(9) Japan International Center for Occupational Safety and Health, http://www.jniosh.go.jp/icpro/jicosh-old/index.html

(10) EU (European Union), http://europa.eu/

(11) Statutory Accident Insurance Fund, Germany, http://www.dguv.de/

(12) INRS (National Institute for Research of Safety, France),
http://www.inrs.fr

(13) BLS (Bureau of Labor Statistics, United States),
http://www.bls.gov/

(14) MOL (Ministry of Labor, Ontario), http://www.labour.gov.on.ca/

(15) Construction Safety Association of Ontario, http://www.csao.org/home.cfm

STUDY ON FALL PROTECTION FROM SCAFFOLDS BY SCAFFOLD SHEETING DURING CONSTRUCTION

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ABSTRACT

The frequency of fall accidents is one of the most serious problems in construction industries, and the countermeasures, such as guidelines, etc., for falls from scaffolds have been tightened in Japan. These countermeasures particularly affect the decrease in the number of the fatal accidents by falls from scaffolds. However, the rate of such accidents from falls is still high in the construction industries. In order to examine further countermeasures to reduce falls, the Japanese Ministry of Health, Labor, and Welfare has established a committee at the authors' institute.

That committee's work experimentally confirmed the effectiveness of using scaffold sheeting as a covering around scaffolds to protect against falling construction materials (a method widely used in Japan). Based on those results, the scaffold sheeting was improved for fall protection, and the effect of the improved sheeting could be confirmed experimentally.

Keywords: Fall accident, Scaffold, Scaffold sheeting, Construction safety.

1. INTRODUCTION

Falling accidents are a serious problem in the construction industry in Japan, as approximately 40% of fatal accidents during construction are caused by workers' falls. Therefore, Japan has introduced countermeasures to reduce falls from scaffolds and strictly enforces these measures with various safety guidelines. These countermeasures have led to a reduction in the rate of fatal accidents caused by falling from scaffolds.

Because the rate of fatal accidents from falls is still high, however, in the construction industry, possible countermeasures became the main issue of the 11th Labor Accidents Prevention Plan in Japan. In order to examine further countermeasures to reduce such falls, the Japanese Ministry of Health, Labor, and Welfare (MHLW) established a committee at the authors' institute to conduct an investigation of the regulations that exist in overseas countries and to evaluate various construction methods according to present safety guidelines.

From the results and the discussion, it was found that workers sometimes fell from the space between the hand rail and the work platform. To prevent the fall of the workers from this space, the

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space has to be narrowed. The scaffold sheeting, which covers around the scaffolds and is widely used in Japan, as shown in Photo 1, had some effect for this purpose according to the experiment by the committee. However, the workers still occasionally fell from the space between the work platform and the scaffold sheeting. One reason for this is because the space was spread by the workers weight, as shown in Photo 2, and the workers fell from the spread space (Ohdo et al. 2009). Therefore, in this study, the scaffold sheeting, which was plastic, was improved for fall protection from the spread space, and the effect of the improved plastic sheeting was examined experimentally.

Photo 1: Scaffolds covered with sheeting.

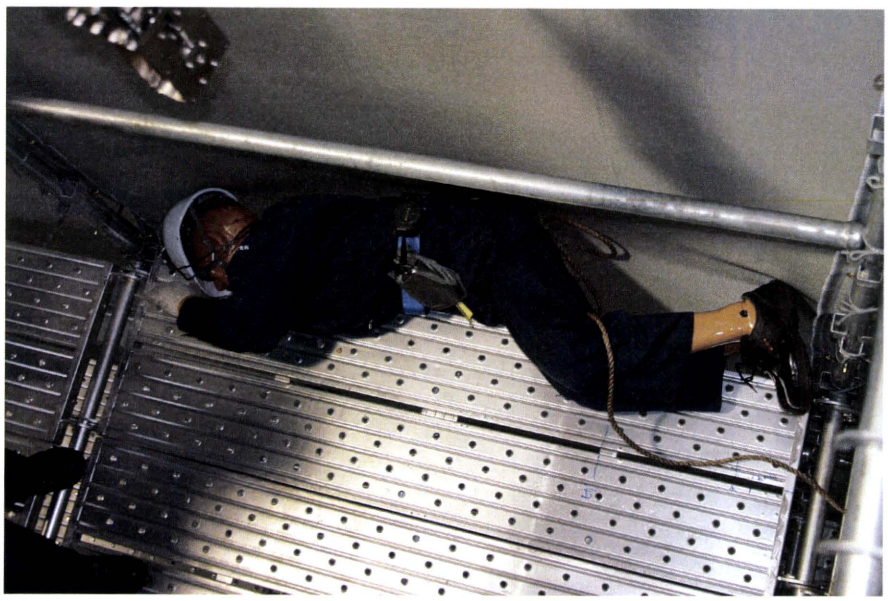

Photo 2: The spread space by the workers weight.

2. WORK EFFICIENCY BY GUARDRAIL-FIRST ERECTION METHOD

In Japan, the guardrail-first erection method is occasionally used for fall protection of the scaffolds as shown in Photo 3, and MHLW is aiming to spread the method by their safety guidelines. However, the method is not wide spread because of poor work efficiency.

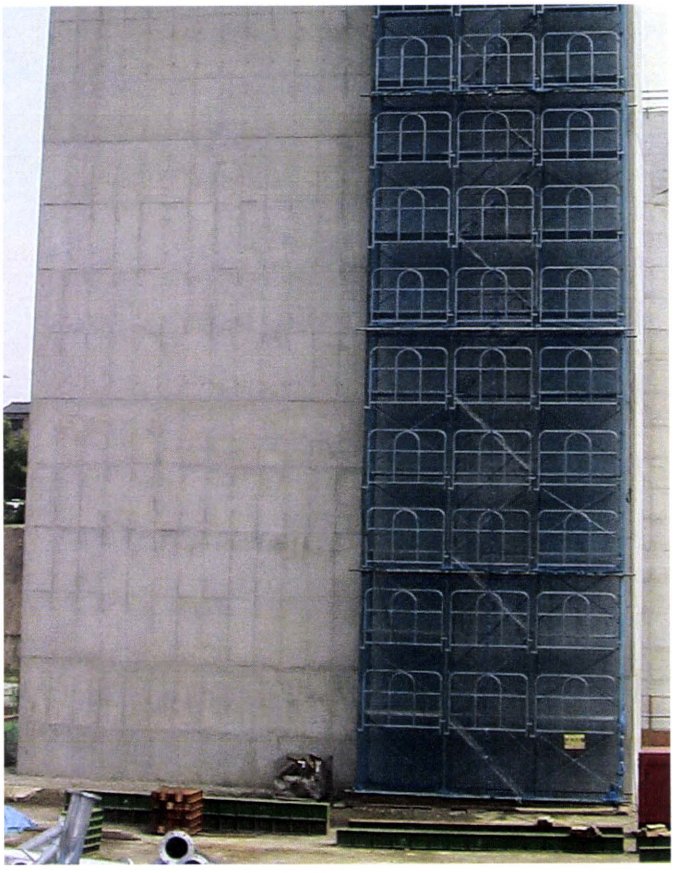

Photo 3: Prefabricated scaffolds constructed by guardrail-first erection method.

Figure 1 shows the results of a questionnaire survey on the work efficiency of the method shown in Photo 3. 18 workers answered the questionnaires. More than 80% of the workers felt that the method took more time, was complex, and had heavy pieces for the erection of the scaffolds.

Figure 2 and Figure 3 show the results of the survey on the safety and use of the method, respectively. Approximately 90% of the workers felt that the scaffolding work improved safety, but more than 60% of the workers answered that they did not want to use the method because of its poor work efficiency.

Therefore, in this study, the safe and easy installation method for fall protection for the scaffolds was developed by improving the scaffold sheeting.

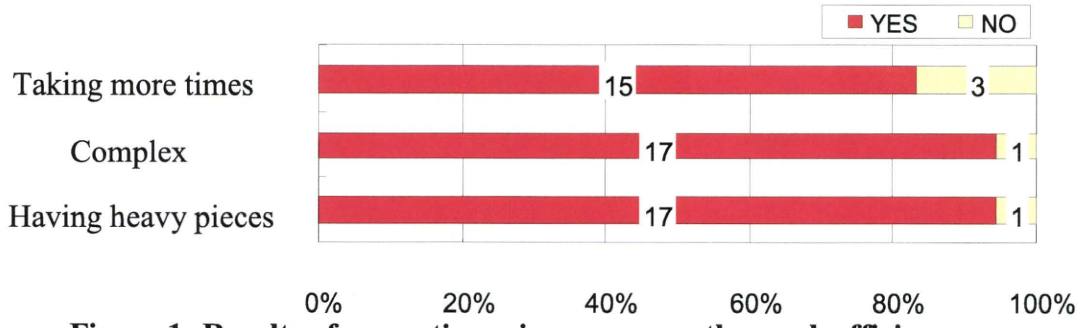

Figure 1: Results of a questionnaire survey on the work efficiency of the guardrail-first erection method.

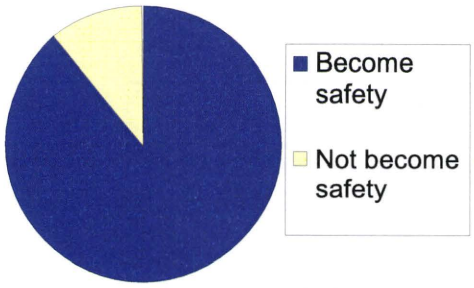

Figure 2: Results of the survey on the Safety of the guardrail-first erection method.

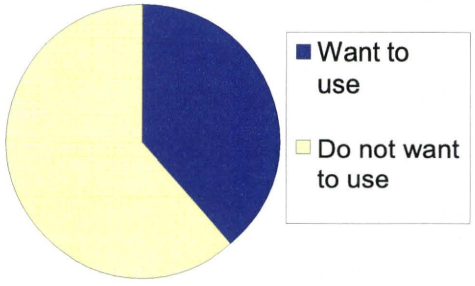

Figure 3: Results of the survey on the use of the guardrail-first erection method.

3. IMPROVEMENT OF PLASTIC SHEETING

In this study, the plastic sheeting was improved for fall protection from the spread space, as shown in Figure 4. The improved sheeting has additional attached sheets, as shown in Photo 4, and the attached sheets were sewn with the plastic sheeting near the work platform.

The effect of the improved plastic sheeting was examined experimentally by using a sand bag or human dummy.

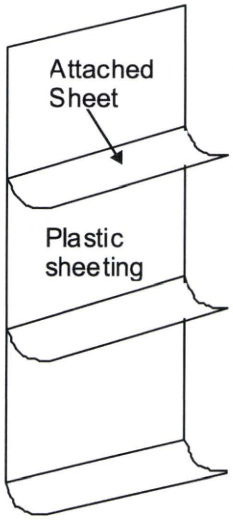

Figure 4: Improved sheeting.

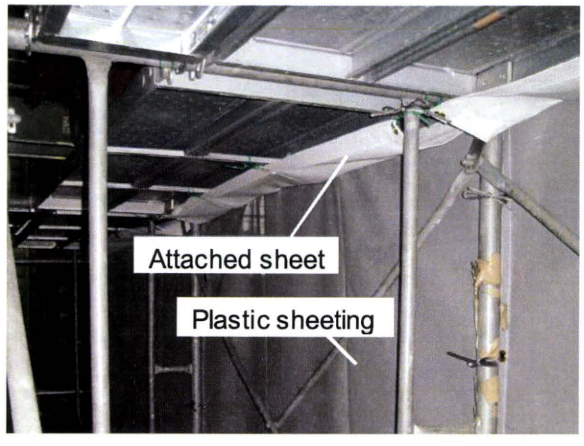

Photo 4: Attached sheet sewn with plastic sheeting.

3.1. Experimental method

Table 1 shows experimental conditions for examining the effect of fall protection provided by the improved sheeting. The attached sheets were fixed to the work platform by three kinds of materials.

a: Fiber rope

b: Steel wire with a diameter of 1.0 mm

c: Steel wire with a diameter of 2.3 mm

Table 1: Experimental conditions

Case	Fixed by	Fall Height	Fallen object
1	Fiber rope	640 mm	Sand bag
2	Wire(1.0mm)	640 mm	Sand bag
3	Wire(2.3mm)	640 mm	Sand bag
4	Wire(2.3mm)	640 mm	Human dummy
5	Wire(2.3mm)	1000 mm	Human dummy
6	Non	640 mm	Human dummy

The experiments were performed by using a sand bag and a human dummy. The sand bag or human dummy were dropped from the height of 640 mm above the work platform into the spread space by using a slide. Only in case 5, the human dummy was dropped from the height of 1000 mm in order to confirm the further safety, as shown in Photo 5.

The weight of the sand bag and human dummy was 735 N for each. The space between the plastic sheeting and the work platform was set to be 160 mm, which was the maximum space of the prefabricated scaffolds, as shown in Figure 5.

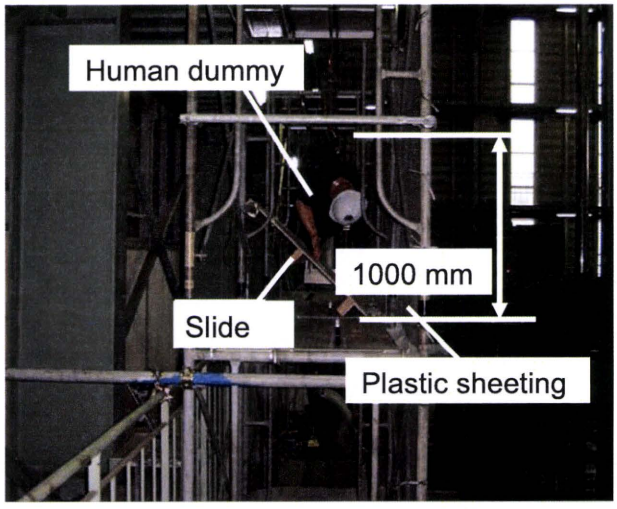

Photo 5: Fall from height of 1000 mm.

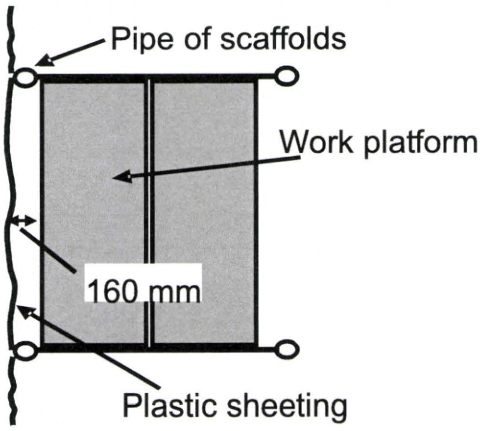

Figure 5: The space of 160 mm.

3.2. Results of experiment

Table 2 shows the results of the experiment. For cases 1-2, the sand bag fell below the work platform. Therefore, the fiber ropes and the steel wire with 1.0 mm diameter were severed by the mass of the sand bag. However, the sand bag did not fall below the work platform for case 3, as shown in Photo 6.

From the results of cases 1 and 2, the fiber ropes and the steel wire with 1.0 mm diameter would not be used as the materials for fixing the attached sheets to the work platform. Therefore, a steel wire with 2.3 mm diameter was used as the material for fixing the attached sheets, in cases 4 and 5. Additionally, the human dummy was used for the fallen object in those tests.

Table 2: Results of experiment

Case	Fixed by	Fall Height	Results(Fell / Not fall)
1	Fiber rope	640 mm	Fell, sand bag
2	Wire(1.0mm)	640 mm	Fell, sand bag
3	Wire(2.3mm)	640 mm	Not fall, sand bag
4	Wire(2.3mm)	640 mm	Not fall, human dummy
5	Wire(2.3mm)	1000 mm	Not fall, human dummy
6	Non	640 mm	Fell, human dummy

For case 5, the human dummy did not fall below the work platform, even though the fall height was 1000 mm, as shown in Photo 7. However, for case 6, in which the attached sheets were not fixed to the plastic sheeting to mimic the normal construction condition, the human dummy fell below the work platform, as shown in Photo 8. Therefore, it can be concluded that the improved sheeting was effective for fall protection from the scaffolds when the attached sheets were fixed by steel wire with at least a 2.3 mm diameter.

Photo 6: Result of case 3.

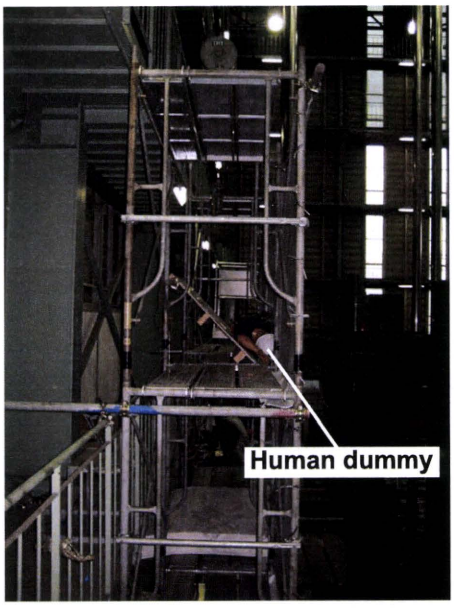

Photo 7: Result of case 5.

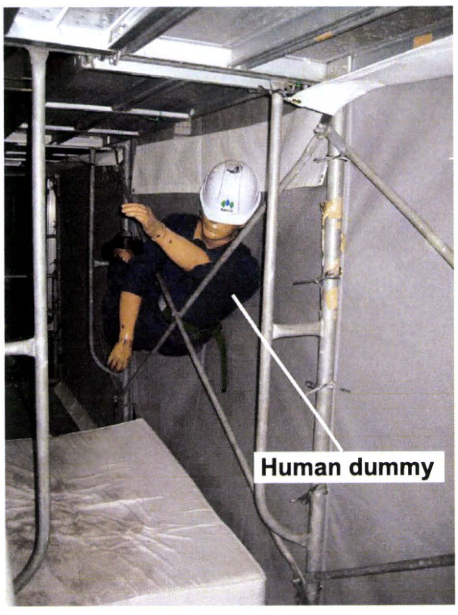

Photo 8: Result of case 6.

3.3. Improvement of work efficiency of the improved sheeting

Case 7 in Table 3 was performed to improve the work efficiency, and the fixing material was changed from steel wires to twisted pair fiber ropes. Then, the weight of the human dummy was increased from 735 N to 833 N for confirming further safety. In this case, the human dummy also did not fall below the work platform, and the work efficiency could be slightly improved. Consequently, the sheeting has been designed to be improved continuously.

Table 3: Results of experiment for improvement of work efficiency

Case	Fixed by	Fall Height	Results(Fell / Not fall)
7	Twisted pair fiber rope	1000 mm	Not fall, human dummy

4. CONCLUDING REMARKS

In this study, the scaffold sheeting was improved for fall protection from scaffolds, and the effect of the improved sheeting was examined experimentally. The results are summarized as follows.

(1) The plastic sheeting was improved for fall protection from the spread space by sewing additional attached sheets.

(2) From the results of the experiments, it was found that the improved sheeting was effective for fall protection from the scaffolds when the attached sheets were fixed by steel wires with a diameter of 2.3 mm.

(3) The work efficiency could be slightly improved when the fixing material was changed from steel wires to twisted pair fiber ropes. Consequently, the sheeting has been designed to be improved continuously.

5. ACKNOWLEDGMENTS

This study was supported by Health and Labour Sciences Research Grants (Research on Occupational Safety and Health) in 2010 from the Ministry of Health, Labour and Welfare of Japan.

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STUDY ON FALL PROTECTION FROM SCAFFOLDS BY IMPROVED SCAFFOLD SHEETING

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The frequency of fall accidents is one of the most serious problems in construction industries, and the countermeasures for the fall from the scaffolds had been tighten as the guidelines, etc., in Japan. These countermeasures take the particular effect as the decrease of the death accidents by fall from the scaffolds. However, the rate of fatal accidents from falls is still high in the construction industries. In order to examine further countermeasures to reduce such falls, the Japanese Ministry of Health, Labour and Welfare had established a committee in the authors' institute. That committee's work experimentally confirmed the effectiveness of using the scaffold sheeting as a covering around scaffolds to protect against falls of construction materials (a method widely used in Japan). Based on those results, the scaffold sheeting was improved for fall protection, and the effect of the improved sheeting could be confirmed experimentally.

Introduction

Fall accidents are a serious problem in the construction industry in Japan, and approximately 40% of fatal accidents during construction are caused by workers' falls. Therefore, Japan has introduced countermeasures to reduce falls from scaffolds, and strictly enforced these with various safety guidelines. These countermeasures have led to a reduction in the rate of fatal accidents caused by falling from scaffolds.

However, the rate of fatal accidents from falls is still high in the construction industry, and possible countermeasures became the main issue of the 11th Labour Accidents Prevention Plan in Japan. In order to examine further countermeasures to reduce such falls, the Japanese Ministry of Health, Labour and Welfare had established a committee in the authors' institute to conduct an investigation of the regulations that exist in overseas countries and to evaluate various construction methods according to present safety guidelines.

From the results and the discussion, it was found that the workers sometimes fell from the space between the hand rail and the work platform. To prevent the fall of the workers from the space, the space have to be made narrow. The scaffold sheeting, which covered around the scaffolds and widely used in Japan, as shown in Photo 1, had a few effects for this purpose according to the experiment by the committee. However, the workers still occasionally fell from the space between the work platform and the scaffold sheeting. One reason is because the space was spread by the workers weight, and the workers fell from the spread space. Therefore, in this study, the scaffold sheeting, of which material was plastic, was improved for fall protection from the spread space, and the effect of the improved plastic sheeting was examined experimentally.

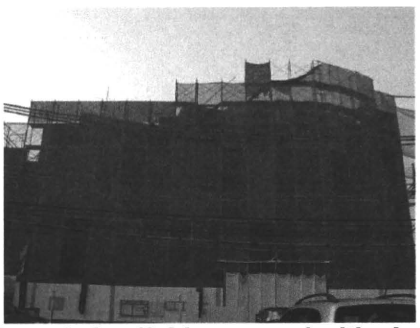

Photo 1. Scaffolds covered with sheeting

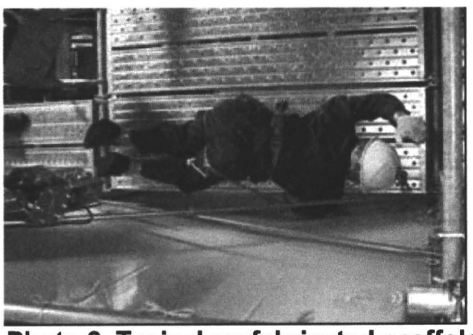

Photo 2. Typical prefabricated scaffolds

Improvement of plastic sheeting

Photo 2 shows the typical prefabricated scaffolds used in Japan. It was considered that the plastic sheeting, which envelop the scaffolds, are able to protect the workers from falling, but their effectiveness was not clear. Therefore, their effectiveness was examined experimentally using a human dummy. The human dummy weighed 700 N, the average body size of Japanese males. Table 1 shows the experimental cases.

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					

These cases were the same as those considered in earlier studies (Japan Construction Occupational Safety and Health Association, 2003). An experiment with a used plastic sheeting (Case 8) was carried out to determine the strength of deteriorated sheeting.

In all experimental cases, the human dummy did not fall from the scaffolds, and it was found that the plastic sheeting were effective for fall protection, given a perfectly installed sheeting. However, in some cases, the dummy almost fell from the scaffolds. Then, the space between the plastic sheeting and the work platform was spread widely, and the dummy almost fell from the space.

Thus, in this study, the plastic sheeting was improved for fall protection from the spread space, as shown in Figure 1. The improved sheeting has additional attached sheets, as shown in Photo3, and the attached sheets were sewed with the plastic sheeting near the work platform.

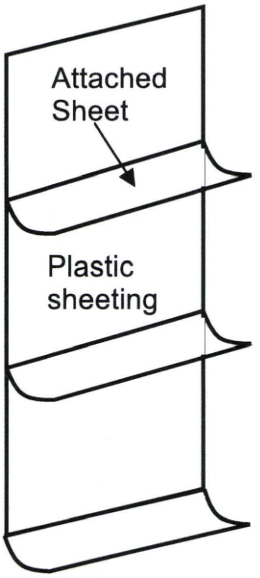

Figure 1. Improved sheeting

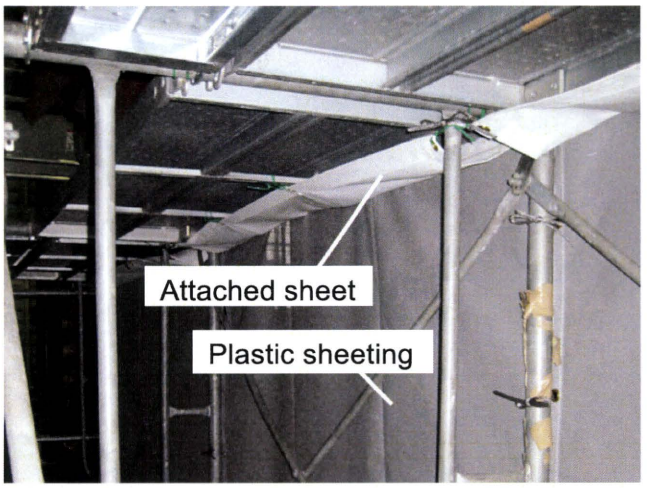

Photo 3. Attached sheet sewed with plastic sheeting

Experimental method

Table 2 shows experimental conditions for examining the effect of fall protection by the improved sheeting. The attached sheets were fixed to the work platform by four kinds of materials.

1: Fiber rope

2: Steel wire with a diameter of 1.0 mm

3: Steel wire with a diameter of 2.3 mm

4. Twisted pair fiber rope

The experiments were performed by using a sand bag and a human dummy. The sand bag or human dummy were fallen from the height of 640 mm above the work platform into the spread space by using a slide. In only cases 5 and 7, the human dummy was fallen from the height of 1000 mm for confirming the further safety, as shown in Photo 4.

The weight of the sand bag or human dummy was 735 N, but in only case 7 the weight was 835N. The space between the plastic sheeting and the work platform was set to be160 mm, as shown in Figure 2.

Table 2. Experimental conditions

Case	Fixed by	Fall Height	Fallen object
1	Fiber rope	640 mm	Sand bag
2	Wire(1.0mm)	640 mm	Sand bag
3	Wire(2.3mm)	640 mm	Sand bag
4	Wire(2.3mm)	640 mm	Human dummy
5	Wire(2.3mm)	1000 mm	Human dummy
6	Non	640 mm	Human dummy
7	Twisted pare fiber rope	1000 mm	Human dummy

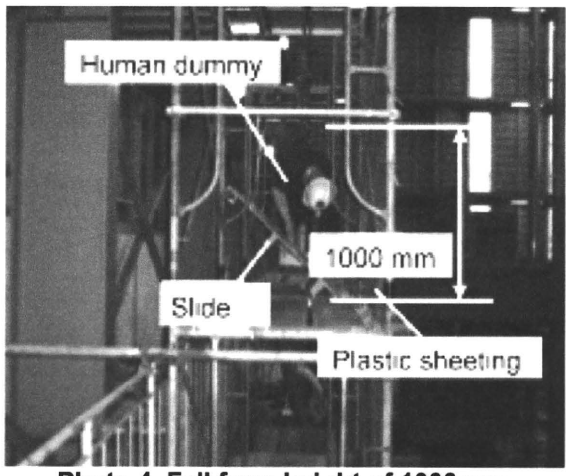

Photo 4. Fall from height of 1000 mm

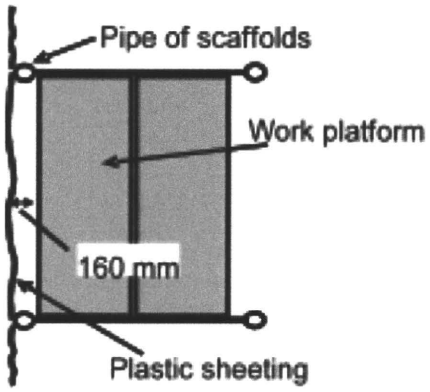

Figure 2. The space of 160 mm

Results of experiment

Table 3 shows the results of experiment. For cases 1-2, the sand bag fell below the work platform. Therefore, the fiber ropes and the steel wire with 1.0 mm diameter were cut by mass of the sand bag. However, the sand bag did not fall below the work platform for case 3, as shown in Photo 5.

Table 3. Results of experiment

Case	Fixed by	Fall Height	Results(Fell / Not fall)
1	Fiber rope	640 mm	Fell, sand bag
2	Wire(1.0mm)	640 mm	Fell, sand bag
3	Wire(2.3mm)	640 mm	Not fall, sand bag
4	Wire(2.3mm)	640 mm	Not fall, human dummy
5	Wire(2.3mm)	1000 mm	Not fall, human dummy
6	Non	640 mm	Fell, human dummy
7	Twisted pare fiber rope	1000 mm	Not fall, human dummy

From the results of cases 1 and 2, the fiber ropes and the steel wire with 1.0 mm diameter would not be used as the materials for fixing the attached sheets to the work platform. Therefore, the steel wire with 2.3 mm diameter was used as the material for fixing the attached sheets, in cases 4 and 5. Continually, the human dummy was used for the fallen object.

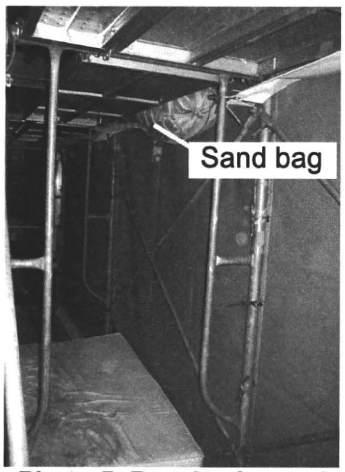

Photo 5. Result of case 3

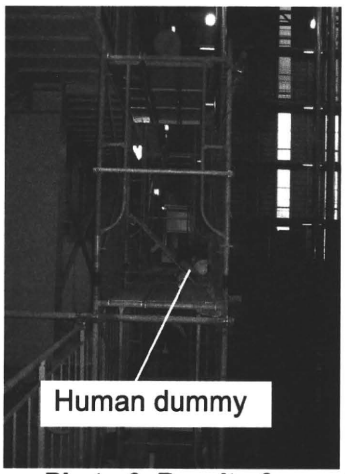

Photo 6. Result of case 5

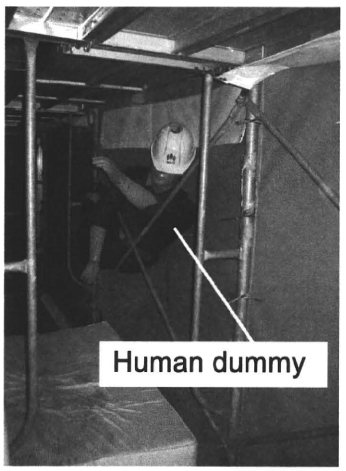

Photo 7. Result of case 6

For case 5, the human dummy did not fall below the work platform, even if the fall height was 1000 mm, as shown in Photo 6. However, for case 6 which the attached sheets were not fixed to the plastic sheeting as same as the normal construction condition, the human dummy fell below the work platform, as shown in Photo 7. Therefore, it can be concluded that the improved sheeting was effective for fall protection from the scaffolds when the attached sheets were fixed by the steel wire with at least 2.3 mm diameter.

Case 7 was performed for improving the work efficiency, and the fixing material was changed from steel wires to twisted pair fiber ropes. Then, the weight of the human dummy was increased from 735 N to 833 N for confirming the further safety. In this case, the human dummy also did not fall below the work platform, and the work efficiency could be slightly improved. Consequently, the sheeting has been planned to be improved continuously.

Conclusion

In this study, the scaffold sheeting was improved for fall protection from the scaffolds, and the effect of the improved sheeting was examined experimentally. From the results of the experiments, it can be concluded that the improved sheeting was effective for fall protection from the scaffolds.

Acknowledgment

This study was supported by Health and Labour Sciences Research Grants (Research on Occupational Safety and Health) in 2009 from the Ministry of Health, Labour and Welfare of Japan.

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メッシュシートを利用した足場からの墜落防止方法の耐久性の検討

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正会員　高橋弘樹，正会員　豊澤康男

1．はじめに

建設業における労働災害による死亡者数は、墜落災害によるものが最も多く、平成19年は207人、平成20年は172人が死亡している。このような状況の中、平成21年6月施行の改正労働安全衛生規則により足場等からの墜落防止措置が強化されており、わく組足場の場合には交さ筋かいの下に下さんまたは幅木を取り付けることが、それ以外の足場については二段手すりを設置することが義務付けられた。

これを海外にも目を向け、欧州三カ国（英国、ドイツ、フランス）および北米二カ国（米国、カナダ）の状況について調査すると、各国とも二段手すり（国によっては幅木）の設置が義務付けられており、ほぼすべての現場で実施されていた[1,2]（写真1参照）。また、米国ではわく組足場が主流であり、交さ筋かいの下に下さん（交さ筋かいの交点の位置によっては上さん）の設置が義務付けられており、ほぼすべての現場で実施されていた（写真2参照）。以上より、今回の改正規則により欧米と同等の墜落防止措置が義務付けられたことになるが、それまでわが国ではメッシュシートが墜落防止に何らかの役割を果たしてきたと考えられる。

メッシュシートの墜落防止性能については、これまでに何度か実験的に検討されており、例えば文献3では完全に墜落を防止することはできないがある程度の墜落防護機能が認められたとされている。このため、メッシュシートを改良し、今回の改正規則と同等以上の墜落防止性能を発揮できるようにすれば、新たな墜落防止措置を行うことなく安全性の高い経済的な足場を設置することが可能となる。

そこで、本研究では、これまでの研究で検討したメッシュシートを利用した足場からの墜落防止方法[4]について、さらなる安全性に関する検討を行うことを目的として、人体ダミーを用いた落下実験によりその耐久性を調べた。

写真1　英国における足場の状況

2．実験方法

これまでの研究[4]では、図1に示すようにメッシュシートを改良したものを製作し、作業者の落下空間を完全に塞ぐ方法について検討を行った。その際の実験条件と結果を表1に示すが、鉄筋等を結束する番線により図1に示す付属のシート（メッシュシートと同じ材質のもの）と作業床を結束すれば、落体として使用した質量75kgの人体ダミーの落下を防止することが可能となることがわかった。しかし、1回実験が終了するたびにメッシュシートを張り替えたため、付属のシートの耐久性が確認できなかったこと、番線での結束では作業性が劣ること等の問題が残されていた。そこで、本研究では、付属のシートの耐久性を確認するため、作業床に取り付けた付属のシートを交換せずに複数回の落下実験を行った。実験の状況を、写真3に示す。その際、人体ダミーの質量を75kgから85kgに増加させ、さらに人体ダミーの落下高さを1000mmに固定して、耐久性に加えさらなる安全性についても検討することとした。また、写真4に示すように付属のシートと作業床の結束を、通常のメッシュシートの結束に使用す

写真2　米国における足場の状況

キーワード　足場，墜落，メッシュシート，人体ダミー
連絡先　〒204-0024　東京都清瀬市梅園1-4-6，TEL:042-491-4512，FAX:042-491-7846

る繊維ロープを 2 本に撚ったもので行い、作業性の向上を図った。

3．実験結果と考察

表 2 に、本研究における実験条件と結果を示す。その結果、同一の付属のシートに対する実験により、6 回目までは写真 5 に示すように人体ダミーの落下を防止することができた。また、2 本に撚った繊維ロープについては、目立った損傷は見られなかった。これより、本研究の方法により高い墜落防止性能とある程度の耐久性があることが確認できた。しかし、7 回目の実験では写真 6 に示すように、メッシュシートと付属のシートの接続部が破損して人体ダミーが落下した。今後は、この接続部の補強について検討し、安定した墜落防止性能を発揮できるように改良していく予定である。

図 1　改良したメッシート

表 1　これまでの研究による実験条件と結果

実験名	シートを結束した材料	落下高さ	落下の有無
実験①	繊維ロープ 1 本	640mm	落下した
実験②	番線(φ1mm)	640mm	落下した
実験③	番線(φ2.3mm)	640mm	落下せず
実験④	番線(φ2.3mm)	640mm	落下せず
実験⑤	番線(φ2.3mm)	1000mm	落下せず
実験⑥	なし	640mm	落下した

表 2　本研究による実験条件と結果

実験名	シートを結束した材料	落下高さ	落下の有無
実験①	繊維ロープ 2 本	1000mm	落下せず
実験②	繊維ロープ 2 本	1000mm	落下せず
実験③	繊維ロープ 2 本	1000mm	落下せず
実験④	繊維ロープ 2 本	1000mm	落下せず
実験⑤	繊維ロープ 2 本	1000mm	落下せず
実験⑥	繊維ロープ 2 本	1000mm	落下せず
実験⑦	繊維ロープ 2 本	1000mm	落下した

写真 3　実験前の状況

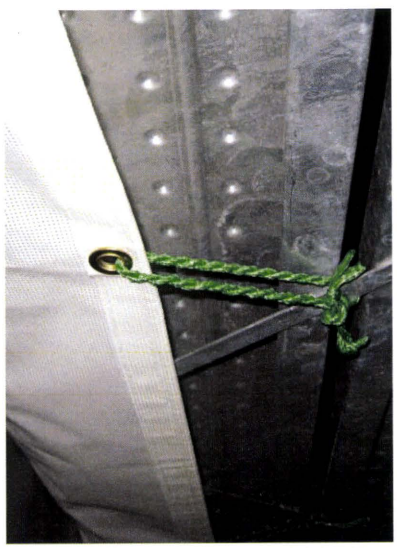

写真 4　2 本に撚った繊維ロープ

4．まとめ

本研究では、これまでの研究で検討したメッシュシートを用いた墜落防止方法を改良し、さらなる安全性に関する検討を行うことを目的として、人体ダミーを用いた落下試験によりその耐久性を調べた。その結果、本研究の方法により、高い墜落防止性能とある程度の耐久性があることが確認できた。

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写真 5　実験後の状況(落下せず)

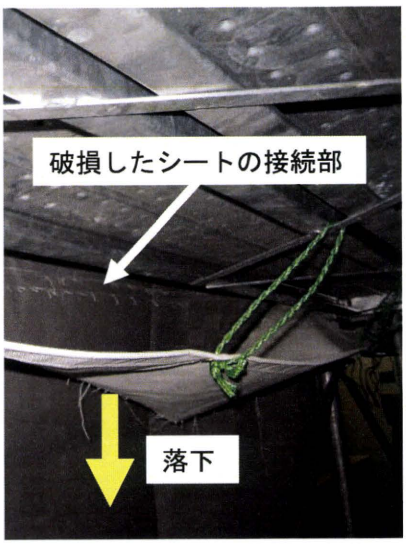

写真 6　実験後の状況(落下)

ドイツ建設業における労働安全管理体制の現場調査

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豊澤康男（労働安全衛生総合研究所）・高橋弘樹（労働安全衛生総合研究所）

1．はじめに

昨年度に報告した文献等に基づく国内調査結果[1]を踏まえ、足場に関する規格の調査を実施した。更にこれら調査で明らかとした法令・規則等が、現地においてどのように運用・機能しているかを明らかにするため、現地調査を実施した。本報は、それら調査結果の概要をまとめたものである。なお現地調査は、2つの都市（ベルリン市およびフランクフルト市）を対象として、これを実施した。

2．ドイツにおける足場規格の概要

ドイツの足場規格は、欧州における共通規格となりつつあるEN規格[2]がベースとなり、国内規定[3]として作成されたものになっている。建設労働者の墜落防止対策としては、“2段手すり”を基本とし、上さんについては高さ1m±0.05m、“中さん”については床上0.47m以上とするものであった。また“幅木”については、高さ0.15m以上に設置し、労働者の墜落防止用ではなく、物体の落下防止用として用いられる、というものであった（図1参照）。なお、枠組み足場で用いられる“交差筋かい”は、日本においては手すりとみなされているが、同規定では、このような規定は存在していないようであった。

3．ドイツにおける足場の設置状況

フランクフルトならびにベルリンの市街地における足場の基本構造は、ほぼすべてにおいて2段手すりに幅木を設けた構造となっていた（写真1参照）。このほか日本との比較で特徴的な事は、①交差筋かいを用いた足場が見られなかった事、②足場用階段が足場板に組み込まれている事、③足場材料として用いられる単管式足場の単管直径が大きい事、④足場板には木製のものが多く用いられていたこと（写真2）が挙げられる。また足場用シートは、景観に適合するようペイントされていたのが印象的であった。

4．ドイツにおける安全衛生管理体制

現地調査では、ベルリン市役所の職員、あるいは建設業労災保険組合（BG-BAU）の職員らとともに建設現場を訪れ、そこで臨検の様子を見学する機会に恵まれた。彼らのインタビューを総括すると、現場に設置された足場は2段手すりが絶対条件であるとの事で、これは事前調査結果

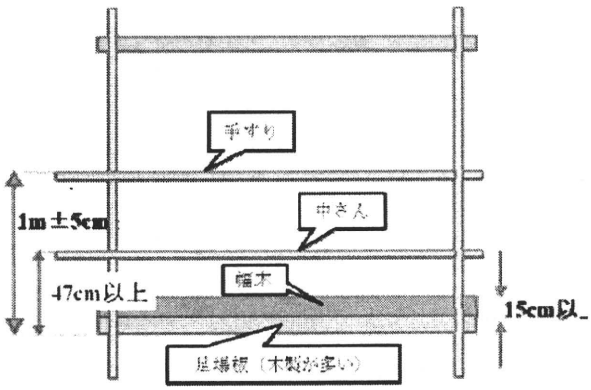

図1　ドイツにおける足場の設置規定

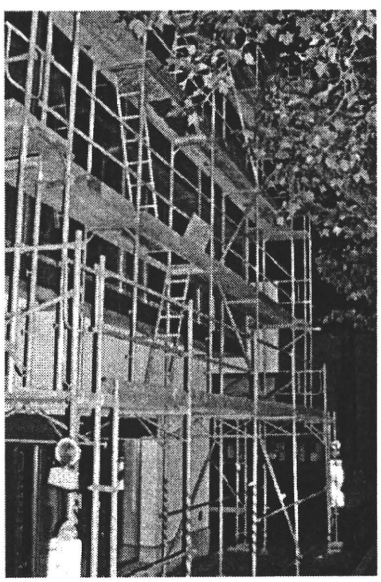

写真1．ドイツにおける足場の設置状況

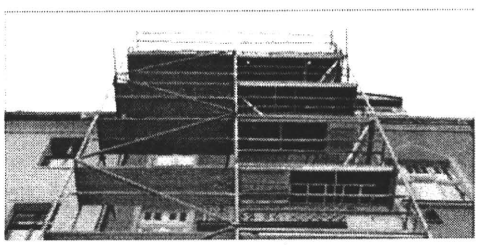

写真2．足場板の状況

と一致する内容であった。ただし具体的な手すりの高さは1.1mで、中さんは地面と手すりの中央（すなわち0.55m）であるとの事であったため、手すりの高さに関しては、事前調査より若干高い値を現在は採用しているようであった。なお、視察した建設現場では、同規定を満たさないものも見受けられたが、作業予定にない箇所については、違反とは見なさないとの事であった。

このほかの足場の規定としては、労働者の墜落を防止するために、足場と建物との間隔を一定間隔未満（具体的には0.3m未満）とする規定が存在するようであり、臨検の際にその間隔（30cm未満）を定規で測るなどして、厳しくチェックしていた。臨検は市役所の職員のほか、BG-BAUの職員に法的権限が認められており、何時でも入場することができ、抜き打ち点検を実施しているとの事であった。また臨検の実施時期は特に決まりはなく、市役所・BG-BAUの職員それぞれが裁量で決定するようであるが、市役所とは情報共有して合同で行なう場合が多いとの事である。そして点検の結果、違反が発見された場合は、是正措置を促すほか、罰金も課すことが可能との事であった。命令に対する改善期限についても職員の裁量に任されているようであった。現場責任者に命令を出したのち、2時間後に再び現場へ点検に向かう場合もあれば、1週間後に確認する場合もあるとの事である。そして是正措置命令などに従わない場合は、当該違反箇所を封鎖する措置をとり、安全を確保するための措置がなされるまで、現場で監視する場合もあるとの事であった。なお、封鎖を行なうのは当該違反箇所のみであり、現場全体を封鎖する措置は死亡災害が発生しても原則として行なわない模様である。この点においては、日本と事情がずいぶん異なっている。

加えてドイツでは、最近5年間で100以上の法律を廃止したとの事である。これは法律さえ守れば責任を逃れられるような制度から脱却して、安全衛生マネジメントを各現場で行なわせるのが主な理由であるとの事であった。このほかドイツの安全衛生管理体制の特長としては、市役所とBG-BAUの連携が良いこと、加えて徹底した現場に対する安全指導が目に付いた。職員は違反を見つけると労働者に対して直接その場でしかりつけるだけでなく（写真3参照）、当該現場責任者に連絡して是正指導を行なっていた。また前回の検査で指摘した事項の改善状況のチェックも行なっていた。

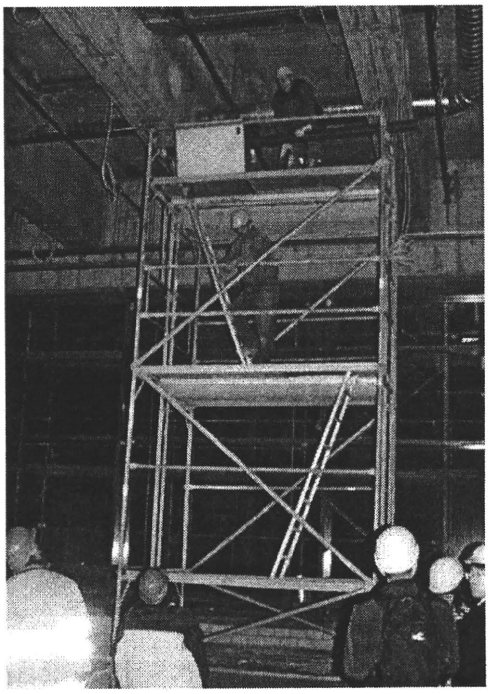

写真3．臨検の際に行われた指導の模様

5．まとめ

ドイツの足場規格は、欧州における共通の基準となりつつあるEN規格をベースとして、国内規定が作成されており、またそのルールがきちんと遵守されていること様子が現地調査から伺えた。また安全衛生管理体制に関しては、政府機関と労災保険組合の職員によって建設現場の臨検等が頻繁に行われており、二元的な立場から当該現場の是正指導が行われていた。情報共有のみならず合同臨検も比較的行われているようであり、公的機関同士の連携の良さも目立った。

謝辞

本稿は、平成２１年度において、厚生労働科学研究費補助金（労働安全衛生総合研究事業）を受け、実施した研究の成果である。

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