Korea (per 100,000 workers employed)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Fatal injury rate	14.66	13.04	14.46	14.68	12.64	11.40	11.04	10.73	10.09
Fatal injury rate excluding commuting- and sports activity-related accidents	12.59	11.63	12.81	12.85	11.11	9.88	9.44	8.69	8.20
Fatal injury rate adjusted with FTE	9.64	9.06	10.11	10.26	9.03	8.05	7.83	7.39	7.28

FTE : full time equivalent.

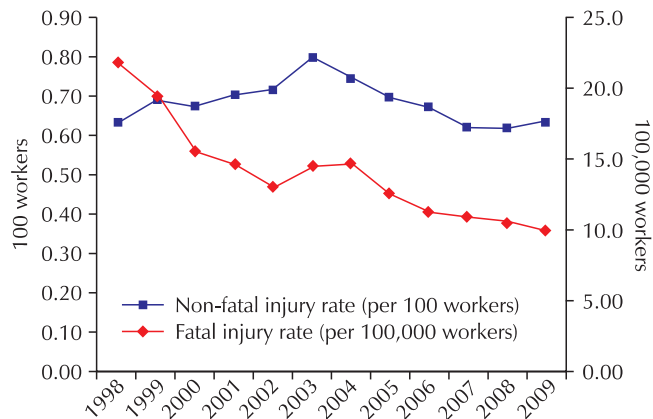


Fig. 1. The fatal and non-fatal injury rates by year in Korea.

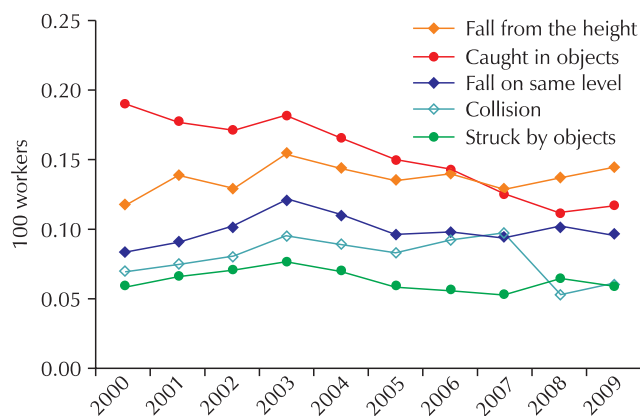


Fig. 2. The fatal and non-fatal injury rates with respect to events by year in Korea.

level, being struck by objects, and collisions have increased or showed no change. 67.4% of the accidents that involved being caught in objects, which usually involved machines and equipment, occurred in the manufacturing industry. This rate has decreased by 34.8% from 1.78 per 1,000 workers in 2001 to 1.16 in 2009 (Fig. 2).

From 2001 to 2009, the number of injuries in the manufacturing industry has decreased by 7.7%, while the number of workers has increased by 8.9%. However, the number of injuries, where the injury rate was relatively low, has increased by 33.5% while the number of workers in the service industry has increased by 51.3%. The fatal and non-fatal injury rate in the manufacturing industry has dropped from 1.22 in 2001 to 1.04 in 2009, while that in the service industry did not change (Fig. 3). Although employers in Korea are required to report their establishment to COMWEL for the paying premiums of workers' compensation, some of them did not notify it unless they had experienced accidents. Injuries occurring before notifi-

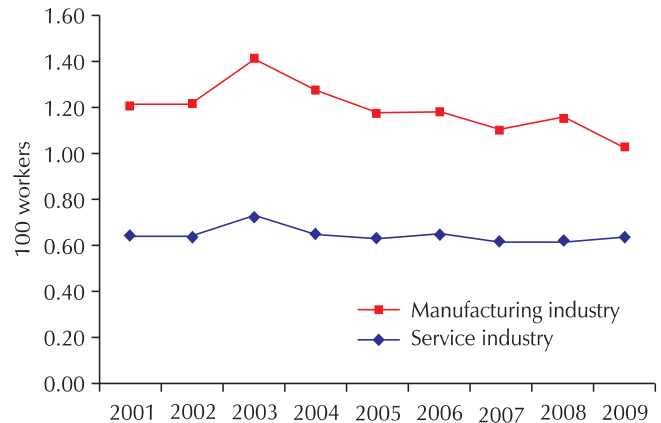


Fig. 3. The fatal and non-fatal injury rates in the manufacturing and the service industry by year in Korea.

cation to COMWEL increased from 2.0% to 10.6% among all compensated cases. It is more prominent in the service industry (10.7%) than in the manufacturing industry (4.6%).

Discussion

Despite the fact that many efforts have been made in Korea in injury prevention over the last 10 years, the current occupational injury report system does not show a significant change in national injury reduction. Several issues are to be explored to understand the underlying factors and to draw an accurate conclusion.

The following factors might affect the calculation of the numerator, i.e. the injury frequency.

First, many cases, especially non-serious ones, might not be reported because compensation was not claimed. Employers are still very reluctant to reveal occupational accidents to the government authority because they assume that they will be inspected if cases are being reported to MOEL. It seems that they preferred to pay the medical expense themselves and claim only the portion covered by the National Health Insurance (NHI). A recent study with the NHI data showed this possibility [7]. According to the study, 56,668 cases per one million people treated by the NHI were probably injured at a workplace in 2006. It projected that 662,300 cases of occupational injury could have qualified for workers' compensation. The estimated number was approximately 9 times higher than the compensated cases of 78,344 in 2006. On the other hand, almost all the serious injuries, especially fatal injury cases, were reported because employers could hardly bare the economic burden that they were to endure in order to compensate the survivors of victims.

Second, expanding compensation as a part of social wel-

fare might have contributed to the increased reporting number of injuries. The accident rate contained occupational diseases and some injuries compensated as a part of social welfare. The coverage for compensation has been expanded according to increasing social awareness of work-relatedness. Including the commuting- and sports-related incidents may also have skewed the statistics of the injury data. Injuries due to commuting accidents doubled during the last 10 years. Allowing compensation for injuries due to sports activities also increased the number of total accidents by 1,500 reported cases in 2009.

Third, recognition effects might also increase the number of claims. During the period from 2001 to 2009, the injury rate in the manufacturing industry decreased substantially while there was no change in the service industry. Especially workers in small service industries did not recognize worker compensation. Their claims may have increased when they noticed the usefulness of workers compensation. Furthermore, workplaces with fewer than 30 employees did not apply the individual rate system for insurance premiums. The insurance premium in workplaces with more than 30 employees was increased or reduced by 50% depending on their performance over 3 years from the rate according to their industrial classification. This system discrepancy might lead injured workers in small service enterprises to more eagerly obtain workers' compensation regardless of the severity of their injury. In fact, the average expense for compensation in the service industry, especially in small enterprises, was lower than that in the manufacturing industry. It is reasonable to suspect that this was a reason, in addition to potentially less-satisfying work environments, that the smaller enterprises had more reported injuries.

Fourth, more than 10% of injuries in the service industry were reported before notification to COMWEL for their establishments. This means that they would not file for the insurance, which is compulsory, unless the injuries have occurred. This leads to an increase of the reported number of injuries (numerator) without a proper increase of the number of workers (denominator) because workers in workplaces where an accident did not occur are still missing.

There were also many factors affecting the calculation of the denominator, i.e., the number of all workers.

First, the denominator was overestimated in Korea because it used the head counts of workers rather than their work hours. The average working hours in Korea were the highest among the Organization for Economic Co-operation and Development (OECD) countries [8]. Longer working hours raise the possibility of accidents. Part-time jobs were also not popular in Korea, which was different in European countries. The denominator should be adjusted to reflect FTE, which is cal-

culated by adjusting the average working hours with the legal standard instead of the head count of workers.

Second, the vagueness of work-durations for construction workers might increase the denominator. In 2009, 70% of construction projects were finished within 6 months; Construction workers then moved on to other workplaces. Construction workers might be counted more than once because the number of insured workers was aggregated by workplace, not by individual. The ratio of the number of workers in construction and manufacturing industries was 43.8% in EAPS and 100.7% in the Workers' Compensation Insurance Data in 2009.

The occupational non-fatal injury rate has decreased by 14.5% between the years of 2001 and 2009. However, we are not sure whether it was real because there was strong uncertainty with the data of occupational non-fatal injuries. The non-fatal injury rate is believed to be rather seriously underestimated and thus does not serve well as a predictor of effectiveness of prevention activities.

The fatal injury rate is considered reliable although it was overestimated because of the use of the unadjusted denominator. It has significantly decreased by 34.9% from 2001 to 2009. In 2009, with all factors adjusted, the fatal injury rate was 7.28 per 100,000 FTE workers. In addition to working hours and the problem with construction workers, inclusion criterion for death also was detrimental to the fatal injury rate calculation. Korea included all deaths that occurred after an accident regardless of the time while European countries included only a case of death within 1 year after an accident. This counted for an average of 6.7% of all fatal injuries during the years of 2001 to 2009. After adjusting the inclusion criterion, the fatal injury rate in 2009 could drop to 6.79 per 100,000 FTE workers.

In summary, the occupational fatal injury rate has decreased and the non-fatal injury rate might have decreased during the last 10 years although the statistics exhibited stagnancy. The decrease of the injury rate was countervailed by various factors affecting the numerator and the denominator in the calculation of the rate. For example, the non-fatal injury rate stagnancy may have been caused by increased claims of non-serious injuries in the service industry. Hence, the current accident rate does not reflect the actual situation of accidents in Korea. Korea needs to develop an improved system to more accurately calculate occupational fatal and non-fatal injury rates.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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