

# EFFECTS OF COUNTERMEASURES FOR SCAFFOLD-RELATED FALLS IN JAPAN

**Katsutoshi Ohdo**

*National Institute of Occupational Safety and Health, 1-4-6 Umezono, Kiyose,  
Tokyo 204-0024, Japan*

Fall accidents are a serious problem in the construction industry in Japan, driving the Japanese government to introduce and strictly enforce countermeasures for reducing falls from scaffolds. Among the preventive strategies formulated are various safety guidelines, such as the Occupational Safety and Health Regulations. Despite these initiatives, however, mortality rates due to fall accidents remain high. To further strengthen the fall prevention measures, the Japan Ministry of Health, Labour, and Welfare established a committee in our institute, tasked to investigate the safety regulations applied overseas. In accordance with the guidelines issued by the government, the committee also evaluated the current construction methods and fall protection system adopted in the country. On the basis of the results and discussion, the Occupational Safety and Health Regulations were amended in 2009. The current study investigates the effects of these amended measures, which were found effective in preventing most fall accidents from scaffolds.

## **Introduction**

Frequent fall accidents are severe problems encountered in construction industries, with approximately 40% of fatal accidents during construction attributed to workers' falls. In Japan, countermeasures for falls from scaffolds had been strengthened through systematization in official guidelines. Although these efforts reduced the rate of scaffold-related fatal falls, the overall percentage remains high—an issue that elevated possible countermeasures to the main agenda of the 11<sup>th</sup> Labour Accidents Prevention Plan in Japan. To develop additional preventive measures for scaffold-related falls, the Japanese Ministry of Health, Labour, and Welfare established a committee at our institute. This committee was mandated to investigate the safety regulations applied in construction industries overseas and to evaluate various Japanese construction methods in accordance with present safety guidelines.

The results and discussion show that workers sometimes fall from the space between guardrails and work platforms. Preventing falls of this nature necessitates compressing this space. The experiments conducted by the committee also indicate that scaffold sheeting, which is used to cover scaffolds and is widely used in Japan (Figure 1), contributes to worker safety; that is, it protects them from falls (Ohdo *et al.*, 2009).










## **Experimental method and results**

The effect of scaffold sheeting was experimentally examined using a human dummy. Table 1 lists the experimental cases. An experiment with a used plastic sheet (Case 8) was carried out to determine the strength of a deteriorated sheet. In all the experiments, the human dummy did not fall from the scaffolds, leading to the conclusion that plastic sheets are effective fall protection measures.



**Figure 1. Scaffolds covered with sheeting**

**Table 1. Experimental cases**

Case	Posture	Type of scaffold	Photos	Case	Posture	Type of scaffold	Photos
1	Standing	Prefabricated		7	Sitting and fall to 1 m using slide	Prefabricated	
2	Crawl on hands and knees	Prefabricated		8	Sitting and fall to 1 m using slide	Prefabricated Used sheeting	
3	Sitting and fall from back	Prefabricated		9	Sitting and fall to 1 m using slide	Pipe	
4	Standing	Pipe		10	Crawl on hands and knees, and fall to 0.2 m using slide	Prefabricated	
5	Crawl on hands and knees	Pipe		11	Sitting and fall from front	Prefabricated	
6	Sitting and fall from back	Pipe					

### *Amendment of regulations*

Nonetheless, occasional falls from the space between work platforms and scaffold sheeting continued to occur. Such incidents are attributed to space expansion stemming from the pressure exerted by workers' weights (Figure 2). When workers reach down to the sides of scaffolds to conduct repairs, they push the sheeting to make room for movement, thereby widening the space between the platform and the sheet. To prevent workers from suffering fall accidents, the Occupational Safety and Health Regulations were amended in 2009 (Figure 3). In this study, the effects of the amended regulations were investigated on the basis of the accident reports provided by the Labour Standard Office of Japan.



Figure 2. A worker making room for movement by pushing the sheeting

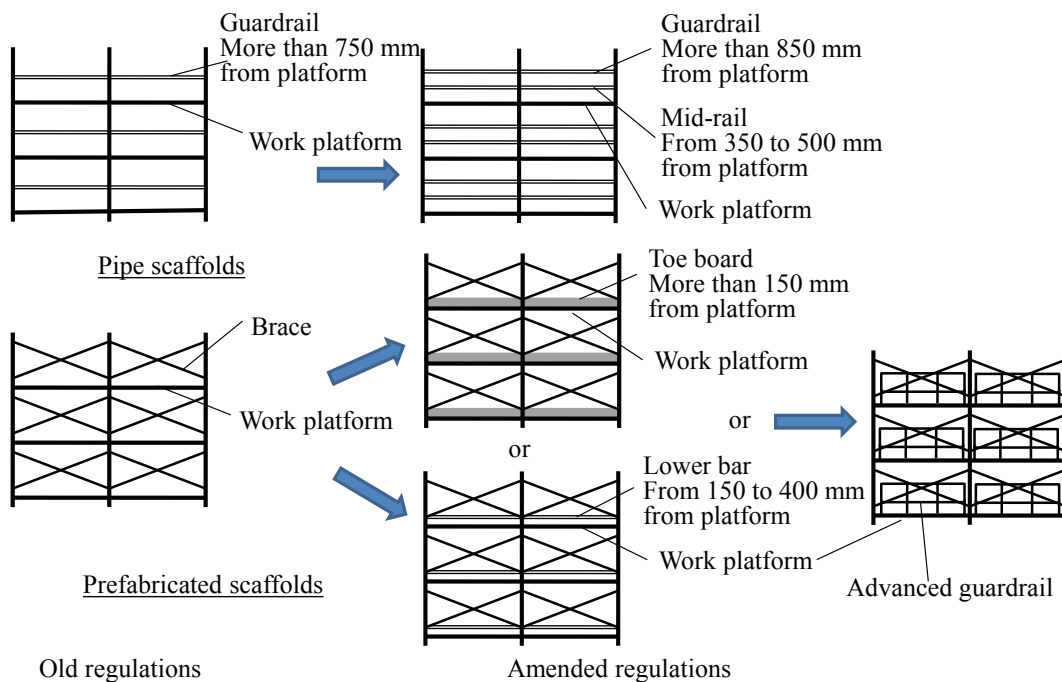


Figure 3. Fall protection as outlined in the amended regulations

## Overall findings

### *Frequency of injury accidents*

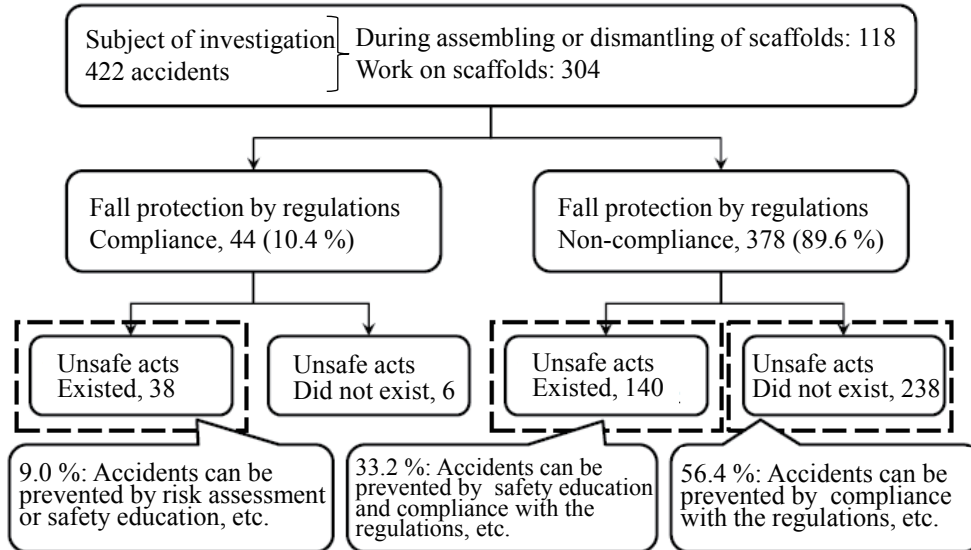
Labor accidents, in which workers are killed or required to rest for more than three days because of injury, are documented by the Labour Standard Office. These injury accident reports were examined in relation to falls from scaffolds (Japan Ministry of Health, Labour, and Welfare, 2013). Table 2 shows the changes in the number of injury accidents from 2007 to 2011. From 2008 to 2009, the number of scaffold-related fall accidents drastically decreased from 1,227 to 828. This finding confirms the effectiveness of the amended regulations in decreasing accident frequency.

**Table 2. Changes in the number of injury accidents from 2007 to 2011 (persons)**

	2007	2008	2009	2010	2011
All accidents	143,529	132,609	108,081	110,441	113,097
Fall	24,383	22,529	18,721	18,315	19,145
Fall from scaffolds	1,552	1,227	828	718	871

### Factors contributory to falls from scaffolds

The injury accident reports were also analyzed to determine other factors that contribute to falls from scaffolds. Figure 4 shows the classification of factors that caused fall accidents in 2011. Approximately 90% of the accidents (378 persons) occurred in work environments characterized by illegal conditions. Most of these fall accidents can be prevented by compliance with the amended regulations. Additionally, 42.2% of the accidents (38 + 140 = 178 persons) occurred because of unsafe acts. Aside from compliance with the amended regulations, therefore, risk assessment or safety education should be executed more.



**Figure 4. Factors that contribute to fall accidents from scaffolds**

### Concluding remarks

The developments on safety in Japan's construction industry are summarized as follows.

- The Occupational Safety and Health Regulations were amended in 2009 to prevent scaffold-related fall accidents.
- The effects of the amended regulations were investigated on the basis of injury accident reports.
- Most fall accidents from scaffolds can be prevented through compliance with the amended regulations.
- Among the total number of accidents, 42.2% occurred as a result of unsafe acts, indicating the importance of awareness programs, such as risk assessment or safety education.

### References

- Ministry of Health, Labour, and Welfare, Japan. (2013). *Reports of the committee for investigation of the effect of the fall protection from the scaffolds*. Retrieved 26 August 2013, from <http://www.mhlw.go.jp/stf/shingi/2r98520000035cmr-att/2r98520000035co8.pdf> (in Japanese).
- Ohdo, K., Toyosawa, Y., Takanashi, S., Hino, Y., & Takahashi, H. (2009). Study on Mitigation of Fall Risk from Scaffolds in Construction Industry. *Proceedings of the Tenth International Conference on Structural Safety and Reliability* (pp. 187-192). Osaka: Kansai University.