

Rethinking Occupational Safety and Health of working in confined spaces – Taking multiple manhole related incidents as example

Occupational Health Education

- ▶ Programme on Promoting Pneumoconiosis Prevention for Construction Workers: Dust and Health
- ▶ Review of major OSH events in Hong Kong – Hand Injuries



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Programme on Promoting Pneumoconiosis Prevention for Construction Workers: Dust and Health

The construction industry has always been an important pillar of the Hong Kong economy and employs one of the greatest number of workers in Hong Kong. However, if suitable precautions are not taken during the works and OSH regulations and policy not implemented, frontline workers may suffer OSH risks causing accidents and work-related illnesses.

To promote awareness among frontline construction workers regarding pneumoconiosis, the Centre and the Hong Kong Construction Industry Employees General Union, under the support of the Pneumoconiosis Compensation Fund Board, co-launched a project titled “Promoting Pneumoconiosis Prevention for Construction Workers” to conduct promotional work at key areas including work sites and old building maintenance project locations. The aim is to educate frontline workers about dangers of pneumoconiosis and protect their health. In this issue, we will introduce the background of pneumoconiosis and ways to control dust at the work environment.

What is Pneumoconiosis?

Pneumoconiosis refers to a range of diseases caused by long-term inhalation of dust, and which leads to the fibrosis of the lung. In Hong Kong, silicosis and asbestosis are two of the common related diseases. These diseases may have an incubation period of over a decade and cause other respiratory diseases including tuberculosis, mesothelioma, lung cancer and bronchitis.

Silicosis and asbestosis are caused respectively by silicon oxide and asbestos. Both lead to fibrosis of the lung causing symptoms including tightness of the chest, shallow breathing, chest pains, lack of appetite and respiratory failure. Most cases of silicosis are caused by long-term exposing to silica dust in a construction work environment. High risk work procedures in Hong Kong include rock mining, well-drilling, tunnel digging, rock processing, road construction and maintenance involving the use of cement and bitumen. Maintaining and dismantling of ships, elevators, old wiring, old piping, boilers and buildings also expose workers to asbestos.

Both silicosis and asbestosis are incurable. World Health Organization (WHO) and the International Agency for Research on Cancer (IARC) have publicized the dangers of silicon oxide and asbestos on health, classifying them as group one carcinogens.

Effective control of environmental dust

Employer and work site management should strive to minimize workers' exposure to dust at the work environment, using such methods as “engineering control and ventilation”, “administrative control”, and “personal protective equipment”. In engineering control, dust contact can be minimized through substitution of materials, changing manufacturing procedures, sealing and isolation, and sprinkling of water. Also, using localized exhaust systems pollutants may be immediately removed from the source hence minimizing exposure. However, care must be taken to regularly and properly maintain dust control facilities. Also, suitable administrative controls including job rotation and rest, environment monitoring, training and education and regular cleaning may reduce dust-related risks. Regular health check up for workers may also facilitate early detection of such diseases as asbestosis or mesothelioma.

If the above measures are not effective in lowering exposure, personal protective equipment must be used including respirators. Care should be taken that such respirators are effective, comfortable and compatible with other protective equipment. As the final line of defense, proper function and usage is crucial to protect workers' health. According to a study in Hong Kong, only 8% of construction workers regularly use respirators and 12% use the wrong kind (cotton masks or towels).^[1] We must therefore start at the source to minimize worker exposure and promote their awareness of using protective equipment.

If workers detect signs of pneumoconiosis, they may visit occupational health clinics under the Labour Department or obtain a referral from chest clinics to seek further support from pneumoconiosis clinics.

Reference:

1. Lam TH (1997), A report on a second telephone survey to evaluate the knowledge of silicosis in the Hong Kong general public, University of Hong Kong

Rethinking Occupational Safety and Health of working in confined spaces – Taking multiple manhole related incidents as example

In an earlier issue, we have reviewed incidents happening in sewage treatment plants and learnt about the dangers of working in confined spaces. According to Section 2 of the *Factories and Industrial Undertakings (Confined Spaces) Regulation*, confined space means “any place in which, by virtue of its enclosed nature, there arises a reasonably foreseeable specified risk”, including any chamber, tank, vat, pit, well, sewer, tunnel, pipe, flue, boiler, pressure receiver, hatch, caisson, shaft or silo.^[1] Industrial accidents in confined spaces were common back in the day, however, as the times progressed such accidents are still not completely eliminated. According to Labour Department figures, occurrence of industrial accidents involving confined spaces is less common than that involving machinery, but the data involves only cases where the “injury-causing medium” was reported, and does not reflect the actual state of affairs.^[2] Meanwhile, lethal incidents such as explosion and suffocation may occur in confined spaces with severe consequences, and the dangers should not be taken lightly.^[3]

In this issue, we will examine a series of manhole related incidents and continue to reflect on the safety and health of working in confined spaces, and what preventive measures should be taken.

A manhole leads underground, and presents a form of confined space; they are the entrance to such underground facilities such as phone and electric cables, gas pipes and water mains, and offer a means for maintenance and repairs for such facilities.^[4, 5, 6, 7] In manholes, microbes digest the organic matter in the sewage to generate gases like marsh gas (methane), carbon dioxide and carbon monoxide.^[8, 9] Methane and carbon dioxide displaces the oxygen inside the manhole, causing suffocation; inhaling the suffocating gases including carbon monoxide and hydrogen sulfide results in the same.^[8, 9] With the exception of carbon dioxide, all of the above are combustible or explosive gases, and it takes only one spark to cause a fire or even explosion.^[3, 4] These are some of the many hazards faced by workers operating in a manhole.

Manhole incidents leading to casualties over the years

According to the newspapers, manhole incidents have been occurring since several decades ago. Take for example on 13th May 1980, an accident occurred at a construction site at Lek Yuen Estate in Shatin which led to the death of 3 workers. According to news reports, a worker fainted upon inhaling poisonous gases in the manhole, and two other workers immediately tried to save him by going after him into the manhole, but also succumbed to the poisonous gases and finally resulted in the tragic death of all three workers.^[10]

In recent years, although industrial accidents involving manholes are less prevalent, manhole accidents are still occurring every one or two years leading to worker

casualties. ^[11-17] The causes of such accidents are many: gas poisoning, damaged cables leading to explosions, caught in torrential floods, concussions, or falling into the manhole. ^[11-17] Casualties are also not limited to those who work inside the manhole but colleagues trying to rescue the first victim and the firefighters. ^[11, 17]

Concerns over manhole incidents

With the hazards involved in confined spaces, in as early as 1973 the Government has formulated the *Factories and Industrial Undertakings (Confined Spaces) Regulation*, with further amendments in 1981 and 1989 to further protect workers' health and safety. Nevertheless, accidents in confined spaces continued to happen, and because of the difficulty in implementing the law and per the suggestions in the *1995 Consultation Paper on the Review of Industrial Safety in Hong Kong*, the Government abolished replaced the old regulations with the new *Factories and Industrial Undertakings (Confined Spaces) Regulation* in 1999. ^[18, 19] Under the new regulation, before workers enter a confined space contractors should arrange for "competent person" to conduct risk assessment for the space and adopt their suggestions of improvement; it also stipulates that only "certified workers" who have completed occupational safety and health (OSH) courses related to working in confined spaces will be allowed to enter a confined space. ^[18, 19]

The new regulation further ensures the health and safety of the work environment in confined spaces, and promotes knowledge among workers entering such spaces regarding the hazards and precautions of working in such spaces. However, after the new regulation became effective, tragedies still recurred from time to time and sparked widespread discussions among the public. Regarding manhole incidents, different organizations have initiated discussions with contractors, government departments and workers. In 2006 for example, two workers died from inhaling marsh gas in the absence of safety monitoring and risk assessment. ^[12, 20] The Drainage Services Department criticized the contractor for neglecting to notify the Department before conducting work in a confined space and arranging for competent persons to conduct risk assessment; the Occupational Safety and Health Committee of The Hong Kong Federation of Trade Unions also urged the government to enforce monitoring and spot checks and penalize non-compliant contractors. ^[20, 21]

On another hand, the effectiveness of existing legislation and precautionary measures are under question. For example, the Hong Kong Construction Industry Employees General Union has pointed out that the Government has been too lax in enforcing the regulations and the penalty is too light, both of which should be redressed to enforce compliance. Another example is that even though the guidelines issued by the Labour Department stated that contractors should conduct repeat risk assessment during severe weather, an accident still occurred in 2011 where a worker was wash away by rain water. After this incident, one group criticized the guidelines for being too vague and there was also insufficient guidance about crisis management and mechanism of retreat in confined spaces, such that the worker still entered the manhole during heavy rain. ^[23, 24]

Also, the workers' awareness and rights regarding occupational safety and health are an issue of concern. Many accidents have happened because workers neglected to wear personal protective equipment when working in manholes, and the Labour Department and the Occupational Safety & Health Council have, as a result, required contractors to strengthen training and education for workers. ^[21, 25] Labour groups are also urging the government to legislate to ensure workers' rights to refuse to work without sufficient protective measures. ^[21]

Besides workers working in confined spaces, labour groups also expressed concerns over the safety of rescue workers and that of their work procedures. In 2004, for example, one firefighter died from gas poisoning when rescuing a worker trapped in a manhole. ^[11, 26] Although firefighters are not required to follow the *Factories and Industrial Undertakings (Confined Spaces) Regulation*, the Fire Services Department did have guidelines for rescue work procedures and risk assessment. After the incident, some organizations have suggested to launch

an investigation into whether the involved firefighters had followed the guidelines and procedures and whether such guidelines and procedures are at fault. ^[11, 27]

Urge the authorities to improve OSH measures to protect workers working in confined spaces

The many manhole-related industrial accidents over the years have proven to us that there is still room of improvement for the OSH of workers working in confined spaces. Improvement measures may be conducted on three facets: eliminate the risk, minimize workers' contact with said risk, and protect workers from harm. ^[28]

1. Eliminate the risk

The first step to protecting workers' health is to minimize unnecessary risks in the work space. Take the manhole accident in 2006 as an example, investigations revealed that the contractor has arranged for workers to enter the manhole to mend the sewage pipes even though such works are not absolutely necessary. ^[12] According to the works order as outsourced by the Drainage Services Department, the original task could have been replaced by the originally-suggested lower-risk trenching works, but instead a high-risk manhole procedure was adopted to save time. ^[12] If the trench works were adopted as suggested, workers would not have to face the dangers of working in a manhole. Thus, whether a project is conducted by the government or contractor, after the work order is issued the authorities should strictly monitor whether the management personnel has followed such order to avoid unnecessary risks.

2. Minimize workers' contact with risks

If entering a confined space is unavoidable, management personnel should arrange for qualified individuals to conduct risk assessment and implement effective controls to minimize workers' contact with risks. For example, an effective ventilation system should be installed to provide fresh air and to dilute explosive or poisonous gases in the manhole. ^[1, 29] However, in the aforementioned manhole accident in 2006, no risk assessment or air quality checking was conducted, nor was any ventilation system installed, resulting in the death of two workers upon inhaling poisonous gases. ^[30]

Therefore, the government should implement administrative controls such as monitoring and training to ensure such precautionary measures are adopted. Although the *Factories and Industrial Undertakings (Confined Spaces) Regulation* has been in place for years, with several amendments and new sections added, industrial accidents in confined spaces are still happening, which could have been avoided if the regulations were strictly adhered to. One has to question whether the authorities have been negligent in monitoring the procedures and adherence to the guidelines. We urge the government to take extra measures to ensure the proper procedures are followed, including hiring competent person for risk assessment, installing effective ventilation systems and monitoring air quality of the work space. Penalties should also be imposed upon non-compliant contractors. Also, both the government and contractors should regularly remind and educate workers about the potential dangers of confined spaces and the importance of precautionary measures so as to build a healthy OSH culture and encourage workers to take an active interest in OSH topics.

When in emergencies or accidents, effective crisis management procedures can reduce casualties and are hence crucial for protecting workers' OSH. According to the guidelines for working in confined spaces issued by the Labour Department, the contractor should have a team of trained rescuers ready to act in case of accidents. ^[1] Also, during works in confined spaces, additional personnel should stand by to monitor the safety of workers working in the space. In case of accident, these personnel should not attempt rescue themselves but should summon rescuers for assistance. ^[1]

According to news reports, in a manhole accident in September 2014, a worker did not wait for the rescue team but went in alone into the manhole to save his trapped colleague. It was only some time later that other workers found out that both have fainted at the bottom of the manhole, resulting in delayed rescue. ^[17, 31] In another accident, a foreman only discovered the accident hours later, indicating that awareness for such accidents are lacking. ^[30, 32] Management personnel should thus implement effect contingency measures and make sure workers know them by heart.

3. Protecting workers from harm

In a confined space, it is essential for workers to wear effective personal protective equipment including respirators, safety helmets and belts. In the many previous manhole accidents workers have neglected to wear safety equipment, or they have not been wearing the proper equipment. ^[15, 30] The management should provide workers with full and effective protective equipment and the necessary knowledge to use such equipment.

Confined space carry great risks, and industrial accidents happen even today. There are many reasons for such accidents, and to fully protect workers' OSH one should take multiple precautions from eliminating risks, minimalizing workers' contact with risks, and protecting workers from harm. Even when regulations and guidelines about work in confined spaces are present, the government should enforce monitoring while arranging for worker training and education to promote awareness among both workers and contractors.

OSH tips

Work in confined spaces present workers with a host of potential hazards. This issue's OSH tips will introduce three of the common hazards:

Hazard	Effect	Example of accident
Gas hazard	Methane and carbon dioxide displaces the oxygen inside the confined space, causing suffocation ^[8, 9] ; inhaling the suffocating gases including carbon monoxide and hydrogen sulfide results in the same. ^[9]	In the manhole accidents in 2004 and 2006 there were worker casualties from gas leak incidents in manholes. ^[12, 17]
Electrical hazard	Working in confined space workers may come into contact with electrical system, causing electrocution or explosion. ^[4]	In 2008 and 2012, workers have accidentally damaged electrical cables causing explosions. ^[13, 16]
Drowning	Working in water tanks or underground waterways sudden surge of water may cause drowning. ^[4]	In 2011 a worker was washed away by flash floods during heavy rain when working in a manhole. ^[15]

References:

1. Labour Department. Code of Practice Safety and Health at Work in Confined Spaces. 2000.
2. Legco. Occupational Injuries in All Workplaces (2004 - 2007) and 1st Three Quarters of 2008 - analysed by Nature of Injury, LegCo Record of Proceedings, 22 April 2009.
3. Jia Tai-Bao. Introduction to Work at Confined Spaces. extracted from <http://www.fengtay.org.tw/source/new%20source/no.50/%E5%B0%88%E9%A1%8C/%E4%BE%B7%E9%99%90%E7%A9%BA%E9%96%93%E5%AE%89%E5%85%A8%E4%BD%9C%E6%A5%AD%E7%B0%A1%E4%BB%8B.htm>
4. Occupational Safety and Health Council. Dangers and precautions of working in confined spaces, Green Cross. July 2003; Issue 4.
5. Patrick Ho. Manhole Covers, Civic Affairs Bureau. 1 March 2005. Extracted from: http://www.hab.gov.hk/file_manager/tc/documents/whats_new/from_the_desk_of_secretary_for_home_affairs/shaarticles42_20050301_c.pdf

6. Utility Training Institute. Knowing the correct steps to test manhole status. Extracted from: <http://www.uti.hk/media/static/pam-bm-hics.pdf>
7. CAP 123I of Hong Kong Law. Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations.
8. Occupational Safety and Health Council. OSH Science – why is there marsh gas in manholes?. Green Cross. Nov/Dec 2009.
9. Chin Dei-wah. Preventing gas incidents, management of confined spaces, Green Cross, Occupational Safety and Health Council. January 2001; Issue 1.
10. 3 workers died from marsh gas during manhole repairs in Shatin yesterday; carpenter died from being hit by falling pipe at Princess Building work site in Central. Tai Kung Pao. 14 May 1980.
11. Firefighter died during rescue; leaves 7 year old daughter. Wen Wei Pao. 8 July 2004.
12. Illegal sub-contracting; works unnecessary; license will be withdrawn; Chief contractor will be suspended for license for involvement in two deaths in manhole incident. Apple Daily. 12 August
13. Worker engulfed in flames upon damaging electric cable in manhole; burnt smell detected at the scene. Apple Daily. 14 November 2008.
14. Worker injured upon falling in manhole in Wanchai. Apple Daily. 28 July 2009.
15. Worker inspecting manhole succumbs in rainy night; death unnecessary. Apple Daily. 18 June 2011.
16. Damage electrical cable causes explosion in Hospital Authority maintenance works; two workers severely injured. Apple Daily. 19 November 2012.
17. Manhole workers inhaled marsh gas; one dead one injured. Apple Daily. 2 September 2014.
18. Education and Manpower Bureau. *Factories and Industrial Undertakings Regulation (Cap 59) Factories and Industrial Undertakings (Confined Spaces) Regulation*, Manpower Affairs - Document – 24 September 1998.
19. *Factories and Industrial Undertakings (Confined Spaces) Regulation (Legal Notice 271, 1999)*
20. Government Information Services. DSD announces investigation results on the fatal incident at Yuen Wo Road manhole. Press releases. 11 August 2006. Extracted from <http://www.info.gov.hk/gia/general/200608/11/P200608110299.htm>
21. The Hong Kong Federation of Trade Unions. Manhole accident reflects insufficient monitoring by Drainage Services. The Hong Kong Federation of Trade Unions. 17 August 2006. Extracted from <http://www.ftu.org.hk/zh-hant/about?id=32&nid=447>
22. Two manhole workers dead from marsh gas. Epoch Times. 2 August 2006.
23. Severe weather warning guideline too general; work resumes if no torrential rain warning. Ming Pao. 18 June 2011.
24. Manhole accidents should be thoroughly investigated. Wen Wei Pao. 18 June 2011.
25. Government Information Services. Work safety in manholes highlighted. Press releases. 2 August 2006. Extracted from <http://www.info.gov.hk/gia/general/200608/02/P200608020275.htm>
26. Worker and firefighter dead from marsh gas in manhole accident. Apple Daily. 7 July 2004.
27. The Hong Kong Federation of Trade Unions. Urge employers to monitor works in confined spaces including manhole works. 8 July 2004. Extracted from: <http://www.ftu.org.hk/zh-hant/about?id=17&nid=211>
28. Yu Tak Sun. *Occupational Safety*. Chinese University Press; 1991.
29. Labour Department. *Prevention of Gas Poisoning in Drainage Work*. 2007.
30. Drainage Services Department: sub-contractor negligent; permit not issued and safety gear absent; two died in manhole from marsh gas. Apple Daily. 2 August 2006.
31. Worker inhaled marsh gas; one dead one critical. The Sun. 2 September 2014.
32. Two drainage workers dead from inhaling marsh gas. Sing Tao Daily. 2 August 2006



Review of major OSH events – Hand Injuries

During the 1960s to 1980s the manufacturing industry in Hong Kong was in full bloom, and heavy machinery was commonly used by workers at the time. Often, a lack of safety awareness either in them or in their employers led to various cases of hand injuries, including pinches and cuts. In severe cases, workers' front limbs were caught and separated from the body. ^[1,2,3,4,5] As the Department of Health pointed out in 1984, on average 60,000 cases of hand injuries were reported each year which required medical attention; about 40,000 cases were inflicted at work. ^[6] Official statistics indicate that the numbers of occupational injuries and deaths ^[1] ^[2] peaked in the 80s and 90s (see table 1), and although the figures dropped in recent years, in 2013 Labour Department figures indicate that there were still some 40,000 cases of occupational injury in Hong Kong, among which 11,820 cases were industrial accidents. Cases in the catering industry take up majority, with some 100 cases of injury resulting from contact with operating machinery. The number of cases are rising and require our attention. ^[9,10,11]

As operating environment and work model change with the times, upper limb injuries currently affect different sectors and work environments. Statistics from the Department of Health in 2008 indicate that among the 132,100 work-related injuries over 40% include upper limb injuries. ^[7]

YEARS	1970	1980	1990	2000	2010
Work population	589,505	1,494,542	2,777,900	3,382,700	3,703,100
Occupational casualties	21,825	70,621	94,694	58,092	41,970
Casualty rate (per 1000)	37.0	47.2	34.1	17.2	11.33
Industry accident	12,695	45,951	53,383	33,652	14,015
Industrial accident rate (per 1000)	21.5	30.7	19.2	9.95	3.78

Table 1: Statistics from 1970 to 2010 on work population, occupational casualties and industrial accidents ^[33]

^[1] According to the *Employees Compensation Ordinance*, occupational casualty refers to cases of work accident (including industrial accidents) leading to deaths or loss of ability to work for 3 days or more. ^[10]

^[2] Industrial accident refers to injuries or deaths happening in industrial undertakings as defined by the *Factories and Industrial Undertakings Ordinance*, which are caused by industrial activities. ^[10]

Penalties insufficient deterrence

The Factories and Industrial Undertakings Ordinance was promulgated in 1955 and the sections targeting the use of machinery and protection were added in 1977. The law requires that the dangerous parts of machinery should be guarded to protect workers from harm.^[11] Factories failing to do so may face risk of prosecution. The Centre has already noted the prevalence of hand injury in the early 1980s and, besides suggesting protective measures, also urged the government to enforce monitoring and perfect legal proceedings of compensation for injured workers.^[12,13] However, to cut costs, many factories in those days continued to allow workers use unguarded machinery, and tragedies continued to happen.

In 1979, a worker was injured when his hand pinched in the factory moulding machine, and the factory owner still refused to add protective guarding as according to the law and was hence required to pay a 10 thousand dollar fine.^[14] On 24 January 1980, a similar accident happened at Oriental Factory Building in Kwun Tong when a worker tried to retrieve the finished product with his bare hands, and suffered serious injury when the movable parts close up suddenly and his left hand was pinched.^[15] Court sentences of both cases resulted in only compensation for the worker, indicating that the owner did not need to take additional responsibility except the fine. The deterrence was far from sufficient.

Insufficient OSH awareness sparks social concern

Besides owners, the workers themselves lack safety awareness. Some would try to retrieve objects from working machinery, and others even remove protective guarding as they find them hindering their work. One example of such lack of awareness can be seen in an accident in 2009, where one dim sum chef removed the safety grille of the meat grinder and used his bare hands rather than a rubber utensil to push meat into the machine, resulting in injury to 3 of his fingers.^[16]

For years, the society has expressed concern over hand injuries caused by work accidents. One organisation has urged the Labour Department to investigate an accident in 2013 where a printing press caused severe hand injury to a worker.^[17] In the same year, a newspaper commentary pointed out that accidents should be the responsibility of both employers and employees. Many employers add protective guarding only during spot checks by the authorities, and on other days such guarding is removed to speed up work; yet workers never complained or reported such non-compliance.^[18] Also, in 2012, Queen Mary Hospital issued a study report which interviewed 250 patients hospitalized for hand injuries between 1999 and 2001, asking them about their work practices upon return to work. They found out that 77% of workers are still insufficiently trained to operate the machinery.^[19] This indicate that both employer and employee should undergo training and raise their OSH awareness.

Ignoring the functions of protective guard endangers workers

Accidents caused by a lack of guarding or use of tools are common. Workers operating machinery with bare hands make them prone to accidents, including meat-grinders^[16,20,22], paper compressors at recycle yards^[22,23,24,25,26], and circular saws^[26,27]. Sporadic accidents also happen in offices where staff were injured when feeding documents into a shredder^[28].

Although in recent years machinery-related upper limb injuries occur less frequently than decades ago, severe accidents still happen. In 2006, a worker lost his hand when using a circular saw, because the proper protective guarding and tools were not used. The injured worker had 20 years of working experience and was cited by his friends as being usually cautious at work.^[26] Both employer and employee should admit the fact that OSH of workers can be protected only when the proper guarding and tools are used.

Take measures to tackle the issue

While modern medical development makes it possible to reattach the lost limb, upon reattachment the limb will lose most of its functionality and the work ability of the individual will be severely impacted. ^[29] Many grassroots workers are sole breadwinners of their family, and loss of ability to work incurs heavy burden, both financially and mentally. Injury to the front limbs is thus not an issue to be taken lightly.

The many accidents cited above have alerted us that the lack of OSH awareness when operating machinery is a real issue. Different approaches are required to reduce such risks including reinforcing the regulations, promoting OSH awareness among employers and workers, and implement effective improvement measures.

1. Reinforcing regulations: raising the penalties

According to section 13 of the Factories and Industrial Undertakings (Guarding and Operation of Machinery) Ordinance (59Q of the Law of Hong Kong), offenders may face a penalty of HK\$10,000 to \$50,000. ^[30] However, the last time this penalty has been amended was 20 years ago, and the GDP per capita in Hong Kong has increased by over HK\$120,000. Such a light penalty is long-overdue for revision, and previous instance has proven that it serves as little deterrence. ^[31] The authorities have been lacking in their monitoring and the relevant laws and penalties are outdated. Even when discovered, employers who fail to provide adequate protection face only light penalties with no threat of imprisonment, and in the end workers will suffer. The government should raise the penalties for example, raising the fines and adding imprisonment, and conduct more frequent spot checks so as to protect workers' health and safety.

2. Works Control: Effective use of protective guarding and tools to ensure worker safety



To protect workers and minimize risks of work injury, targeted and effective measures should be taken. Existing work processes or the machinery should be redesigned to minimize the risks.

Exposure to risks should also be minimized. In the accident involving a circular saw in 2006, workers suffered injury because a protective guarding was not installed; hence it is important that both protective guarding and safety tools are used. Employers may also add sensors to protective guarding that automatically cuts off the electricity when opened or removed. This not only protects workers during work processes but also ensures that during maintenance or repairs workers will not be injured by accidental triggering of the machinery.

Tools are also critical for avoiding injury, as workers may use them to reach into the machine rather than using their bare hands. Such tools should thus be placed beside the machinery or an easily accessible location. Should such tools be damaged, continued use of the machinery should be prohibited until repairs are done or the tools are replaced.



3. Administrative control: Promoting OSH awareness

The cited cases of upper limb injury prove that workers are lacking in safety awareness. In the 2009 accident where the dim sum chef injured himself, the accident was caused by the worker trying to “speed things up” and neglecting to use the necessary tools. Some workers even remove the guarding thinking they obstruct the work, which greatly increases dangers of injury. Workers should be educated on the potential dangers of working with machinery, and the severe consequences if they neglect the safety measures. The importance of protective guarding should be highlighted, that it is not a hindrance to work but rather a necessary OSH measure. Work procedures and guidelines should be drafted and placed at noticeable places near the machinery, so that they will not neglect and suffer injuries.

Employer should also take greater responsibility in protecting workers' safety and health. Besides installing protective guarding, employers should also monitor the workers so that they make proper use of the necessary tools and protective guarding. Training should also be provided to newcomers teaching them the proper ways of operating machinery, and regularly to all workers reminding them the importance of OSH and the dangers of machinery operation. Employers should also provide proper protection in accordance of the law, and workers should also know about the laws to protect their own interests.

Upper limb injuries caused by machinery accidents may not be fatal, but they can have a severe impact on later life. The cited examples indicate the protective measures for workers are far from sufficient, and employers and employees are both lacking in OSH awareness. These shortcomings must be addressed to minimize injury, coupled by a tightening of the laws to ensure a safe work environment.

OSH Tips

In this issue's OSH tips, we will introduce the various kinds of protective guarding of machinery. Factory machinery come in great varieties, and many have moving parts. Neglect of the safety operation procedures may cause severe injuries or even deaths. Protective guarding protects workers from direct contact with machinery and lowers risks of injury.^[32]



Protective guarding of machinery	Characteristics and benefits	Limits
Fixed guarding	<ul style="list-style-type: none"> ➤ Made from strong materials ➤ Safely covers dangerous parts of machinery ➤ Most reliable type of guarding 	<ul style="list-style-type: none"> ➤ May affect the view of the operator ➤ May limit the operation area ➤ During maintenance or calibration the guarding must be temporarily removed, and other safety measures should be implemented to avoid accidental start of machinery
Interlocked guarding	<ul style="list-style-type: none"> ➤ The guarding is movable and linked to the control or power system of the machinery ➤ Unless the guarding is in place the machinery will not operate ➤ Until the machinery is completely safe, the guarding cannot be removed 	<ul style="list-style-type: none"> ➤ Requires accurate maintenance and regular checks
Automatic guarding	<ul style="list-style-type: none"> ➤ Guarding is linked to the machinery and as the machinery starts the guarding automatically moves into place ➤ Moves the dangerous parts of machinery away from the body 	<ul style="list-style-type: none"> ➤ Requires regular maintenance and calibration to ensure the range and force of movement of the guarding are suitable ➤ Not suitable for machinery with fast movements as the guarding will pose a hazard itself. ➤ Limits operator movement ➤ May obstruct work space near the operator
Touch-sensitive guarding (mechanical)	<ul style="list-style-type: none"> ➤ When operator comes into contact with guarding, frame or grille, the machinery will stop 	<ul style="list-style-type: none"> ➤ May requires complementary design features ➤ Only protects operator ➤ May require a brake ➤ Guarding effective only by manual touch ➤ Guarding must be installed within reachable distance of operator
Sensitive guarding (light curtain / electronic eye)	<ul style="list-style-type: none"> ➤ When operator enters the protective area framed by light, and once the light is blocked, an interlocking mechanism stops the machinery 	<ul style="list-style-type: none"> ➤ Requires frequent maintenance and checks ➤ Suitable only for machinery that can be instantly stopped during an operation cycle

References

1. Moulding worker loses finger; gets \$100,000 in compensations. Tai Kung Pao, 19 October 1982.
2. Old worker at Chai Wai machine factory loses palm. Overseas Chinese Daily News, 28 February 1989.
3. Worker loses finger at iron factory in Kowloon City. Tai Kung Pao, 17 May 1986.
4. Tow boat worker loses hand to steel cable. Tai Kung Pao, 20 February 1986.
5. Factory must pay \$331,000 for accident: In the courts, South China Morning Post & the Hongkong Telegraph, 16th January 1986

6. 60000 hand injuries reported, South China Morning Post, 13th November 1984
7. Statistics of accidental injuries in 2008. Department of Health. September 2010.
8. 6200 accidents in catering industry. Apple Daily, 6 January 2014.
9. Common accidents in catering industry and legal requirements, Labour Department http://www.fehd.gov.hk/tc_chi/licensing/images/LabourDept.pdf
10. OSH Statistics 2013 Labour Department
11. Labour Department Factories and Industrial Undertakings Regulation (Cap 59 Hong Kong Law) <http://www.labour.gov.hk/tc/legislat/content3.htm>
12. Industrial Safety, Workers' Health Centre, December 1981
13. Industrial Safety, Workers' Health Centre, December 1983
14. No guarding installed on moulding machine; factory owner fined \$10,000, Overseas Chinese Daily News, 10 August 1979.
15. Worker gets \$115,000 for loss of hand, South China Morning Post & the Hongkong Telegraph, 23rd March 1983
16. Dim Sum chef loses 3 fingers making siu mai, The Sun, 9 October 2009.
17. Worker loses arm to printing press, Oriental Daily, 29 March 2013
18. Worker regrets losing limb to carelessness, Apple Daily, 1 May 2013
19. Garg et al., Epidemiology of occupational hand injury in Hong Kong, Hong Kong Medical Journal, Vol. 18, No. 2, April 2012 http://www.hkmj.org/article_pdfs/hkm1204p131.pdf
20. Female worker loses palm to meat grinder; family upkeep in peril. Wen Wei Pao, 29 November 2011.
21. Female worker loses 3 fingers to meat grinder. Apple Daily, 10 July 2014.
22. Worker loses palm to paper compressor; reattached in hospital. The Sun, 13 July 2007.
23. Young owner loses palm to paper compressor, Apple Daily, 23 January 2009.
24. Worker loses palm in machinery accident in Kowloon City on.cc news, 23 July 2014.
25. Recycle yard worker loses arm in accident, Apple Daily, 10 October 2014.
26. Worker loses palm to circular saw; Labour Department investigates for negligence, Apple Daily, 29 August 2006.
27. Worker loses fingers when sawing wooden boards, Oriental Daily, 26 May 2011
28. 17-year-old worker injured when hand caught in shredder, Commercial Radio, 21 August 2009
29. Irregularity in severed limb increases difficulty of reattachment, Oriental Daily, 29 March 2013
30. Labour Department, the Factories and Industrial Undertakings (Guarding and Operation of Machinery) Ordinance. Cap 59Q, Article 13
31. 26Gross Domestic Product and its major components, Hong Kong Economy http://www.hkeconomy.gov.hk/en/pdf/domestic_eng.pdf
32. Machinery Safety, Green Cross, 2014年3月 <http://www.oshc.org.hk/download/publishings/1/2586/06.pdf>
33. Census Department, Monthly Digest of Statistics. http://www.censtatd.gov.hk/hkstat/sub/sp140_tc.jsp?productCode=B1010002





香港安健認證計劃

Hong Kong Safety and Health
Certification Scheme

Objective

Hong Kong Safety and Health Certification Scheme

The Occupational Safety and Health Council introduced the Hong Kong Safety and Health Certification Scheme, aiming at providing certification services on Safety and Health Management System for industries, communities and enterprises, thereby ensuring the development of an effective safety management system, as well as to achieve the target of continuous improvement through re-certification.

The scheme also provides accreditation services to relevant OSH practitioners and competent persons to ensure that they possess the necessary qualifications and capability to perform the specified duties. The accreditation services would enhance their competency and safety performances, and at the same time provides a recognition to the industry.

Services

Scheme Certification

The Hong Kong Safety and Health Certification Scheme now offers certification and re-certification services to the following Safety and Health Management System Scheme:

- OSH Star Enterprise — RMAA Safety Accreditation Scheme
- Outstanding OSH Restaurant — Pilot Scheme on Catering Safety Accreditation
- Continual Improvement Safety Programme Recognition of System (CISPROS)
- Hong Kong Safe Community Scheme and its umbrella programs:
 - ◆ International Safe Schools Program
 - ◆ International Safe Workplace Program
 - ◆ Hong Kong Safe & Healthy Residential Care Home Accreditation Scheme
 - ◆ Hong Kong Safe & Healthy Estate Accreditation Scheme

Accreditation

The Hong Kong Safety and Health Certification Scheme now offers accreditation and re-accreditation services to the following OSH Practitioners and Competent Persons:

- Accredited Safety Auditor
- Accredited Safety Consultant
- Competent person for the Selection, Installation, Application, Inspection and Testing of Anchor Devices for Attachment of Personal Fall Protection Equipment for Truss-out Bamboo Scaffolds

The Hong Kong Safety and Health Certification Scheme continues to offer accreditation services to other OSH Practitioners and Competent Persons for different trades and operation to raise the industry safety standards.

Contact Us

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職業安全健康局
OCCUPATIONAL SAFETY & HEALTH COUNCIL



Organizer:



香港建造業總工會
H K C I E G U

Supporting Organization:



香港工人健康中心
Hong Kong Workers' Health Centre

Sponsor:



肺塵埃沉着病補償基金委員會
PNEUMOCONIOSIS COMPENSATION FUND BOARD

Programme on Promoting Pneumoconiosis



Prevention for Construction Workers

Construction Industry has long been an integral part of the Hong Kong economy and also one of the industries which most labour engaged in. With the recent economic recovery in Hong Kong, many infrastructure and urban renewal projects are currently in progress. In particular, the "Operation Building Bright" and the "Integrated Building Maintenance Assistance Scheme" projects have significantly increase the number of minor works in Hong Kong. However, if there are no appropriate precautions, or the occupational health and safety policies and laws are not strictly implemented and executed, frontline construction workers are put at risk, resulting in work injuries and occupational diseases.

To efficiently enhance workers' awareness on Pneumoconiosis (an occupational lung disease) and other occupational diseases, Hong Kong Workers' Health Centre, with the great support from the Pneumoconiosis Compensation Fund Board (PCFB), is going to initiate a series of education programs with the Hong Kong Construction Industry Employees General Union (HKCIEGU) in the districts where most constructions and building maintenances take place. This project aims at providing workers with knowledge of occupational risks to better protect their health and well-being.

Duration:

1st Jan, 2014 – 31st Dec, 2015

Target:

- Construction workers in small construction sites
- Construction workers and contractors from the Operation Building Bright project and other building maintenance and renewal related projects

Details:

- "Pneumoconiosis Prevention Ambassador" Training
- Pneumoconiosis Prevention Talks
- Exhibitions at construction sites
- Medical referral for Pneumoconiosis and other related diseases

Community Programme on Promoting Asbestosis Prevention

Hong Kong Workers' Health Centre, with the sponsorship from the Pneumoconiosis Compensation Fund Board (PCFB), will cooperate with the Hong Kong Construction Industry Employees General Union in the implementation of a two-year trans-regional health promotion activity, namely "Community Programme on Promoting Asbestosis Prevention". The aim of the campaign is to raise public awareness regarding the hazards brought about by asbestos and to increase concern for the health problems brought by asbestos.

In recent years, many demolition works were carried out on old buildings and these were accompanied by redevelopment projects, including building maintenance funded by the Operation Building Bright. These led to an increase in small to medium-sized engineering projects in Hong Kong. However, if these engineering projects were carried out using inappropriate methods which do not comply with the relevant legislation, asbestos-containing materials in the old buildings may be destroyed to release asbestos fibers, which may cause harm to workers and residents of the buildings.

Through activities such as organizing and training ambassadors in different regions, holding exhibitions, arranging training workshops and talks and distributing leaflets and posters, this promotional campaign allows front-line workers and residents of old buildings to learn more about asbestos and its harmful effects to human body, and also to locate such materials in old buildings. The campaign also teaches them the proper approach to treat materials that may contain asbestos so that they can take preventive measures to avoid inhalation of asbestos fibers released, which helps to lower the risk of these concerned persons suffering from asbestosis or other related diseases.

At the same time, the PCFB launched a project namely "Pneumoconiosis/Mesothelioma Medical Surveillance Programme" in November 2011. Not only is it a free programme for workers to participate, the PCFB will arrange voluntary participants who are working in the construction industry * to do regular chest examinations, including chest X-rays and pulmonary function tests, in designate clinics. It is hoped that workers will learn about their own health situations as soon as possible, will be able to receive early treatments and make suitable arrangements in their living and working habits if they are unfortunately diagnosed with related diseases.

* Workers involved in production of silica dust will be given priority to the examinations while other workers may have to wait for a longer period of time; workers who are required by law to have regular medical examinations (e.g. workers engaged in asbestos works and tunneling works or mine workers and quarry workers) will not be allowed to participate in this programme.

Sponsor:



肺塵埃沉着病補償基金委員會
PNEUMOCONIOSIS COMPENSATION FUND BOARD



香港建造業總工會
H K C I E G U



香港工人健康中心
Hong Kong Workers' Health Centre