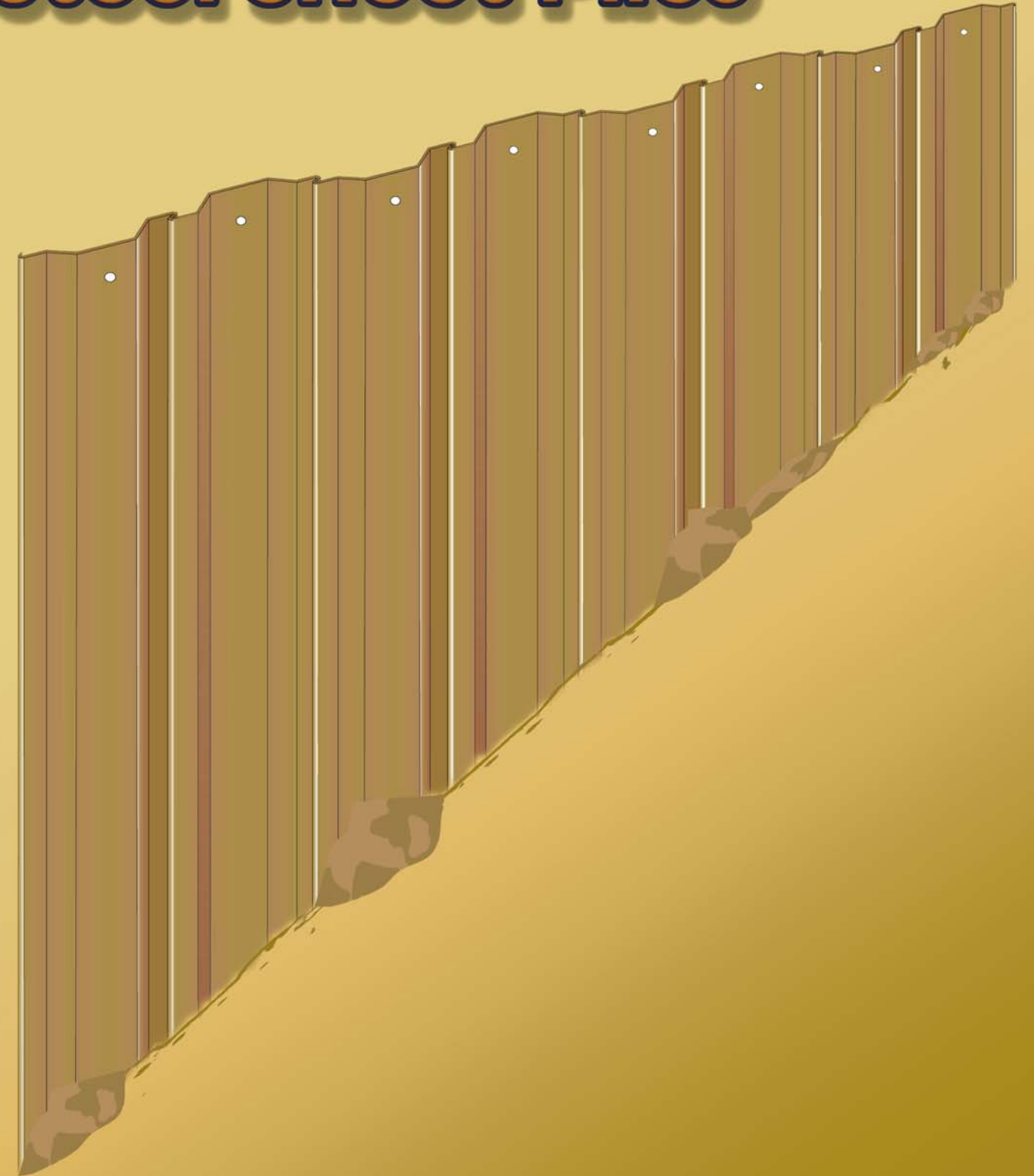


# Safety Guide for Interlocking of Steel Sheet Piles



This guide is prepared by  
the Occupational Safety and Health Branch, Labour Department

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# **Safety Guide for Interlocking of Steel Sheet Piles**

This guide is issued free of charge and can be obtained from offices of the Occupational Safety and Health Branch, Labour Department. It can also be downloaded from website of the Labour Department at <http://labour.gov.hk/eng/public/os/B131.exe>. Addresses and telephone numbers of the offices can be found in website of the Department at <http://www.labour.gov.hk/eng/tele/osh.htm>.

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1. Sheet piling work is a process commonly relating to excavation work in construction projects. Steel sheet piles driven to required depth into the ground to form a panel before the commencement of excavation will be used as a temporary support to prevent collapse of soil and permit other work activities to proceed safely.
2. In most cases, each sheet pile has to be interlocked with its neighbouring sheet pile before it is driven into the ground. An analysis of the past accidents that happened in the trade reveals that the use of 'man-cages' to carry workers at elevated position for purposes of interlocking operations has posed serious hazards to workers, and some accidents even have resulted in fatalities.
3. This guide aims to provide information on hazards associated with the use of 'man-cages' and appropriate safety measures to be taken relating to interlocking steel sheet piles.

## Use of 'Man-cages' in Interlocking Operations

4. A 'man-cage' is a means for workers to gain access to the top of a sheet pile panel already erected on the ground. It is placed on the top of the panel allowing a worker to stay there to guide a suspended sheet pile interlocking manually with the panel, and thereafter to release the lifting tackle from a pitched sheet pile.
5. Most 'man-cages' are improvised, composed of metal bars welded together to form the man-cage frame. Their construction and loading capacity are always in doubt.
6. The 'man-cage' is lifted with a worker inside to the top of a fixed sheet pile panel and hooked there with a bent section of metal bar. In this position, the worker will assist in guiding other piles in position. Additional devices to secure the 'man-cage' to the sheet pile panel may not be sufficient. Some securing devices may become defective after prolonged use.

## Hazards associated with use of 'Man-cages'

7. The worker responsible for interlocking sheet piles at the top of the sheet pile panel will face the hazards of :
  - a. Fall from height arising out of -
    - \* Inadequate anchorage of a 'man-cage' on top of a fixed sheet pile
    - \* Mechanical failure of a 'man-cage' caused by overloading
    - \* Inadequate protection during raising and lowering of a 'man-cage' and that of a worker



- \* Collapse of a 'man-cage' from top of the fixed sheet pile upon being struck by the steel sheet pile in transit



- \* Inadequate fencing for working on a 'man-cage'

- \* Over-reaching of worker whilst carrying out work on a 'man-cage'



## Safety Measures

8. In view of the hazards associated with the use of 'man-cages', it is necessary to abolish its use and to adopt safe alternatives to perform the interlocking operation. Implementation of a revised work method and the employment of specially designed equipment for the purpose should be adopted:

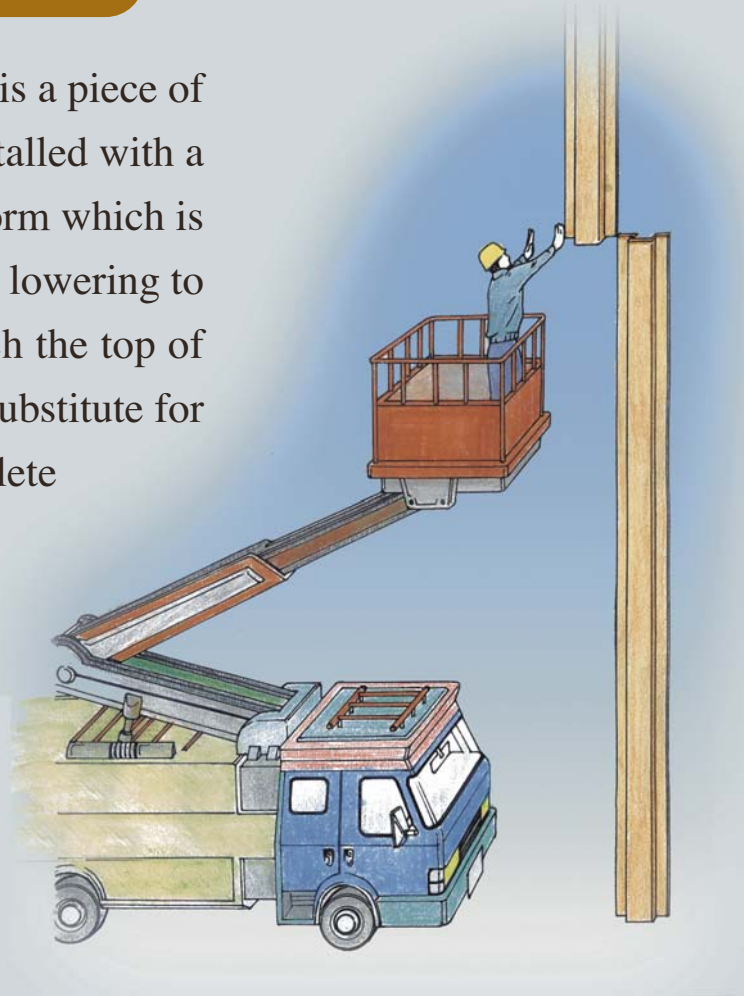
### (a) Minimizing Protruding Portion of Fixed Sheet Pile

This work method requires a sheet pile to be driven into the ground until it is about one metre high from ground level before starting the next pile. In so doing, the worker responsible for the interlocking sheet piles can carry out the guiding process at ground level. In some cases, it is necessary to consider the adequacy of interlocking length for the new pile to hold onto the fixed one.

b. Strike by a hoisting sheet pile during the interlocking operation, in particular, in a windy condition

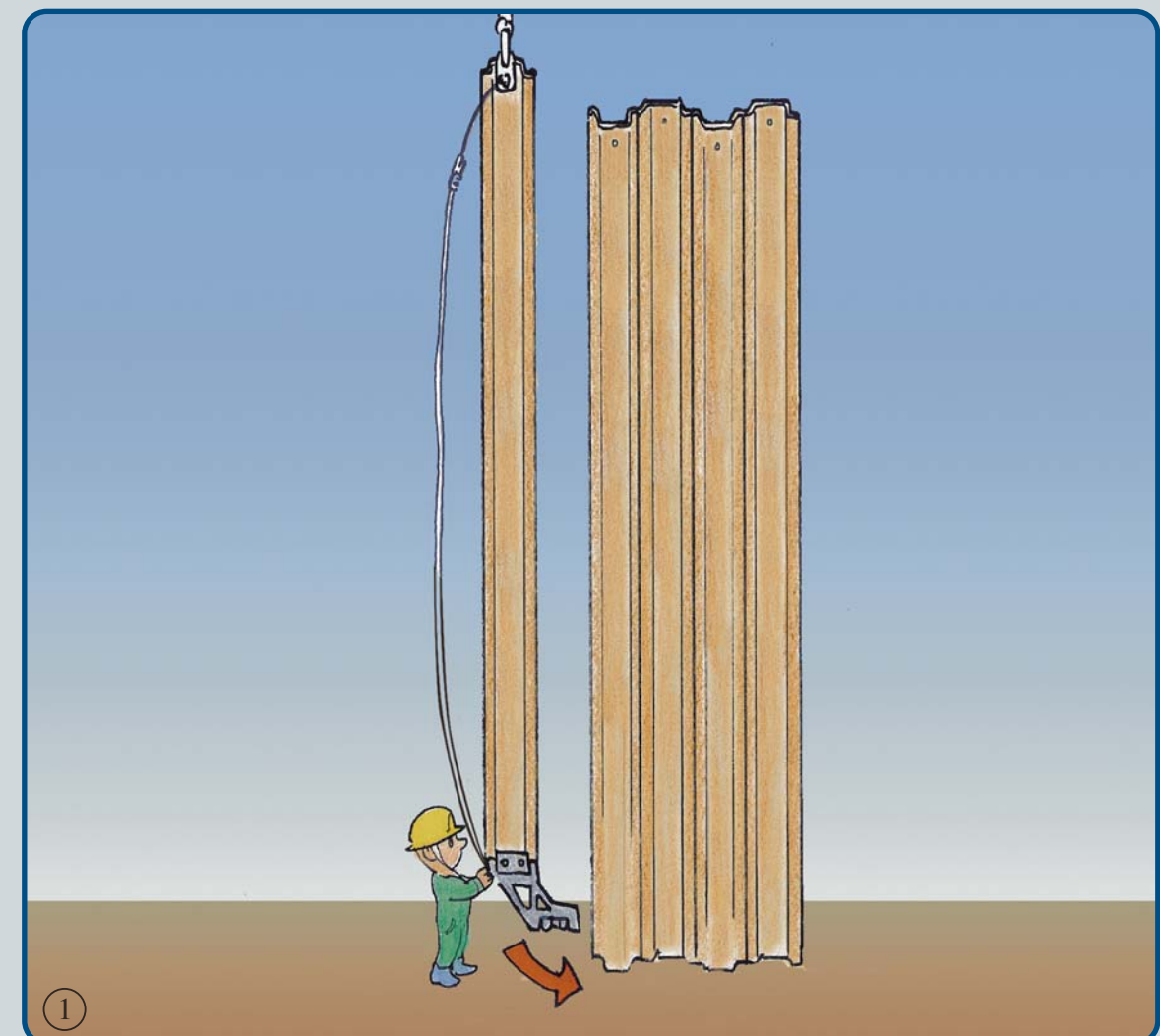
### (b) Use of Elevated Platforms

An elevated platform is a piece of mobile equipment installed with a properly fenced platform which is capable of raising and lowering to allow workers to reach the top of a fixed sheet pile, as substitute for a 'man-cage', to complete the interlocking of sheet piles and the releasing of lifting tackles.



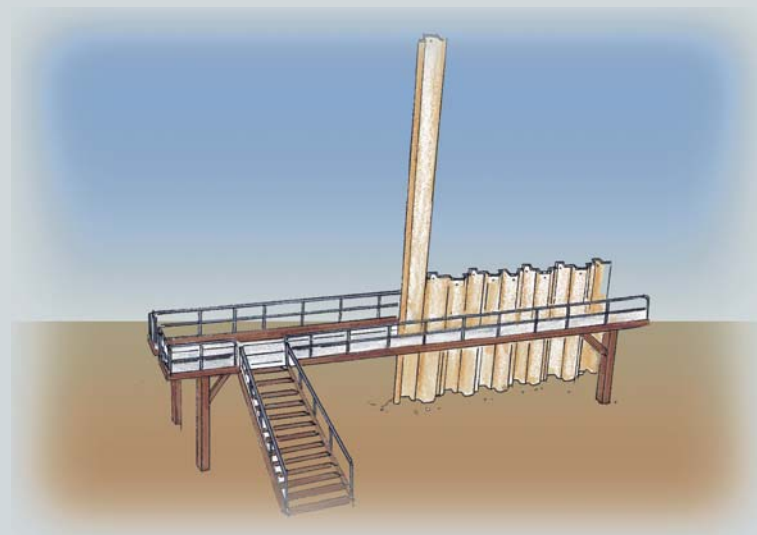
### (d) Use of Sheet Pile Threaders

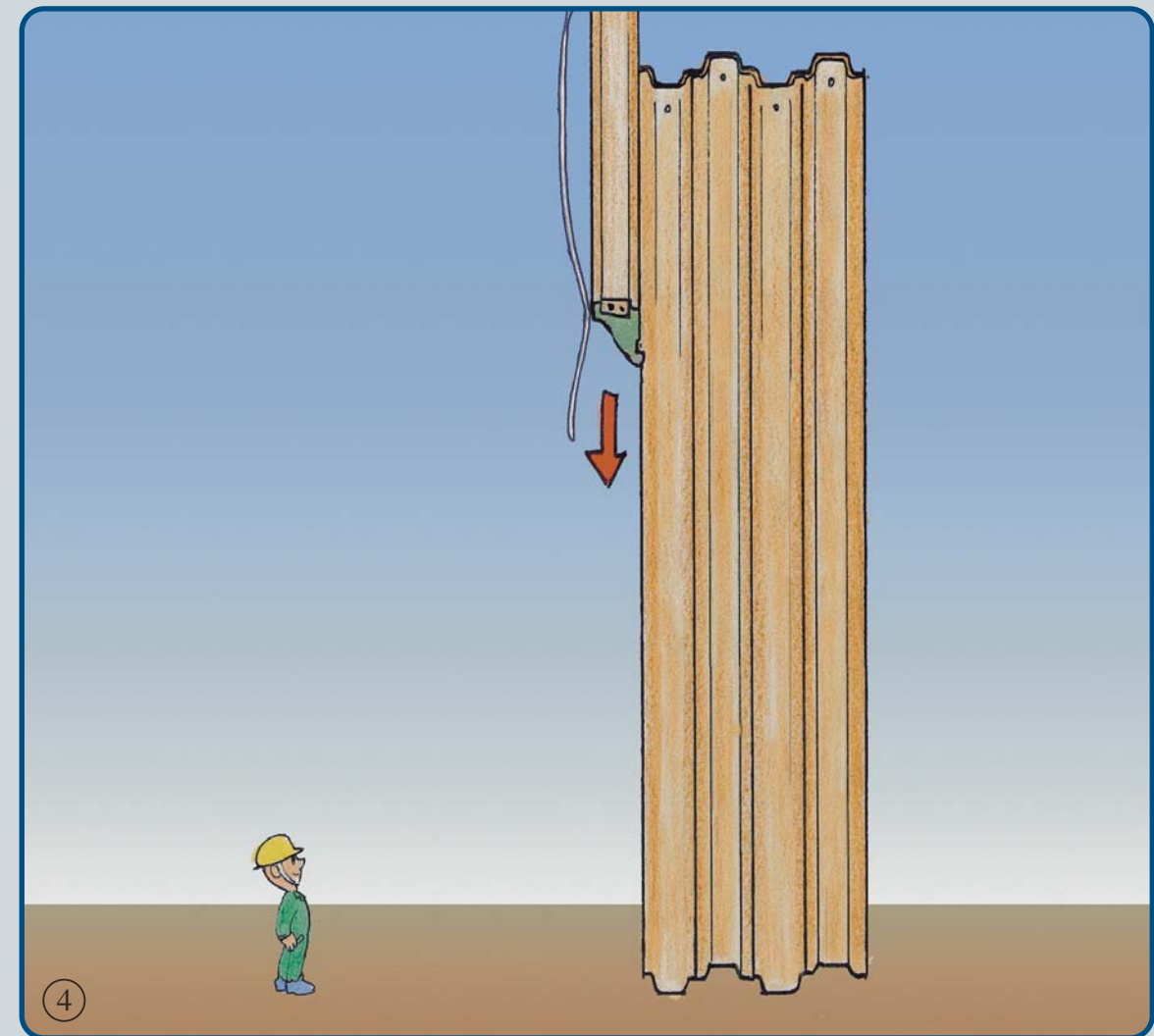
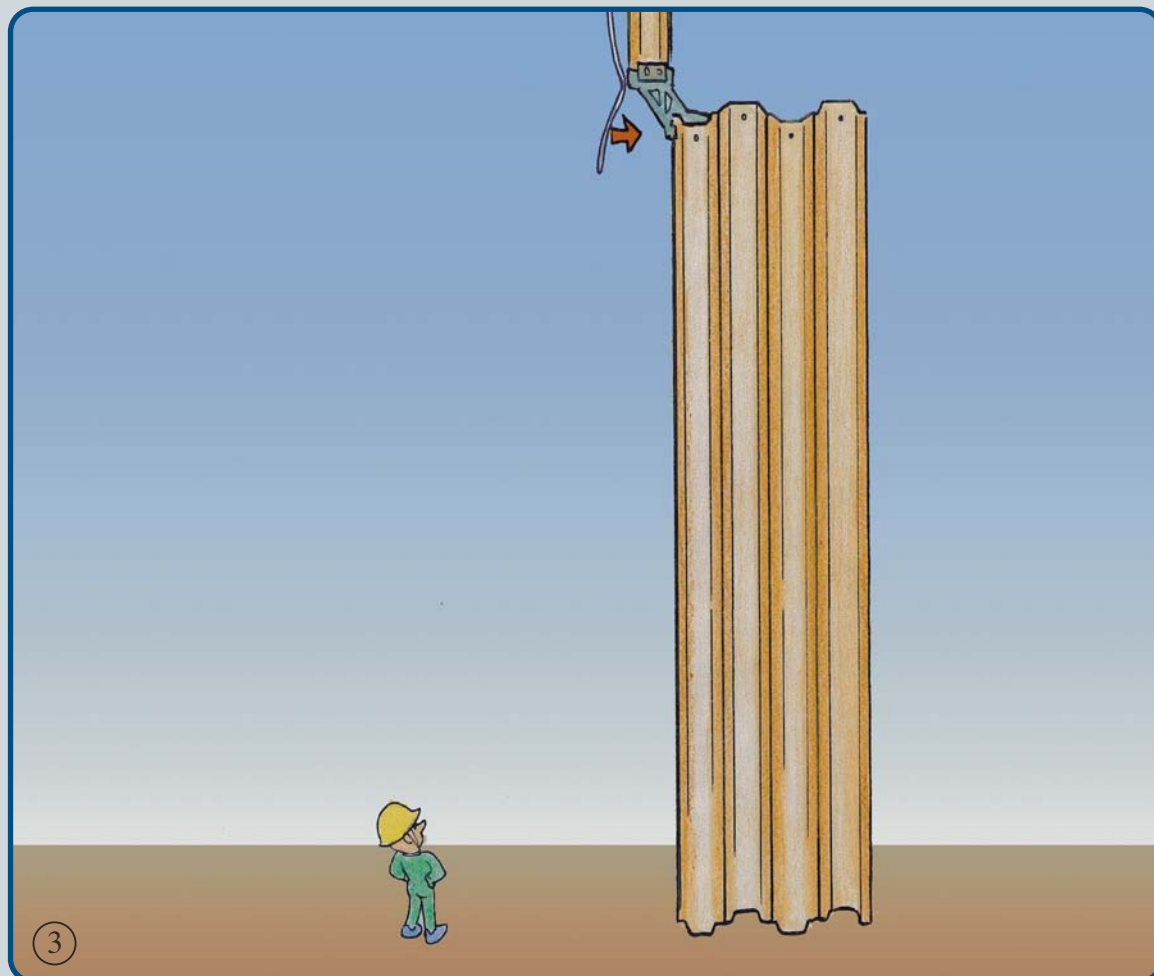
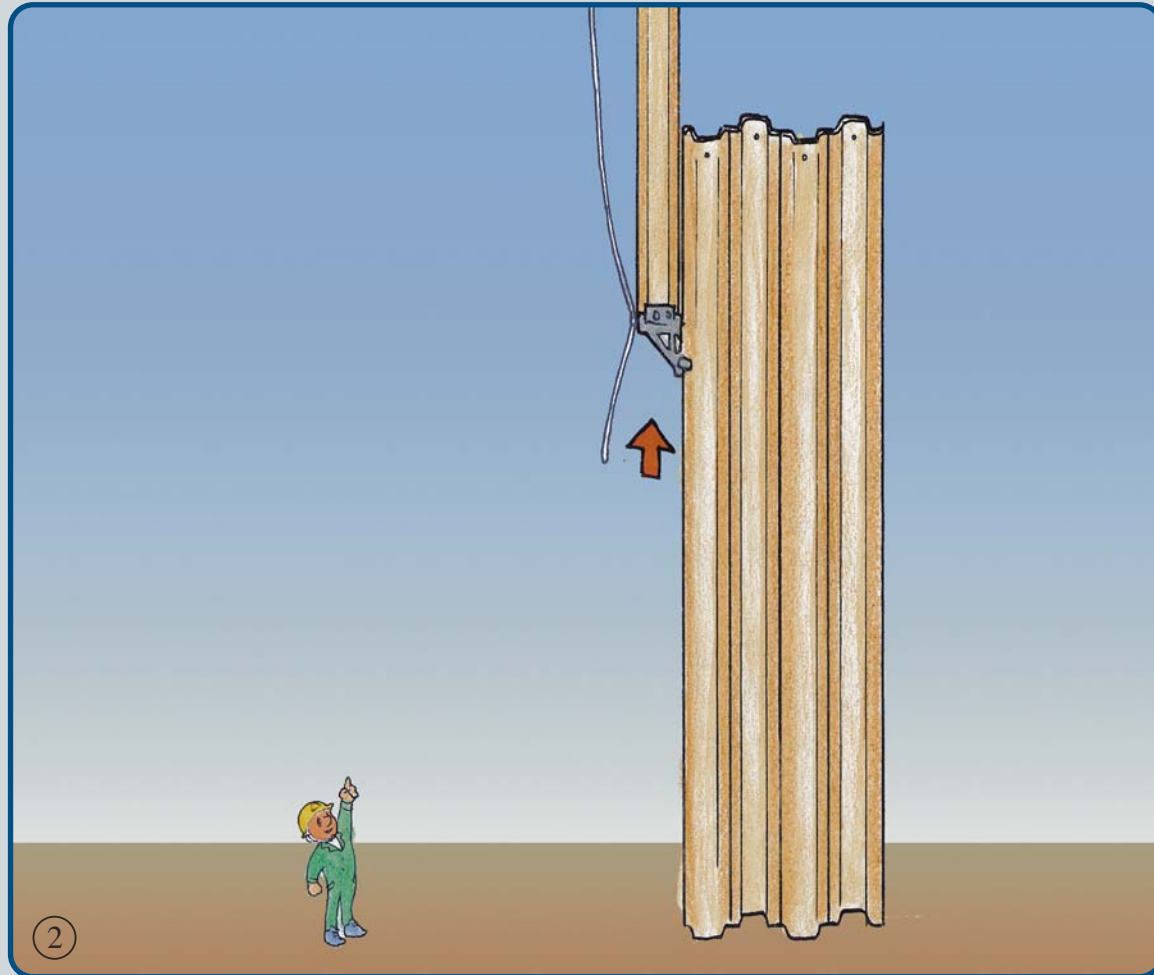
A sheet pile threader is a mechanical device designed for interlocking sheet piles such that no worker is required to work at height. Before its installation onto a suspended sheet pile, the lower end of the sheet pile 'face' that is to be interlocked with the fixed panel is tapered to facilitate threading. The suspended sheet pile is lifted up after its lower end is locked to the fixed sheet pile with the use of the threader. When the sheet pile together with the threader is lifted up to the top of the fixed sheet pile, the spring action in the threader will cause the tongue of the suspended sheet pile to move into the groove location of the fixed sheet pile. Subsequent lowering of the suspended sheet pile will interlock with the fixed sheet pile.



### (c) Use of 'Walkway Walings and Trestles'

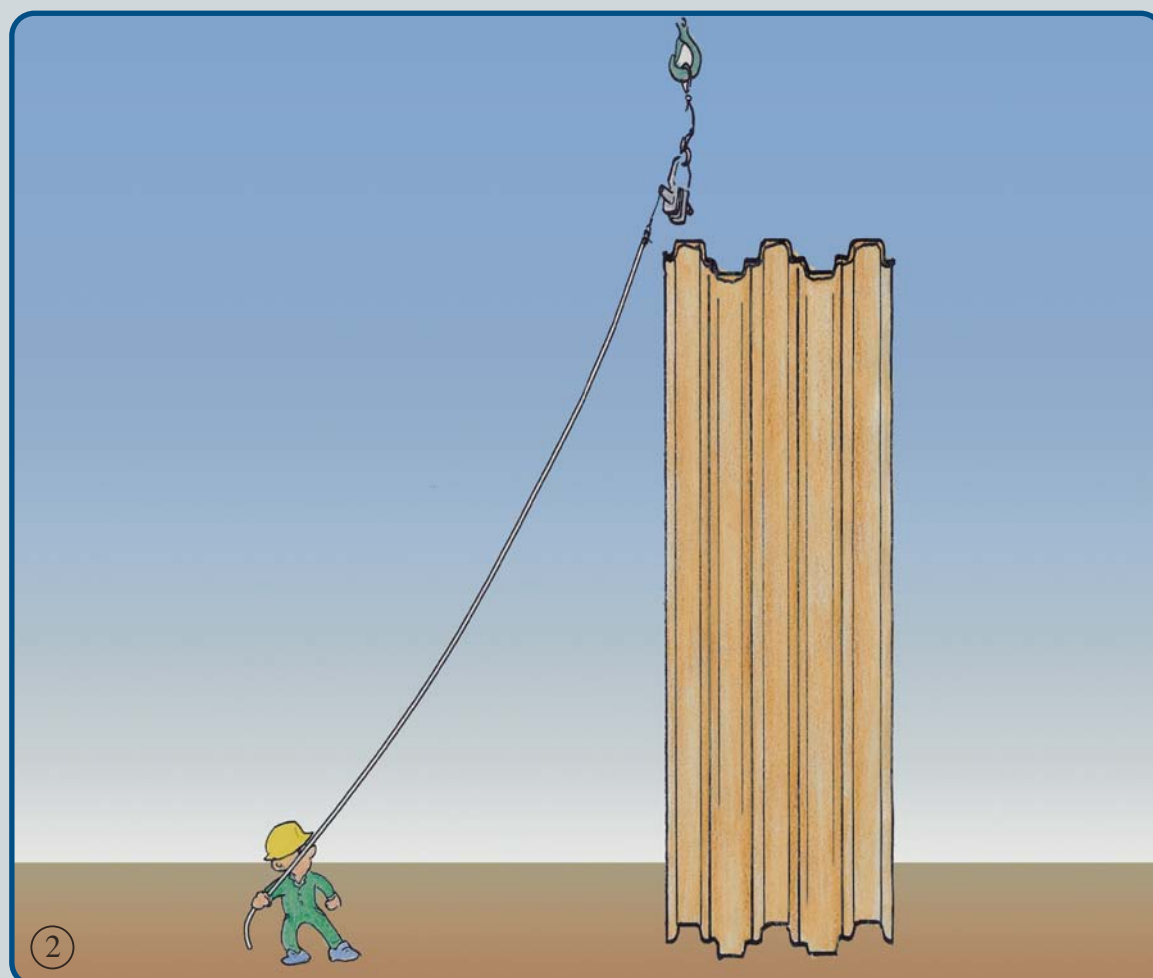
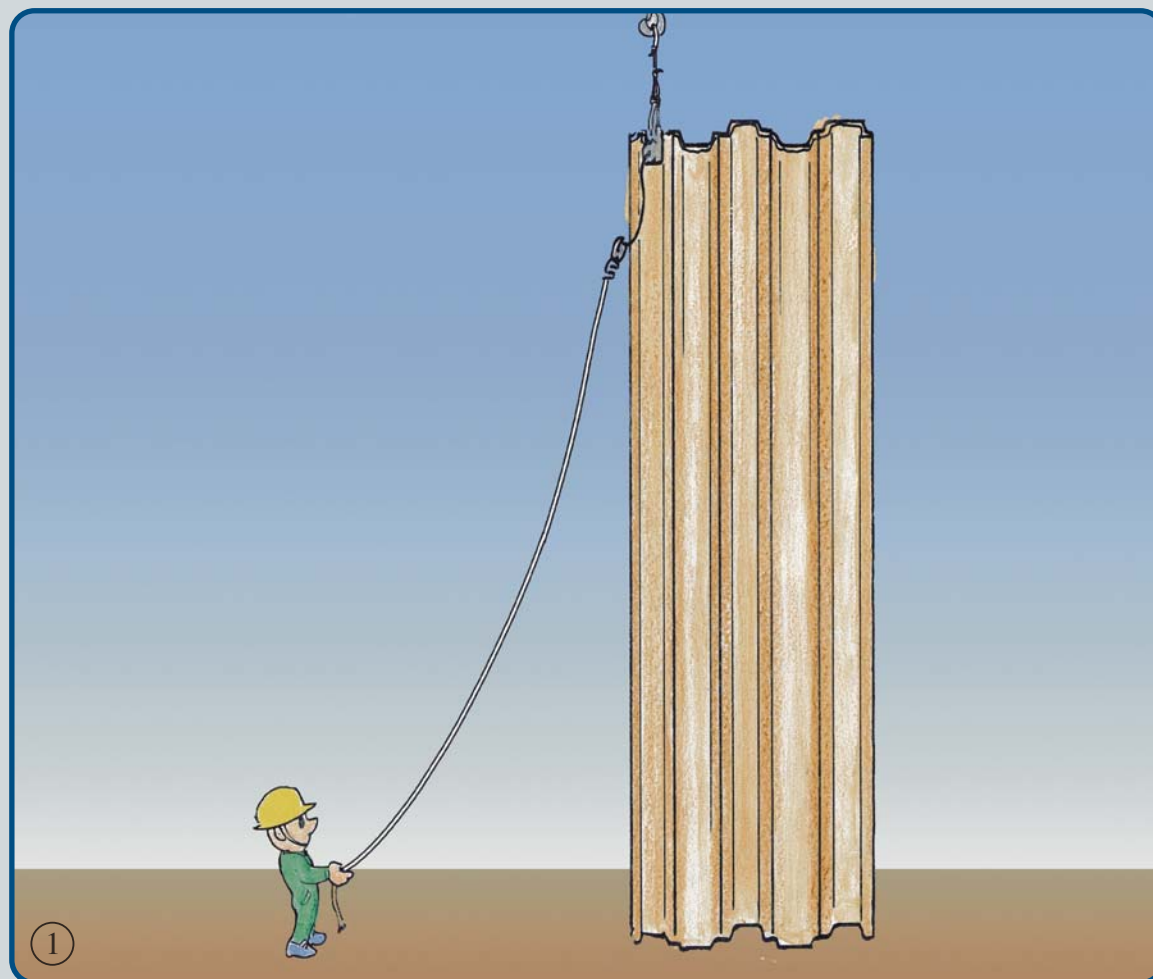
'Walkway Walings and Trestles' is a purposely-built temporary structure providing support to sheet piles as well as access, with guardrails and toe-boards, to the top waling.





### (e) Ground Release Shackle

Upon completion of the interlocking operation, the lifting tackle at the top of a pitched sheet pile has to be detached for subsequent operation. To avoid workman having to release the lifting tackle at height after a suspended sheet pile has been delivered to its designated position, a ground release shackle should be used. The shackle is equipped with a locking pin for securing the sheet pile. The pin can be unlocked through a pull wire operated at ground level so as to release the shackle from the load.



## Duties of Contractors and Employers

9. Under the Factories and Industrial Undertakings Ordinance, contractors and employers have legal obligations to ensure the safety and health of their workers at work. This guide outlines some measures to control the hazards associated with interlocking of steel sheet piles. Nevertheless, contractors and employers should conduct risk assessment on the work processes, develop and implement a safe system of work that best suits the working environment, the plant and equipment used, the processes to be carried out and the personnel involved. Meanwhile, workers engaged in the interlocking operation should be fully trained, informed and instructed on the safe system of work to be adopted and the related safety measures to be taken. Supervision should also be exercised to ensure safe implementation of the system of work.

## Enquiry

10. If you wish to enquire about this guide or require advice on occupational safety and health, you can contact the Occupational Safety and Health Branch of the Labour Department through:

Telephone : **2559 2297** (auto-recording after office hours)

Fax : **2915 1410**

E-mail : **enquiry@labour.gov.hk**

11. Information on the services offered by the Labour Department and on major Labour Legislation can also be found by visiting our website **<http://www.labour.gov.hk>**.
12. Information on the services offered by the Occupational Safety and Health Council can be obtained through **2739 9000**.