Approval Conditions
for Operating
Mandatory Safety Training Courses

Part II – Module 5

Course Design and Specifications

For

(A) Training Course for Persons Working on Suspended Working Platforms

(B) Revalidation Training Course for Persons Working on Suspended Working Platforms

Version Control Record

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1.0	5 September 2011	26 September 2011	
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2.0	27 December 2019	27 March 2020	Sections 1.8, 1.9, 6.1-6.4, 8.1, 9.1, 10.1, 10.2 & 11.1-11.5 Annexes 2-6

Inquiry

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Contents

1. Overview

1.1 The terms and abbreviations adopted in this module follow those defined in Part I. This module is Part II – 5 of the AC which covers 2 suspended working platform ("SWP") training courses, i.e. full course and revalidation course. This module should be read together with Part I of this AC.

1.2 Section 17 of the Factories and Industrial Undertakings (Suspended Working Platforms) Regulation ("the Regulation"), Cap 59AC, requires that every person working on a SWP should have successfully completed the relevant safety training course and obtained a relevant certificate. In this regard, the CL is empowered by section 17(1)(b) of the Regulation to recognise the following safety training courses:

(A) Training Course for Persons Working on Suspended Working Platforms ("full course"); and

(B) Revalidation Training Course for Persons Working on Suspended Working Platforms ("revalidation course").

1.3 Procedures for application for course recognition are stipulated in the GN. Applicant who wishes to run full course or revalidation course should submit an application to the CL for course recognition.

1.4 Unless stated otherwise, requirements stated in this module are applicable to both full course and revalidation course.

1.5 TCP should ensure that the course materials used should comply with the requirements of this module.

1.6 The objective of the full course is to provide the necessary training for the trainees to acquire knowledge and practical skills to operate the SWP in question safely. The trainees will be issued with a certificate upon successful completion of the course.

1.7 Revalidation course aims to provide refresher training to holders of SWP certificates, which are expiring or expired, to enhance or reinforce their occupational safety and health knowledge in connection with operation of SWP in question. Upon successful completion of the course, the trainee will be issued a new certificate.

1.8 At the end of the full course, the trainees should be able to acquire the knowledge of:

1.8.1 designed purpose, capabilities and limitations of SWP;
1.8.2 installation and working principles of SWP;
1.8.3 correct operating procedures and good safety practices;
1.8.4 basic maintenance knowledge required for checking and reporting to the management the irregularities identified;
1.8.5 any statutory regulations relevant to the type of work which might be carried out in SWP;
1.8.6 the types, purposes, correct selection procedures and the proper use of personal protective equipment commonly used in connection with the operation of SWP; and
1.8.7 describe the typical/alarming accidents (including causes and related preventive measures) associated with operation of SWP, in particularly those occurred during the five years preceding the conduct of the course.

Furthermore, the trainees should also be able to acquire the following practical skills to operate the SWP:

1.8.8 starting up, manoeuvring, operating and shutting down SWP in question. Operating skills must include all the normal tasks for which the machine is designed and operational safety in relation to work conditions;
1.8.9 checking of SWP and of its immediate surroundings prior to operating SWP;
1.8.10 identifying abnormalities in the operation and report to the management of any defects; and
1.8.11 understanding emergency procedures.

1.9 At the end of the revalidation course, the trainees should be able to acquire the knowledge of:

1.9.1 designed purpose, capabilities and limitations of SWP;
1.9.2 installation and working principles of SWP;
1.9.3 correct operating procedures and good safety practices;
1.9.4 basic maintenance knowledge required for checking and reporting to the management the irregularities identified;
1.9.5 any statutory regulations relevant to the type of work which might be carried out in SWP;
1.9.6 the types, purposes, correct selection procedures and the proper use of personal protective equipment commonly used in connection with the operation of SWP; and
1.9.7 describe the typical/alarming accidents (including causes and related preventive measures) associated with operation of SWP, in particularly those occurred during the five years preceding the conduct of the course.

Furthermore, the trainees should also be able to acquire the following practical skills to operate the SWP:

1.9.8 starting up, manoeuvring, operating and shutting down SWP in question. Operating skills must include all the normal tasks for which the machine is designed and operational safety in relation to work conditions;
1.9.9 checking of SWP and of its immediate surroundings prior to operating SWP;
1.9.10 identifying abnormalities in the operation and report to the management of any defects; and
1.9.11 understanding emergency procedures.

2. Admission criteria

2.1 Full course is run for trainee who does not possess a SWP certificate or possesses a SWP certificate which has expired for more than 6 months.

2.2 A TCP should ensure that applicant to be admitted to a revalidation course should, at the time of application, be holding a SWP certificate which either will expire within 6 months or has expired for not more than 6 months.

2.3 A TCP should ensure that trainee admitted to its full course and revalidation course has attained the age of 18 years.

3. Qualifications of trainer

3.1 A TCP should ensure that its trainer should at least possess the qualifications stipulated in **Annex 1**.

4. Trainees to trainer ratio

4.1 A TCP should ensure that the maximum ratio of trainees to trainer is 20 to 1 for theory session and 10 to 1 for practical session of the full course.

4.2 A TCP should ensure that the maximum ratio of trainees to trainer is 10 to 1 for both theory session and practical session of the revalidation course.

4.3 For effective instruction in practical training, there should never be more than two trainees on one SWP at any time.

5. Class size

5.1 A TCP should ensure that the maximum size of a class is 20 trainees for the full course.

5.2 A TCP should ensure that the maximum size of a class is 10 trainees

for the revalidation course.

6. Course duration

6.1 A TCP should ensure that the minimum course duration of full course should be 14 hours in 2 whole days (7 hours per day) (break between half-day sessions or lunch time not included). It should include a practical session of about 4 hours on general safe practices and complete check of the SWP, a written examination session of 30 minutes, a practical examination of not more than 30 minutes (per trainee), and a total of not more than 30 minutes recess time per day.

6.2 A TCP should ensure that the minimum course duration of revalidation course should be 7 hours (break between half-day sessions or lunch time not included). It should include a practical session of about 3 hours, a written examination session of 30 minutes and a total of not more than 30 minutes recess time.

6.3 A TCP is allowed to use the time saved from the practical training, particularly in a small class size situation, to supplement additional relevant materials in the practical session if all the trainees have completed the practical training as specified in relevant course materials. In such case, the TCP should properly record the supplemented training and produce the records, upon request, to an occupational safety office of the LD for inspection.

6.4 A TCP should make an application in writing to the CL for seeking approval for a special arrangement on the partition of course duration, if needed, where the duration of each half-day session should not be less than 3 hours. The CL will consider the application when the special arrangement does not affect the quality of training and course monitoring.

7. Attendance

7.1 A TCP should ensure that any trainee who is absent from the theory class for more than 15 minutes for any half-day sessions will be disqualified to attend the examination.

8. Lesson plan

8.1 A TCP should ensure that its full course and revalidation course should be taught in accordance with the lesson plans stipulated at **Annex 2** and **Annex 3**, respectively.

9. Course contents

9.1 A TCP should ensure the course materials used for full course and revalidation course should include all the topics and details stipulated at **Annex 4** and **Annex 5**, respectively. The course contents include the reference teaching time and the additional requirements for the delivery. The TCP should also supplement additional materials in accordance with the needs of the trainees and the latest safety information.

10. Display, demonstration and practising

10.1 A TCP should provide suitable and sufficient equipment for the purpose of display, demonstration and practising. The details are stated in relevant sections of the course contents at **Annex 4** and **Annex 5**.

10.2 A TCP should ensure that every trainee should safely complete the hands-on practices. A TCP should provide the following equipment (for shared use) for trainee for hands-on practice:

Full and Revalidation Courses:

- Minimum one suspended working platform approved by the CL for the relevant training purpose;
- Minimum two set of safety harnesses with lifelines and fall-arresting devices;
- Minimum two safety helmets with chin-strips; and
- Minimum two pairs of safety gloves.

11. Examination

11.1 A TCP should ensure that every trainee attending the examination should meet the required attendance and the requirement of completing the hands-on practice.

11.2 A TCP should ensure that the examination papers used are issued and specified by LD.

11.3 A TCP should provide the answer sheet at Annex 6 to the trainee for the examination.

11.4 A TCP should ensure that the invigilator and the trainee should sign on the answer sheet.

11.5 The passing mark for both written and practical examinations is 60%.

12. Validity period of certificate

12.1 A TCP should ensure that the validity period of SWP certificate issued is 5 years.

12.2 For full course, validity period of the certificate should be counted from the date when the trainee successfully completes the course.

12.3 For revalidation course, validity of the certificate should be counted from the day—

12.3.1 immediately after the expiry date of the current certificate if

the revalidation course is successfully completed within 6 months prior to expiry of the current certificate, or

12.3.2 of completing the revalidation course if the revalidation course is successfully completed within 6 months after expiry of the current certificate.

13. Standard certificate format

13.1 A TCP should ensure that the front side of the "Certificate for Operation of Suspended Working Platform" should be designed with the required words, in the format as shown in **Figure 1** and according to the specifications below. The reverse side is left to the TCP to include other information as appropriate, which should be commensurate with the purpose of the certificate.

Figure 1: Required Words and Design Format of the Front Side of SWP Certificate

(not to scale)

13.1.1 The certificate should be made of durable materials, either laminated or plastic, and in standard size of 85 mm x 55 mm;

13.1.2 A photograph (minimum size of not less than 20 mm x 25 mm) of the trainee should be incorporated into the certificate for easy identification;

13.1.3 For laminated card, the corner of the trainee's photo should be stamped with the TCP's company's chop;

13.1.4 For plastic card, the trainee's photo should be printed on the card;

13.1.5 Unless otherwise specified, information on the certificate should be printed in both Chinese and English;

13.1.6 The certificate should contain the following information:

- The name of certificate, i.e. "操作吊船證明書" and "Certificate for Operation of Suspended Working Platform";
- The empowering legislation, i.e. "工廠及工業經營（吊船）規例第 17 條" and "Section 17 of the Factories and Industrial Undertakings (Suspended Working Platforms) Regulation";
- The Chinese and English name as printed on the Hong Kong Identity Card (or equivalent identity documents) of the certificate holder;
- Reference number of the certificate (an "R" should be appended to the last digit of the reference number to denote that the certificate is issued for a revalidation course);
- Date of Course Completion (in the format of DD/MM/YYYY);
- Validity period with starting date and expiry date (in the format of DD/MM/YYYY);
- Name of the certificate issuing course provider; and
- The wordings of "此證明書須由持證人擁有及保存。" and "This certificate is owned and should be kept by the certificate holder."

14. Training records

14.1 A TCP should submit the record of every certificate issued according to the required details stipulated in **Table 1** as well as the name of the course.

Table 1：Example of Training Records

HKID/ Passport No. (TRT1)	Name of trainee (TRT2)	Class Ref. (TRC1)	Name of Trainer (TRC2)	Date of Course completion (TRC3)	Certificate Effective Date (TRT3)	Certificate Expiry Date (TRT4)	Certificate Serial No. (TRT5)
A123456(1)	Chan Siu On	ABC1	HAU To-si	13/06/2011	13/06/2011	12/06/2016	W396000201R
A123457(2)	Chan Siu Chuen	ABC1	HAU To-si	13/06/2011	23/09/2011	22/09/2016	W396000202R
A123458(3)	Chan Siu Feng	ABC2	HAU To-si	18/06/2011	18/06/2011	17/06/2016	W396000203
A123459(4)	Chan Siu Lin	ABC2	HAU To-si	18/06/2011	18/06/2011	17/06/2016	W396000204

Annex 1

Qualifications for Trainer of Training Course for Persons Working on Suspended Working Platforms

	The trainer should have:
1.	at least 3 years' experience of working with SWP or similar plants;
2.	successfully completed an acceptable instructional-skills training course, such as the certificate course of Basic Instructional Techniques by The Education University of Hong Kong or the certificate course of Occupational Safety and Health Trainer by the Occupational Safety and Health Council ("OSHC") or the certificate course of Effective Site Safety Training and Instructing Techniques Course by Construction Industry Council ("CIC") or equivalent;
3.	hold a valid certificate for operation of SWP;
4.	attended the legislation-related courses and obtained the relevant certificates such as a mandatory basic safety training certificate issued by any approved course providers and a certificate of Safety Supervisor Course issued either by OSHC or CIC or equivalent; and
5.	sound knowledge relating to the prevention of injuries and property losses in connection with the use of SWP.
	In addition to the above, the trainer should be:
6.	familiar with the local safety regulations relating to the operation of SWP involved;
7.	able to read and write in the language to be used as a medium of instruction for the course;
8.	fit and proper to conduct the course; and
9.	nominated in writing by the course provider and approved by the CL.

Annex 2

Lesson Plan for Training Course for Persons Working on Suspended Working Platforms

Day 1

Section	Topic & Content	Time (Minutes)
1	Introduction to Arrangements of the Course	10
2	Relevant Occupational Safety and Health Legislation Applicable to Suspended Working Platform Work	35
3	General Knowledge of the Suspended Working Platform	70
Recess		**15**
4	Knowledge Relating to Electrical Apparatus Necessary for the Starting and Operation of the Suspended Working Platform	30
5	Safe Operation Procedures	70
Break between Half-day Sessions or Lunch Break		
6	Explanation, Display and Demonstration of Personal Protective Equipment and Portable Fire Extinguishers	30
7	Safety Measures in Adverse Weather Conditions	15
8	Signalling and Communication Systems	10
9	Safe Working Load	10
10	Emergency Procedures	30
Recess		**15**
11	Analysis of Common Serious Accidents involving Suspended Working Platforms	30
12	Conclusion of the Course	10
13	Written Examination	30
14	Review of the Examination Paper After the Examination	10
Total Time of Day 1【Class+Exam+Review】		**420 (7 Hrs)**

Lesson Plan for Training Course for Persons Working on Suspended Working Platforms

Day 2

(The maximum ratio of trainees to trainer for the practical session is 10 to 1)

Section	Topic & Content	Time (Minutes)
15	Hands-on Practice	225
Recess		**15**
	Hands-on Practice (continued)	
Break between Half-day Sessions or Lunch Break		
16	Practical Examination	165
Recess		**15**
	Practical Examination (continued)	
Total Time of Day 2【Practice+Exam】		**420 (7 Hrs)**

Note: The teaching time allocated for Sections 1 to 11 is for reference.

Annex 3

Lesson Plan for Revalidation Training Course for Persons Working on Suspended Working Platforms

Section	Topic & Content	Time (Minutes)
1	Introduction to Arrangements of the Course	5
2	Relevant Occupational Safety and Health Legislation Applicable to Suspended Working Platform Work	20
3	General Knowledge of the Suspended Working Platform	30
4	Knowledge Relating to Electrical Apparatus Necessary for the Starting and Operation of the Suspended Working Platform	15
5	Safe Operation Procedures	20
6	Explanation, Display and Demonstration of Personal Protective Equipment and Portable Fire Extinguishers	20
Recess		**15**
7	Safety Measures in Adverse Weather Conditions	10
8	Signalling and Communication Systems	5
9	Safe Working Load	5
10	Emergency Procedures	15
11	Analysis of Common Serious Accidents involving Suspended Working Platforms	20
Break between Half-day Sessions or Lunch Break		
12	Hands-on Practice	180
Recess		**15**
	Hands-on Practice (continued)	
13	Conclusion of the Course	5
14	Written Examination	30
15	Review of the Examination Paper After the Examination	10
Total Time【Class+Practice+Exam+Review】		**420 (7 Hrs)**

Note: The teaching time allocated for Sections 1 to 11 is for reference.

Annex 4

Course Contents for Training Course for Persons Working on Suspended Working Platforms

Course Contents for
Training Course for
Persons Working on Suspended Working Platforms

Section 17 of Factories and Industrial Undertakings

(Suspended Working Platforms) Regulation

Occupational Safety and Health Branch
Labour Department

The Course Contents are prepared by
The Occupational Safety and Health Branch
Labour Department

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Information on the services offered by the Labour Department and on major labour legislation can also be found by visiting our Home Page in the Internet.

Contents

1. Introduction to Arrangements of the Course

[Reference teaching time for Section 1: 10 mins]

1.1 Training Venue, Training Equipment and Examination Requirements

- To introduce briefly about the training venue, training equipment and the examination requirements

1.2 Introduction to the Course Contents

- To introduce briefly about the course structure and contents

1.3 Objectives of the Course

Suspended working platforms which are commonly known as gondolas are widely used in Hong Kong. They carry workers, site personnel, or engineers for working at height during the installation of curtain walls and windows, window cleaning, external renovation and decoration of buildings, bridges, chimneys, silos and other structures, etc. According to Section 17 of the Factories and Industrial Undertakings (Suspended Working Platforms) Regulation, the owner of a suspended working platform (hereinafter abbreviated as "SWP") shall ensure that every person working thereon shall have undergone training that is either recognized by the Commissioner or provided by the manufacturer of the SWP or its local agent, on general construction of the SWP and how to operate it safely, and have obtained a certificate in respect of such training from the person who provided the training.

At the end of the course, the trainees should be able to acquire the knowledge of:

- designed purpose, capabilities and limitations of SWP;
- installation and working principles of SWP;
- correct operating procedures and good safety practices;
- basic maintenance knowledge required for checking and reporting to the management the irregularities identified;
- any statutory regulations relevant to the type of work which might be carried out in SWP;

- the types, purposes, correct selection procedures and the proper use of personal protective equipment commonly used in connection with the operation of SWP; and
- describe the typical/alarming accidents (including causes and related preventive measures) associated with operation of SWP, in particularly those occurred during the five years preceding the conduct of the course.

Furthermore, the trainees should also be able to acquire the following practical skills to operate the SWP:

- starting up, manoeuvring, operating and shutting down SWP in question. Operating skills must include all the normal tasks for which the machine is designed and operational safety in relation to work conditions;
- checking of SWP and of its immediate surroundings prior to operating SWP;
- identifying abnormalities in the operation and report to the management of any defects; and
- understanding emergency procedures.

2. Relevant Occupational Safety and Health Legislation Applicable to Suspended Working Platform Work

[Reference teaching time for Section 2: 35 mins]

2.1 Occupational Safety and Health Ordinance and the Regulation (Chapter 509)

Purposes

- To ensure the safety and health of employees when they are at work
- To prescribe the occupational safety and health measures
- To improve the safety and health standards applicable to workplaces
- To improve the safety and health aspects of working environments of employees

Coverage

- This ordinance covers almost all workplaces - places where employees work, including offices, shopping arcades, supermarkets, hospitals, construction sites, etc.
- However, there are a few exceptions, including places where only self-employed persons work and domestic premises where the only employees are domestic servants.
- Every employer must, so far as reasonably practicable, ensure the safety and health at work of all his employees.

Subsidiary Regulations include:

- Occupational Safety and Health Regulation
- Occupational Safety and Health (Display Screen Equipment) Regulation

2.2 Factories and Industrial Undertakings Ordinance and the Regulations (Chapter 59)

- Provide for the safety and health protection to workers in the industrial sector
- Coverage
  - factories
  - construction sites

- catering establishments
- cargo and container handling undertakings
- repair workshops and other industrial workplaces

- General Duties of Proprietors

  Every proprietor of an industrial undertaking must, so far as is reasonably practicable, ensure the safety and health at work of all persons employed by him. The matters to which that duty extends include:

  - providing and maintaining plant and work systems that do not endanger safety or health;
  - making arrangements for ensuring safety and health in connection with the use, handling, storage or transport of plant or substances;
  - providing all necessary information, instruction, training and supervision for ensuring safety and health;
  - providing and maintaining all parts of the workplace and means of access to and egress from the workplace that is safe and without risk to health; and
  - providing and maintaining a working environment that is safe and without risk to health.

- General Duties of Persons Employed
  - every person employed at an industrial undertaking must take reasonable care for the safety and health of himself and others; and
  - co-operate with the proprietor of an industrial undertaking to enable any duty or requirement for securing the safety and health of persons employed at the industrial undertaking to be performed or complied with.

Subsidiary Legislation under Factories and Industrial Undertakings Ordinance

Under the Factories and Industrial Undertakings Ordinance, there are subsidiary regulations covering various aspects of hazardous work activities in factories, building and engineering construction sites, catering establishments, cargo and container handling undertakings and other industrial workplaces. The subsidiary regulations prescribe detailed safety and health standards on work situations, plant and machinery, processes and substances.

Subsidiary legislation under Factories and Industrial Undertakings Ordinance include Factories and Industrial Undertakings Regulations, Construction Sites (Safety) Regulations, Factories and Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations, Factories and Industrial Undertakings (Suspended Working Platforms) Regulation, Factories and Industrial Undertakings (Loadshifting Machinery) Regulation, Factories and Industrial Undertakings (Dangerous Substances) Regulations, Factories and Industrial Undertakings (Electricity) Regulations, Factories and Industrial Undertakings (Guarding and Operation of Machinery) Regulations, Factories and Industrial Undertakings (Safety Management) Regulation, Factories and Industrial Undertakings (Confined Spaces) Regulation, Factories and Industrial Undertakings (Gas Welding and Flame Cutting) Regulation, etc.

2.3 Factories and Industrial Undertakings (Suspended Working Platforms) Regulation (Chapter 59AC)

Application

- This Regulation applies to an industrial undertaking in which any SWP for carrying persons is used.

Interpretation

- "Suspended working platform" means a scaffold (not being a slung scaffold) or a working platform suspended from a building or structure by means of lifting gear and capable of being raised or lowered by lifting appliances (but does not include a boatswain's chair or similar device), and includes all lifting appliances, lifting gear, counterweights, ballast, outriggers, other supports and the whole of the mechanical and electrical apparatus required in connection with the operation and safety of such a scaffold or working platform.
- "Safe working load", in relation to a SWP, means the safe working load for operating it as specified in the current certificate of thorough examination or load test and thorough examination given by a competent examiner.
- "Competent person", in relation to any duty to be performed by such a person under this Regulation, means a person who is:
  - appointed by the owner to ensure that the duty is carried out; and

- by reason of substantial training and practical experience, competent to perform the duty.

- "Competent examiner", in relation to the carrying out of any thorough examination or load test and thorough examination required by this Regulation, means a person who is:
  - appointed by the owner required by this Regulation to ensure that such thorough examination or load test and thorough examination is carried out;
  - a registered professional engineer registered under the Engineers Registration Ordinance (Cap. 409) within a relevant discipline specified by the Commissioner; and
  - by virtue of his previous experience, competent to carry out such thorough examination or load test and thorough examination;
- "Climber" means a lifting appliance through which a suspension rope passes which is controlled either by friction grips or by turns of the rope round drums within the appliance and the lower end of which rope is not anchored to the climber.
- "Lifting appliance" includes a winch, climber, chain block, hoisting block, pulley block or gin wheel used for raising or lowering, or as a means of suspension of, a SWP.
- "Lifting gear" includes a chain sling, wire rope sling or similar gear and a ring, link, hook, shackle, swivel or eyebolt.
- "Owner", in relation to any SWP, includes the lessee or hirer thereof, and any overseer, foreman, agent or person in charge or having the control or management of the SWP, and the contractor who has control over the way any construction work which involves the use of the SWP is carried out and, in the case of a construction site, includes the contractor responsible for the construction site.

Construction and Maintenance

- A SWP shall be of good design and construction, adequate strength and made of sound material and free from patent defect. A SWP shall be properly installed or assembled, and it shall be properly maintained.

Anchorage and Support

- Adequate arrangements shall be made for fixing and anchoring the appliance to secure its safety. A SWP shall be adequately and securely supported. Every structure supporting it shall be of good construction and adequate strength, of sound materials and free from patent defect.
- All outriggers of a SWP shall be of adequate length and strength. They shall be properly installed and supported. All outriggers of a SWP shall be firmly anchored at the inner ends and securely fastened to any ballast or counterweights.

Suspension

- The points of suspension shall be at adequate horizontal distances from the face of the building or other structure so as to prevent the SWP from coming into contact with such face.
- Only wire ropes or chains shall be used for the raising, lowering and suspension of the platform.
- They shall be securely attached to the outriggers or other supports.
- They shall be of such length that the platform is capable of being lowered to the ground or a safe landing place.
- Adequate arrangements shall be made to prevent undue tipping, tilting or swinging of the platform and to secure it to prevent undue horizontal movement while it is being used.

Counterbalance and Counterweights

- Water or other liquids, earth, clay, sand, chippings or aggregates shall not be used as counterweights of a SWP.
- Every portable counterweight shall have its weight permanently and distinctly stamped, engraved or embossed thereon.
- All counterweights shall be securely attached at the inner end of the outriggers to prevent tampering by any person.
- They shall be not less than three times the weight necessary to balance the load on the projecting part of the outriggers when the platform is fully loaded.

Platforms

The platform of a SWP shall be:

- at least 440 millimetres wide and of sufficient length to allow the number of persons using it to do so safely.
- except to the extent necessary for drainage, either closely boarded, planked or plated.
- provided on all sides with toe boards placed at a height not less than 200 millimetres above its floor level.
- provided on all sides with guardrails of adequate strength. The guardrails shall be so positioned that the top guardrail is at a height between 900 millimetres to 1150 millimetres above the floor level and the lowest guardrail is not more than 700 millimetres above the top of the toe board.

Safe Means of Access

- Sufficient safe means of access and egress shall be provided to the platform of the SWP.
- Sufficient safe means of access shall be provided to those parts of the installation of the SWP requiring periodic inspection or maintenance.

Drums and Pulleys

- Every drum or pulley on which a rope is carried shall be of sufficient diameter and shall be of such design for the rope used.
- Every rope which terminates at the winding drum of a SWP shall be properly secured to the drum. The rope shall be long enough so that, at all times, at least 2 turns of the rope shall remain on the drum.

Brakes

- Every winch, climber or similar devices of a manually operated SWP shall be provided with an efficient brake which comes into operation when the operating handle or lever is released.
- Every winch, climber or similar devices of a power operated SWP shall be provided with 2 independent and efficient braking systems. Each of which is capable of preventing the SWP from falling out of control or in a dangerous manner.

Control Levers, Switches, etc.

- Every lever, handle, switch, or other device used for controlling the operation of any part of the SWP shall be provided with a suitable spring or other locking arrangement to prevent accidental movement or displacement (unless the lever, handle, switch or other device is so placed as to prevent accidental movement or displacement).
- The lever, handle, switch or other device shall have clear markings to indicate its purpose and the mode of operation.

Protection of Climbers against the Effect of Weather, etc.

- Every winch, climber or similar devices of the SWP shall be adequately protected against the effect of weather, dust or material likely to cause damage to them that can result in a malfunction.

Safety Ropes and Safety Devices

- A safety rope having an automatic safety device mounted on it shall be provided at each suspension point of a SWP such that the safety rope with the automatic safety device will support the platform if the primary suspension rope, the winch, the climber or any part of the mechanism for raising or lowering the platform fails.
- The requirement to provide a safety rope and an automatic safety device shall not apply when:
  - the platform is supported on 2 independent suspension wire ropes at or near each end such that, in the event of the failure of one rope, the other rope is capable of sustaining the weight of the working platform and its load and prevent it from tilting.
  - there is a system incorporated into the platform, which operates automatically to support the platform and its load in the event of the failure of the primary suspension rope.
- The safety rope and the automatic safety device shall be properly maintained and kept in good working order.

Safety Belts, Lifelines, etc.

- A safety belt and an independent lifeline or an anchorage with fittings shall be provided to each person using the SWP. Each safety belt, lifeline,

anchorage and fitting shall be properly maintained and shall be of such a design and so constructed as to prevent serious injury in the event of a fall to any person using it.

- Every person carried on a SWP shall wear a safety belt that is attached to the independent lifeline or an anchorage with fittings.
- A notice in English and Chinese in the following form shall be displayed prominently on the SWP:

  "Every person riding on a suspended working platform shall wear a safety belt properly attached to an independent lifeline or an appropriate anchorage
  吊船上的人員須佩戴安全帶；安全帶須繫於獨立救生繩上或穩固的繫穩物上"

Erection, Dismantling and Alteration

- A SWP shall not be erected or dismantled; or the structure, as originally designed, shall not be altered except under the supervision of a competent person.

Trained and Competent Workers

- Every person working on a SWP shall:
  - be at least 18 years old;
  - have undergone training that is either recognized by the Commissioner for Labour or provided by the manufacturer of the SWP or its local agent; and
  - have obtained a certificate in respect of such training from the person who provided the training.

  The training shall cover:
  - general construction of the SWP; and
  - how to operate it safely.
- The above regulation of "Trained and Competent Workers" does not apply where a person is undergoing training in working on a SWP and he is doing so under the supervision of a person who meets the requirements specified in the above regulation.

Use in Bad Weather Conditions

- No SWP shall be used under weather conditions likely to endanger its

stability or cause danger to the persons carried thereon.

- After exposure to weather conditions likely to have affected the stability of the SWP:
  - the SWP shall be load tested and thoroughly examined by a competent examiner as soon as practicable thereafter and before it is again used; and
  - in the event of the anchorage, ballast, counterbalance or supports being found on examination to be unsafe, steps shall be taken to ensure again the stability of the SWP.

Inspections by Competent Persons

- Every SWP shall be inspected in the immediately preceding 7 days before its use by a competent person.
- A certificate in the approved form (Form 1), in which the competent person has made a statement to the effect that it is in safe working order, shall be obtained from the competent person.
- Besides, all suspension ropes and safety ropes shall be inspected and found in safe working condition by a competent person prior to commencement of daily work.
- A notice in English and Chinese in the following form shall be prominently displayed on the platform:
  "All wire ropes shall be inspected prior to commencement of daily work
  每日開工前須檢查所有繩索"

Test and Examination Prior to Use

- Every SWP shall be thoroughly examined by a competent examiner in the immediately preceding 6 months before it is put into use. The owner of the SWP shall obtain a certificate in the approved form (Form 2) from the competent examiner to certify that the SWP is in safe working order.
- Every SWP shall be load tested and thoroughly examined by a competent examiner during the preceding 12 months before its use. The owner of the SWP shall obtain a certificate in an approved form (Form 3) containing a statement to the effect that the SWP is in safe working order made by the competent examiner in respect of the SWP after such examination.
- Every SWP has to be further load tested and thoroughly examined by a

competent examiner when the SWP has subsequently undergone:

- substantial repair;
- re-erection, including erection following its removal to a different location;
- adjustment to any member of the SWP, being an adjustment which involves changes in the arrangements for anchoring or supporting the SWP; or
- failure or collapse.

The owner of the SWP shall obtain a certificate in an approved form (Form 3) containing a statement to the effect that the SWP is in safe working order made by the competent examiner after the examination.

Marking of Safe Working Load and Number of Persons Allowed

- The platform of a SWP shall be clearly and legibly marked with the following:
  - the safe working load;
  - maximum number of persons allowed; and
  - appropriate mark to distinguish it from other similar platform.
- The safe working load of a SWP shall not be exceeded except when tests of such appliance are being done by competent examiner. The maximum number of persons carried shall not be exceeded when the SWP is used.

Construction of Wire Rope

- A wire rope shall not be used for raising or lowering, or as a means of suspension or as a safety rope if in any length of 10 diameters, the total number of visible broken wires exceeds 5% of the total number of wires in the rope. A wire rope shall not be used if there is any kink, distortion, marked signs of wear or corrosion in the rope.

Keeping of Records of Maintenance

- The records of maintenance shall be kept in a safe place. They shall be kept for a period of at least 6 years after the date on which the SWP is taken out of use. The records of maintenance shall made available for inspection by an occupational safety officer at all reasonable times.

Keeping and Displaying of Reports

- The certificates or reports in respect of any thorough examination and load test, or thorough examination shall be kept for a period of 3 years after the dates of the certificates or reports are received.
- A copy of the most recent certificate or report shall be displayed on the SWP.
- If a SWP is taken out of use, the owner shall keep the most recent certificates or reports in a safe place for a period of at least 2 years after the date on which it was taken out of use.
- The certificates or reports shall be made available for inspection by an occupational safety officer at all reasonable times.

Prohibitions

- No person shall tamper or interfere with or render inoperative any safety rope and automatic safety device.
- No one shall use a SWP unless he wears a safety belt and keeps it attached to the lifeline or other anchorage.

2.4 Construction Sites (Safety) Regulations (Chapter 59I)

These regulations control the construction, maintenance, use and operation of hoists, scaffolds and working platforms. There are also provisions for the use of personal protective equipment for protection against falling of person, falling objects and drowning in a construction site. There are miscellaneous safety requirements such as prevention of inhalation of dust and fumes, protection of eyes and the provision of first aid facilities.

Part VA of the Construction Sites (Safety) Regulations provides a greater degree of safety to persons working on construction sites, in particular in relation to preventing falls from heights. The contractors have the general duty to make and keep every place of work on a construction site safe, and in particular, to take suitable and adequate steps to prevent persons from falling from a height of 2 metres or more, for example, the provision, use and maintenance of working platforms, guard-rails, barriers, toe-boards and fences, coverings for openings, gangways and runs, etc.

2.5 Factories and Industrial Undertakings (Lifting Gear and Lifting Appliances) Regulations (Chapter 59J)

The regulations define the meaning of lifting appliance, lifting gear and crane. It is mandatory for the owner to ensure that the lifting appliance and lifting gear shall be examined and inspected by competent examiner and competent person periodically. A certificate shall be obtained from the competent examiner in the approved form in which he has made a statement to the effect that the lifting appliance is in safe working order.

2.6 Code of Practice

The Code of Practice (hereinafter referred as the Code) is approved and issued by the Commissioner for Labour under Section 7A of the Factories and Industrial Undertakings Ordinance, Chapter 59 of the Laws of Hong Kong (hereinafter referred as the FIUO). It provides a practical guidance to proprietors of industrial undertakings and the employees for compliance with the requirements under the provisions of the Sections 6A and 6B of FIUO concerning the general duties of proprietor and employee. It is important to note that compliance with the Code does not of itself confer immunity from legal obligations.

The Code has a special legal status. Although failure to observe any guidance contained in the Code is not in itself an offence, that failure may be taken by a court in criminal proceedings as a relevant factor in determining whether or not a person has breached any of the provisions of the regulations to which the guidance relates.

Codes of practice that are often used include:

- Code of Practice for Safe Use and Operation of Suspended Working Platforms
- Code of Practice for Bamboo Scaffolding Safety
- Code of Safety for Safety and Health at Work in Confined Spaces
- Code of Practice for Metal Scaffolding Safety
- Code of Practice for Safe Use of Tower Cranes
- Code of Practice for Safe Use of Mobile Cranes.

3. General Knowledge of the Suspended Working Platform

[Reference teaching time for Section 3: 70 mins]

3.1 Definition of Suspended Working Platform

"Suspended working platform" means a scaffold (not being a slung scaffold) or a working platform suspended from a building or structure by means of lifting gear and capable of being raised or lowered by lifting appliances (but does not include a boatswain's chair or similar device), and includes all lifting appliances, lifting gear, counterweights, ballast, outriggers, other supports and the whole of the mechanical and electrical apparatus required in connection with the operation and safety of such a scaffold or working platform.

3.2 Types of Suspended Working Platforms

There are two main types of SWPs, namely permanent SWPs and temporary SWPs.

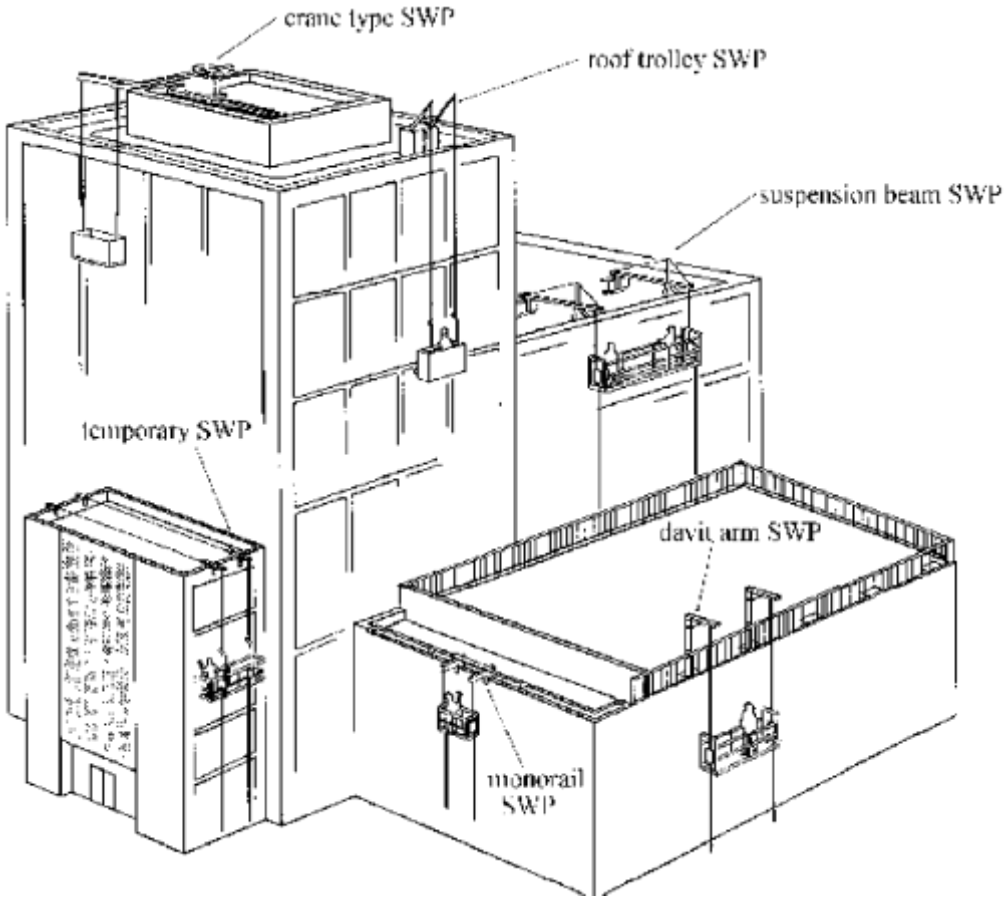
3.2.1 Permanent Suspended Working Platform

- A permanent SWP is designed especially to be permanently installed on a specific building or structure for the inspection, cleaning and maintenance of the facades.
- It comprises a working platform suspended by wire ropes from a roof rig, a trolley of the monorail fixed to the building, or a roof trolley. The roof rig may be a fixed structure to which a working platform is attached. The working platform may be lifted and lowered and may be traversed and rotated.
- If the SWP consists of a roof trolley, the roof trolley can operate either on rails or on suitable surface, e.g. a concrete track.
- The system may be power or hand operated. The hoisting mechanism may be mounted either on the roof rig or on the working platform.

3.2.2 Temporary Suspended Working Platform

- A temporary SWP is temporarily assembled on a building or a structure. It will be dismantled at the end of the work for which it was installed.
- This type of temporary SWP is generally used for painting and insulating work, cladding, repairs and refurbishment on building, bridges, chimneys, silos and other structures.
- A temporary SWP comprises a working platform, normally suspended on wire ropes attached to a roof rig. The working platform may be lifted or lowered by winches or climbers which are usually mounted on the working platform. Sometimes, the working platform is also designed to traverse. The stability of the roof rig may be achieved either by counterweights or direct attachment to the structure component of the roof of the building or structure.

Figure 1: Permanent and Temporary Suspended Working Platforms



(various technical details such as independent lifelines,
safety ropes and automatic safety devices are not shown)

3.3 Basic Construction of Common Suspended Working Platforms

The basic construction of a common SWP comprises wire ropes, winches/climbers, drums and pulleys, a platform, control devices, safety devices and brake systems.

Definitions of Components:

- "Suspension rope" is the wire rope carrying the weight of the working platform and the imposed load thereon.
- "Safety or secondary rope" is a wire rope which is normally not carrying the weight of the working platform and the imposed load thereon but rigged in conjunction with a safety device or arrestor to come into operation for supporting the working platform in the event of a failure of the suspension rope, the winch, the climber or any part of the mechanism for raising or lowering the working platform.
- "Winch" is a lifting appliance operated to raise and lower the working platform by means of a suspension rope reeled on to a drum.
- "Climber" is a lifting appliance through which the suspension rope passes which is controlled either by friction grips or by turns of the rope round drums within the appliance. The lower end of the rope is not anchored to the climber.
- "Working platform" is the working platform of the SWP, consisting of a framework and decking used for carrying persons and their equipment.
- 'Roof rig" is the portion of the suspended working platform (excluding the track system) mounted on the roof or at roof level to support and position the working platform.
- "Outrigger" is the cantilever portion of the roof rig or similar support or arrangement for suspending the working platform, including any assembly of beams, joists, tubular scaffold framework or proprietary brackets to which the upper ends of the suspension members are secured.
- "Automatic safety device" is a device or devices acting on a safety rope which will arrest and sustain a working platform in the event of the failure of a suspension rope, the winch, the climber or any part of the mechanism for raising or lowering the working platform.

- “Primary brake” is a brake, automatically applied, which stops the hoist and holds the working load under normal operating conditions, when power to the prime mover is interrupted or discontinued.
- “Secondary brake” is a brake acting directly on the drum or the traction sheave, or the final drive shaft, intended to stop the descent of the working platform, under emergency conditions.

3.3.1 Wire Rope

- Wire ropes or chains should be used for raising, lowering and suspension of the working platform. They should be securely attached to the outriggers or other supports.
- The wire ropes or chains used in the suspension system should be of such lengths that the working platform should be capable of being lowered to the ground or a safe landing place.
- The wire rope or chains used in the suspension system should be in one continuous length and free from joints and repairs.
- The points of suspension of a SWP should be at adequate horizontal distances from the face of the building or other structure so as to prevent the SWP from coming into contact with such face. The suspension and safety rope should at all times be kept vertical during the raising, lowering or suspension of the working platform.
- Only wire ropes specified by the manufacturer of the working platform should be used.
- Where the suspension of a working platform is by means of four suspension ropes, that is, two at each end of the working platform, 6mm diameter steel wire ropes would be the minimum acceptable requirement. Preferably, 8mm diameter steel wire ropes or above are recommended.
- Where the suspension of a working platform is by means of primary suspension ropes and safety ropes, wire ropes used for primary suspension ropes or safety ropes should be made of steel wire ropes of not less than 8 mm diameter and the diameter of the safety rope should not be less than the diameter of the primary suspension rope.
- Each suspension and safety rope should have a factor of safety of not less than 8, based on the maximum rope tension when related to the minimum

breaking load of the rope, or such other higher factors as specified by the manufacturer of the winch or climbing device.

- Where the working platform is raised or lowered by a winch, there should be at least two turns of the wire rope remained on the drum when the working platform is at the lowest level.
- Where the working platform is raised or lowered by a climber or traction pulley, after the working platform has reached the ground or a landing place, the free ends of the suspension and safety ropes should have a minimum length of three metres measured from the discharge of the climber or traction pulley.
- Where a wire rope is fixed to a jib or outrigger arm, the rope termination should be attached to the outrigger or jib with a shackle or other suitable means. Where a wire rope is attached to a working platform, the rope termination should be attached to a structural load bearing portion of the working platform with a shackle or other suitable means. U-bolt grips should not be used.
- Wire rope termination should be suitable for their purpose and should have a strength of not less than 80% of the minimum breaking load of the rope. Any free end of rope should be finished to prevent unlaying.
- The end of the suspension rope other than that on or through the lifting device or winch should be fixed to the suspension point on the roof rig or on the working platform with a thimble eye splice or ferrule secured eye termination or other rope coupling device giving a strength of not less than 80% of the breaking load of the rope.
- Wire ropes should be properly maintained and lubricated to prevent corrosion. Ropes with the following defects should not be used:
  - ropes with kinks, birdcage or any other distortion;
  - when the total number of visible broken wires exceeds 5 % of the total number of wires in the rope in any length of ten diameters of the rope;
  - there is on the rope marked signs of wear or corrosion; and
  - reduction of nominal diameter of more than 10 %.

3.3.2 Winch/Climber

- All winches, climbers, or other lifting appliances or similar devices should

be adequately protected against the effect of weather, dust, or material likely to cause damage to them that could result in a malfunction.

3.3.3 Drums and Pulleys

- When wire ropes pass over pulleys or round drums in winches and climbers, such pulleys or drums should have a pitch circle diameter of not less than 19 times the diameter of the rope.
- Where the rope terminates at the winding drum, the rope should be fastened on to the drum in the manner specified by the manufacturer.
- If the rope is to be wound on to the drum in more than one layer, the rope anchorage should be so located as to avoid interference with even winding. It should preferably be placed outside the drum flange and should be capable of sustaining twice the maximum force induced in the rope system.

3.3.4 Working Platform

- The working platform should be of sufficient area for the persons employed on it and of at least 440 mm wide. The working platform should be of sound material and the surface should be slip resistant.
- Except for the provision of drainage holes, the working platform should be closely boarded, planked or plated. Any gap in the working platform should not exceed 6 mm in width.
- The working platform should be provided on all sides with suitable toe boards placed at a height not less than 200 mm above the level of the working platform.
- The working platform should be provided on all sides with suitable guardrails of adequate strength to a height between 900 mm and 1150 mm above the level of the working platform. The space between any toe board and the lowest guard-rail above it does not exceed 700 mm.
- When being stationed or left in place between two periods of work, the working platform should be tied at each end into the building to prevent undue movement.
- The working platform should be kept clean at all times. Materials which would cause slipping hazards on the working platform or on the place of

access to it should be removed. No materials should be stored on the working platform. Adequate precautions should be taken to prevent materials and hand tools from falling down at height.

3.3.5 Control Devices

- Requirements on control levers and switches
  - Every lever, handle, switch, or other device used for controlling the operation of any part of the SWP (being a lever, handle, switch, or other device the accidental movement or displacement of which is liable to cause danger) should be, unless it is so placed as to prevent accidental movement or displacement, provided with a suitable spring or other locking arrangement to prevent any such accidental movement or displacement.
  - Every lever, handle, switch, or other device for controlling the operation of any part of the suspended working platform should have either on or adjacent to it clear markings to indicate its purpose and mode of operation.
  - The control for the power unit and hence the climbing device should be such that when manual application is released, the power unit will stop.
  - Emergency stop device (e.g. emergency stop button) should be located at each operator control panel and other places where emergency stop may be required. It should be operative irrespective of whether the control station is in operation. The device should be in red colour.
- Common control panel in the working platform of a SWP
  - A control panel installed at the working platform of a SWP serves to control the operation of the winches/climbers. A common control panel usually have installed on it a selection switch, on/off switches and an emergency stop button, etc. Some SWPs use a pendant control.
  - Selection switch: The selection switch allows an operator to select between synchronized operation of the two winches/climber and operation of the left or the right winch/climber. Usually, the switch is labelled with “Left-Both-Right”(左-齊-右).
  - On/off switches: When an on/off switch is pressed and held, the winch(es)/climber(s) would operate. When the on/off switch is released,

it bounces back to its original position and the winch(es)/climber(s) will immediately stop operation. The on/off switches on the control panel are labelled with “Up”(上) and “Down”(下) to distinguish between their functions for moving up and moving down.

- Emergency stop button: When the emergency stop button is pressed under emergency circumstances (e.g. accident), all operations of the working platform will be stopped immediately. The control panel can resume its normal functions only after the emergency stop button is released to its original position. The emergency stop button is labelled “Emergency”(緊急停止).

3.3.6 Safety Device

- Every working platform should be supported on two independent suspension wire ropes at or near each end such that in the event of the failure of one suspension wire rope, the other wire rope is capable of sustaining the weight of the working platform and its load and preventing it from tilting.
- Where a working platform is raised or lowered by means of climbers or winches with one suspension wire rope at or near each end, the working platform should be provided, at each suspension point, with a safety rope with an automatic safety device mounted on it, such that the safety rope with the automatic safety device will support the working platform in the event of the failure of the primary suspension rope, the winch, climber or any part of the mechanism used for raising or lowering the SWP.
- The automatic safety device must be designed to cover the following situations:
  - the breaking of one of the suspension wire ropes; and
  - the mechanical failure of one of the winches or climbers, causing a slow or rapid slippage of the wire rope. The maximum incline of the working platform deck should be less than 25% (i.e. 1:4).
- The automatic safety device should not be used to stop and hold the working platform under normal operating conditions. It should be engaged mechanically and must be operational after resetting. It should not be possible to release the device under load but should allow the working platform to be lifted.

- A lifting limit switch is installed at the top of a SWP. When the lifting limit switch touches a striker plate installed at the limiting position of a wire rope, the SWP would stop its upward movement.
- The SWP in its operating position should be designed to withstand the sustained wind speed up to 14 metres per second and gust up to 31 metres per second.
- Adequate arrangements (e.g. traversing rope, slack rope device, or anti-tilt device etc.), should be used to prevent undue tipping, tilting or swinging of the working platform and to secure it to prevent undue horizontal movement while it is being used.
- For permanent SWPs, restraint systems and safety devices should be, as far as reasonably practicable, equipped to the SWP as recommended by recognized international or national standards.

3.3.7 Brake Systems

- Each winch, climber or other lifting appliance or similar device of the suspended working platform should be provided with the following braking system:
  - in case of manually operated appliances or devices, an efficient brake which comes into operation when the operating handle or lever is released; and
  - in case of power operated appliances or devices, two independent efficient braking systems, i.e. the primary brake and the secondary brake capable of preventing the suspended working platform from falling out of control or in a dangerous manner.
- Where a temporary suspended working platform is raised or lowered by a manually operated hoist, the hoist should be designed to have:
  - a positive crank force to lift and lower the load. The maximum force applied to the end of the crank or cranks for lifting the rated capacity of the hoist should not exceed 250N;
  - an interlocking device must be provided to prevent the release of the gripping mechanism when the suspension wire rope is under a load above 2% of the maximum safe working load; and
  - a means to prevent rapid handle movement, fast unreeling or

uncontrolled descent.

- The primary brake should :
  - engage automatically in the event of power failure or interruption;
  - be capable of stopping and sustaining the working platform even when the working platform is overloaded by 25%;
  - be directly coupled to the drive train of the appliance or climbing device and not by using belts, pins, clutches, roller chain or rollers; and
  - be capable of being released manually in the event of a power failure or emergency. The means of releasing the brake should ensure its immediate reapplication as soon as the control is released.
- The secondary brake should be mechanically operated independently of the primary brake. It should be capable of arresting and sustaining the working platform if the primary braking system fails and in the event of overspeeding of the working platform.
- Each climbing device should be provided with an automatic emergency type secondary brake that could stop and hold 125 % of the rated load of the climbing device. If such a secondary brake is of the instantaneous stopping type, it should stop and hold its total load before the device travels a vertical distance of 450 mm. If such a secondary brake is of the deceleration type, it should stop and hold its total load before the device travels a vertical distance of 1.2 m.
- Secondary brakes should be independent of the drive trains on all climbing devices. In normal operation, such a brake should not engage before the device is stopped by the primary brake.

4. Knowledge Relating to Electrical Apparatus Necessary for the Starting and Operation of the Suspended Working Platform

[Reference teaching time for Section 4: 30 mins]

4.1 Basic Knowledge of Power Units

- Temporary SWP should be regarded as heavy mobile plant and therefore a suitable power supply should be provided.
- An independent electrical power supply should be provided to temporary SWP. This electrical supply should be of adequate capacity in terms of voltage and current. The supply should be provided with a switch controlling a socket outlet.
- Cables feeding power from the main power supply point to the suspended platform should be of adequate length to allow for the planned movements of temporary SWP.
- The power supply to permanent SWP should form part of the maintained power supply for the building.
- A dedicated electrical supply should be provided to permanent SWP.
- Cables feeding electrical power from the supply points to suspension rigs or suspended platforms should be of adequate length to allow for movement of suspension rigs or suspended platforms of permanent SWP.

4.2 Electrical Safety and Danger of Shock

- The power cable connecting the roof trolley to the power supply point and the cable suspended from the roof trolley or davit arm to the working platform should be suitably sheathed and protected wherever possible from damage of breaking, and should have sufficient cable strength to avoid the cables from being damaged by its own weight. All other cables should be suitably protected against mechanical damage by being enclosed in conduit and/or trunking or other suitable means.
- Protection should be provided for all electrical parts, motors, cables etc. against accidental or environmental damage. All circuit panels should be locked when not in use.
- All electrical equipment should have adequate mechanical strength and

should be adequately protected against mechanical damages and water ingress under site condition. Cable terminations to the suspended working platform and electrical panels should also be the weatherproof type or higher rating to avoid ingress of water and moisture.

- All exposed metal parts or extraneous conductive parts of the roof trolley and of the working platform should be properly earthed.
- The rail tracks, davit arm brackets and other exposed and extraneous metal parts should be connected to the roof lightning protection conductor. All connections should be of negligible resistance, metal to metal and mechanically sound and with non-ferrous nuts, bolts and washers using clamps where necessary.
- All electrical equipment and wiring should be protected against overloads, short circuits and earth faults. Enclosure for electrical equipment which are exposed to open air should be protected from ingress of water or solid foreign. All terminals should be protected from corrosion.
- The power supply for the SWP should be provided with appropriate overload short circuit and earth-fault electrical protection. Power supply cables passing over parapets, edges of roofs or over the corners of beams or slabs should be protected from abrasion or other mechanical damage.
- Any plug and socket should be so placed that they would not be damaged by the intended movement of the working platform or by the accidental swinging of the working platform against the building.
- All control units and pendant controls should be so marked and identified that there is no confusion between the various controls. Their purpose and the direction of travel resulting from their operation should be clearly identified.
- Pendant controls should be so placed or fixed that they cannot be damaged by the intended movement of the working platform or by the accidental swinging of the working platform against the building. The control button or levers should be robust and require continuous light pressure to maintain powered movements, and the control units should be so designed as to prevent them from being operated accidentally, e.g. by the provision of shrouds.
- If 3-phase induction motors are employed as power drives of the SWP, protection devices should be provided to protect against single phasing and

wrong phase sequence.

- Cable reels or other suitable device should be used for the proper handling of the cables connected from the fixed building to the working platform. It is to minimize the risk of physical damage to the cables due to stress and strain. It also helps to eliminate the risk of trip and trap to the operators.
- Where electric arc welding and/or cutting is to be carried out from the working platform, special precautions should be taken to reduce the possibility of the welding current arcing through the suspension wire rope during the course of welding from the working platform and to prevent the transfer of stray welding currents to the suspension or safety ropes as this could impair their strength or cause their fracture.
- When portable electrical equipment is used by operatives on the working platform, electrical supply for these equipment should not be drawn from the power source of the SWP. Electricity should be supplied from an independent power source from the building.

5 Safe Operation Procedures

[Reference teaching time for Section 5: 70 mins]

[Endless winder mode temporary SWP should be cited to explain the content of this section.]

5.1 Pre-use Checks

- Prior to commencement of daily work, all the suspension ropes and safety ropes should be inspected by a competent person. The ropes should be in safe working condition before they are put into use. The inspection should ensure that no bolts are loose or have been removed and that all connections are sound.
- Every SWP should be inspected in the immediately preceding 7 days before its use by a competent person. A statement to the effect that it is in safe working order should be entered into an approved form (Form 1) by the competent person.
- The visual and physical inspection is to find out if there are any items having abnormal wear and tear, malfunction, oil leakage, overheating, corrosion, unusual noise, dislocation, misalignment, visual cracks, overloading, abnormal slackening or elongation, and excessive vibration etc. Any defect discovered during the inspection should be recorded in the maintenance log book and thereafter effectively remedied immediately.
- Any defect and abnormal function noted during the inspection should be recorded in the maintenance log book. Minor repairs such as tightening of bolts and nuts should be immediately carried out. If repairs involve the strength and stability of the suspended working platform, the effectiveness and efficiency of the driven mechanism, function of electrical equipment or proper function of the various safety devices, the suspended working platform should be removed immediately from service. The suspended working platform should be returned to maintenance contractor for repair and thereafter tested and thoroughly examined before put it into service again.
- Proper personal protective equipment should be used e.g. safety harnesses and safety helmets with chin straps, when conducting the checks.

5.1.1 Visual Inspection

- Visual inspection should cover the following:
  - any apparent defect in the hoist mechanism (e.g. the winch or climber, etc), wire ropes and shackles;
  - the condition of the braking system and the automatic safety device;
  - the condition of the outriggers, socket for the davit arm, parapet wall clamp and the tie-back;
  - any defect in the power cable, control button and plug;
  - incorrect fitting of lifeline, safety harness and their anchorages;
  - the condition of guardrails and toe-boards of the working platform;
  - Form 1, Form 2 and Form 3 of SWP:
    - ensure that the forms are all present and they are within their respective validity periods;
    - ensure that Form 2 and Form 3 shall be displayed on SWP;
  - notices and markings: the notices and markings on the working platform should be properly secured and free from patent defect; and display prominently the notices and markings as required by the regulation which include the following:
    - Notice: "Every person riding on a suspended working platform shall wear a safety belt properly attached to an independent lifeline or an appropriate anchorage
      吊船上的人員須佩戴安全帶；安全帶須繫於獨立救生繩上或穩固的繫穩物上。"
    - Notice: "All wire ropes shall be inspected prior to commencement of daily work
      每日開工前須檢查所有纜索"
    - the safe working load applicable to the SWP; the maximum number of persons that may be carried at any one time; and an appropriate mark to distinguish it from other similar SWPs; and
  - others: e.g. suitable fire extinguishers should be provided when flammable substances are used in the working platform.

5.1.2 Functional Test

- During the inspection, the competent person should switch on the power

supply to the SWP and carry out functional tests of the following items in accordance with the manufacturer's instructions:

- all operational control including emergency stop device;
- communication system;
- manual descend facility;
- all limit switches (e.g. the lifting limit switch);
- all electrical wiring and earthing component;
- automatic safety devices; and
- braking systems.

5.2 Start-up Procedures

When the pre-use checks are completed and the SWP is found in safe working condition, the SWP can be started up in accordance with the following procedures:

- Check and ensure that the safety harnesses is securely anchored to an independent lifeline or an anchorage.
- Board the working platform via the designated safe means of access and egress.
- Be aware of the environment around.
- Check again the power cable, wire ropes, independent lifelines etc. to ensure that they are not entangling with miscellaneous objects or the working platform.
- If all are found normal, the operator can start using the SWP.

5.3 Close-down Procedures

- Place the SWP to a designated parking location (e.g. a flat and stable ground).
- Leave the working platform via designated safe means of access and egress.
- Wind all the power cable, wire ropes and independent lifelines and place them on the working platform.
- Isolate the power supply (e.g. by disconnecting the plug from the socket).
- Properly cover the climbers, other lifting appliances or similar devices.

6. Explanation, Display and Demonstration of Personal Protective Equipment and Portable Fire Extinguishers

[Reference teaching time for Section 6: 30 mins]

[Training course provider should ensure that the safety equipment used in this section should comply with the requirements of relevant regulations, and recognized international or national standards. In addition, the manufacturers' instruction manuals on the proper use of the safety equipment should be strictly followed.]

6.1 Personal Protective Equipment

- Personal protective equipment (PPE) is intended to be worn or otherwise used by a person at work for protecting the person against one or more hazards to his/her safety or health. Use of PPE is the last resort when controlling the sources of accident is impracticable. PPE should be handled with care and stored properly when not in use. The equipment should be kept clean and maintained in good condition.
- Employers have duties on guidance, training and supervision with respect to use of PPE. They should ensure that their employees know why and when PPE is used, its maintenance or replacement schedule and limitations.
- PPE should be provided by employers. Employees must wear PPE for the entire period of exposure to hazards.

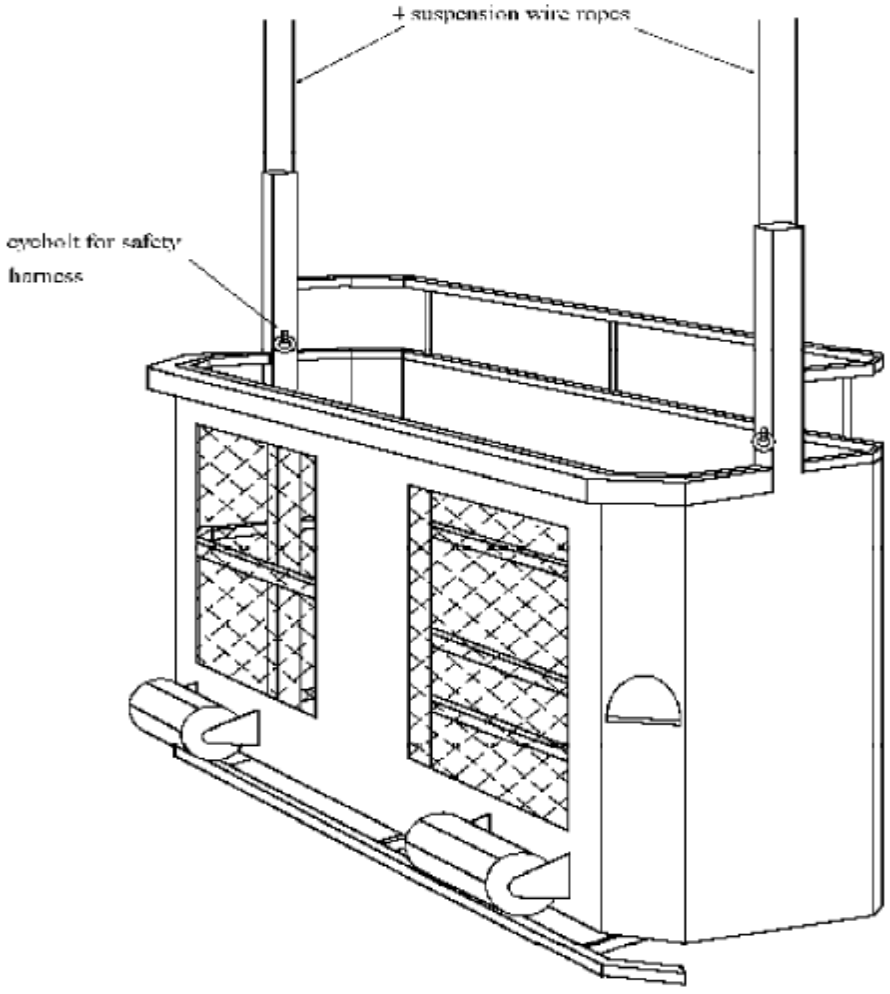
6.1.1 Safety Harnesses Attached to Independent Lifelines and Fall Arresting Devices **[Demonstrate using the real object of PPE]**

- Every person carried on a SWP should be provided with a suitable safety belt, an independent lifeline or suitable anchorage and fittings. Each safety belt, lifeline, anchorage and fitting should be of such a design, so constructed and properly maintained as to prevent serious injury in the event of a fall of any person using it.
- Full body harness meeting the specifications of a national standard should be used instead of a general purpose safety belt. The hook of the lanyard should be anchored to the rope chuck (fall arrestor) of an independent lifeline or a fitting of the working platform designed by the manufacturer. The hook

should be above the user's waist.

- Independent lifeline used for permanent SWP should be properly anchored to the structural member of the roof rig and should be independent of the suspension system.
- No part of the working platform including its railing should be used to anchor the lanyard of a safety harness. However, in case of a permanent SWP which is suspended by two suspension ropes at each end, the lanyard of a safety harness can be hooked to an eye bolt on the structural member of the working platform which is designed by the manufacturer (Figure 2). Where a permanent SWP involves the use of safety ropes and automatic safety devices, the lanyard of a safety harness should be anchored to an independent lifeline.

Figure 2: Safety Eyebolt for Safety Harness



- Independent lifeline should be used for anchorage of the lanyard of a safety harness for all temporary SWP. The lifeline should not be secured to any part of the roof rig, including the outriggers, parapet clamps or any counterweights. They should be secured to reinforced concrete beams or column, structural steel beams or other fixture which are sufficiently strong. It is not recommended to anchor the lifeline to railings or any member of a temporary scaffolding, bamboo scaffolding, or in any section of water, gas or drainage pipes of the building as these fixtures are not designed to withstand sudden shock or impact force.
- Each person on the working platform should be provided with a safety harness and an independent lifeline or an eye bolt. No more than one lanyard should be anchored to each independent lifeline or eye bolt.

6.1.2 Safety Helmets with Y-type Chin Straps **[Explain by means of the real object of PPE or powerpoint]**

- A safety helmet is primarily intended to protect the top of the head from being injured by falling objects.
- A suitable safety helmet should bear appropriate marking indicating the conformity to certain international/ national standards such as European Standard.
- A safety helmet should be equipped with a chin-strip.
- When using SWP to conduct construction work (e.g. external wall cleaning, renewal, etc), workers should wear safety helmets.

6.1.3 Safety Shoes **[Explain by means of the real object of PPE or powerpoint]**

- Safety shoes should have steel toe caps, steel soles, slip-proof and water-proof characteristics.

6.1.4 Ear Protectors **[Explain by means of the real object of PPE or powerpoint]**

- Ear muffs are the most efficient noise isolation ear protectors.

- Properly wear ear protectors according to the manufacturer's instructions.
- When there is a risk of hearing damage (and other control measures are not practicable), such as using concrete breaker to conduct external wall repairing work on a SWP, workers should wear suitable ear protectors.

6.1.5 Eye Protectors [Explain by means of the real object of PPE or powerpoint]

- Ensure that eye protectors are comfortable to wear, and keep clean.
- Replace damaged or defective eye protectors immediately.
- When there is a risk of eye injury (and other control measures are not practicable), such as using corrosive liquid to conduct external wall cleaning or repairing work on a SWP, workers should wear suitable eye protectors.

6.1.6 Breathing Apparatus [Explain by means of the real object of PPE or powerpoint]

- Protect workers against dust, fibres, hazardous gases and fumes, and prevent workers from oxygen deficiency.
- When using breathing apparatus, it must be properly fitted on the wearer’s face.
- When hazardous substances are present in the air (and other control measures are not practicable), such as dust produced when using concrete breaker to conduct external wall repairing work on a SWP, workers should wear suitable breathing apparatus.

6.1.7 Safety Gloves [Explain by means of the real object of PPE or powerpoint]

- Protect hands from getting injured by abrasion; cuts and punctures; contact with chemicals; electric shock and skin infection.
- Types of safety gloves include rubber gloves, steel mesh gloves, leather gloves, wrist and arm protective devices.
- Workers should not wear cotton gloves for operating a machine with revolving parts so as to avoid causing injury to hands due to entangling of

cotton gloves with the revolving parts of the machine.

6.2 Portable Fire Extinguishers [Explain by means of the real object or powerpoint]

- When flammable substance is used by persons working on the working platform, the flammable substance should be contained in a proper container. Fire extinguisher of a suitable type should be provided on the working platform (Table 1). Under no circumstances should any person be allowed to smoke on the working platform, nor any naked flame process such as gas welding work be conducted.

Table 1: Types of Fire Extinguishers for Extinguishing Fires Involving Different Materials

Type of fire / Type of extinguisher	Class 1 **Paper, Textiles, Wood, Plastic**	Class 2 **Flammable liquids, Solvent, Oil, Grease**	Class 3 **Electrical Appliances, Motors, Electrical switches**	**Notes**
Carbon Dioxide Gas	X	✓	✓	Vapours will asphyxiate. Withdraw to open air after use.
Water	✓	X	X	**Never** on fires involving electrical or flammable liquids or metals.
Dry Powder	✓	✓	✓	Discharged dry powder may reduce visibility and cause disorientation.
Foam	✓	✓	X	**Never** on electrical fires.

7. Safety Measures in Adverse Weather Conditions

[Reference teaching time for Section 7: 15 mins]

- Before commencement of work
  - Conduct risk assessment on working under inclement weather conditions, identify and analyze the hazards.
  - Formulate safety plans and emergency plans.
  - Appoint an overseer to monitor changes in weather conditions likely to affect the safety of employees.
- A SWP should not be used under weather conditions likely to endanger its stability or cause danger to the persons carried thereon.
- Wind conditions which arise during the use of SWPs can do damage to the buildings they serve and the ropes on which the working platforms are suspended. A SWP should not be used where there is thunder and storm in the vicinity, during rainy periods or when a strong wind signal is hoisted.
- When winds give rise to unsatisfactory working conditions, work should be stopped until the winds subside.
- All winches, climbers, or other lifting appliances or similar devices should be adequately protected from any malfunction caused by the effect of weather.
- The machinery of the roof trolley should be enclosed by weatherproof covers. They should be so designed and constructed to enclose the equipment and moving parts as completely as possible. Lockable maintenance access covers should be so fixed that they are not readily removable.
- A SWP should be docked at a safe place and securely anchored. All loose items of the SWP are securable to fixed structure so that during the typhoon conditions, the items will not be disintegrated or damaged.
- A SWP in its docked position should be designed to withstand the wind pressure as given in the Code of Practice on Wind Effects in Hong Kong.
- After exposure to weather conditions likely to have affected the stability of a SWP, the SWP should be load tested and thoroughly examined by a competent examiner as soon as practicable thereafter and before the SWP is used again. In the event of the anchorage, ballast, counterbalance or supports being found on examination to be unsafe, steps should be taken to ensure the stability of the SWP.

8. Signalling and Communication Systems

[Reference teaching time for Section 8: 10 mins]

- A person working on the working platform should maintain effective communication with other persons working on the ground.
- Communication devices generally include intercom systems, walkie-talkies and mobile phones, etc.
- When an intercom system is used, it is necessary to install properly an intercom cable on the working platform.
- If mobile phones are used, it should be checked that the phones have a signal; the phones are fully charged; and everyone concerned has a list of all relevant telephone numbers.
- If walkie-talkies are used, it should be checked that the devices are in good working order; they are set to the same frequency; and the batteries are charged.

9. Safe Working Load

[Reference teaching time for Section 9: 10 mins]

- Safe working load, in relation to a SWP, means the safe working load for operating it as specified in the current certificate of thorough examination or load test and thorough examination given by a competent examiner.
- The safe working load takes into account of the number of persons intending to use the working platform, and any other known weights generally required on the working platform. The design of all parts of the SWP should take into account of the possible grouping of the persons using the working platform at one end of the working platform adjacent to the point of suspension.
- Every SWP should be marked clearly and legibly on its working platform the safe working load applicable to the SWP.
- A SWP should not be used to carry any load greater than the safe working load except for the purpose of carrying out a load test.
- A SWP should not be used to carry a greater number of persons than the maximum number marked on the platform.

10. Emergency Procedures

[Reference teaching time for Section 10: 30 mins]

- A safe system of work should be established for every operation of a SWP by the owner. The safe system of work should include emergency preparedness including the recovery procedure of the plant and the personnel staying on the working platform.
- In the event of any malfunctioning or suspected defect, the person working on the working platform should not attempt to put it right if he is not competent to do it. He should communicate and report any defect to the competent person for technical assistance.
- When a SWP is being used and an emergency such as power failure, tilting of the platform or fire, etc. occurs, the person working on the SWP should keep calm and take the following measures:
  - Power failure
    - Keep calm if the SWP shuts down in the midair due to power failure.
    - Press emergency stop button. Check the safety harness and the fall arrestor, and ensure that the safety harness is still securely anchored to an independent lifeline or proper anchorage.
    - Use the communication device to inform the persons working on the ground and wait for them to handle and give instruction.
    - The persons working on the ground should summon a competent person and/or the fire brigade to the scene for recovery and rescue.
    - When the power supply is resumed, check the environment around carefully. After checking the conditions of the SWP are safe, SWP can be operated again.
    - If the power supply cannot resume shortly, park or fix the SWP to a safe place according to safety instruction given, and then leave the SWP.
  - Tilting of the platform
    - Keep calm.
    - Press emergency stop button. Check the safety harness and the fall arrestor, and ensure that the safety harness is still securely anchored to an independent lifeline or proper anchorage.

- Find a suitable position on the working platform and grasp the guardrails to maintain the balance of the body. Stand calmly and don't try to climb along any rope.
- Use the communication device to inform the persons working on the ground and wait for them to handle and give instruction.
- The persons working on the ground should summon a competent person and/or the fire brigade to the scene for recovery and rescue.

■ Breaking out of fire on the platform

- If the situation warrants, disconnect the power supply (e.g. unplug the power of the control panel).
- Use a fire extinguisher to put out the fire.
- Use the communication device to inform the persons working on the ground and wait for them to handle and give instruction.
- The persons working on the ground should summon the in-charge person of the SWP and/or the fire brigade to the scene for recovery and rescue.
- If the situation warrants and it is safe to do so, leave the SWP as soon as possible.

(Remark: (i) Persons working on SWP should adhere to the established safe working procedures and observe the fire prevention measures, such as prohibition of smoking and any naked flame process in using inflammable substances, etc.

(ii) When a fire breaks out on SWP, persons working on the platform should first consider to evacuate from the platform in accordance with the established fire escape route. The adoption of above measures for handling of fire outbreak may be considered only if the situation warrants and it is safe to do so.)

11. Analysis of Common Serious Accidents involving Suspended Working Platforms

[Reference teaching time for Section 11: 30 mins]

[This section must be conducted in an interactive manner through discussion with trainees.]

[Play Video: Suspended Working Platform]

- Workplace accidents not only cause sufferings to the victims and their families, but also result in financial losses arising from stoppage of work, insurance claims, medical and rehabilitation expenses, etc.
- In fact, most of the workplace accidents are preventable. Very often, they share common scenarios and causes. These scenarios and causes should be properly understood in order that lessons are learnt and suitable measures implemented to prevent recurrence of such accidents.

11.1 Serious Accident Cases Involving Suspended Working Platforms

Case 1

A cleaner fell from a tilted suspended working platform.

Circumstances

- A cleaner who held a certificate for operating SWPs fell to the ground when the SWP he was working on suddenly tilted, causing his death.

①

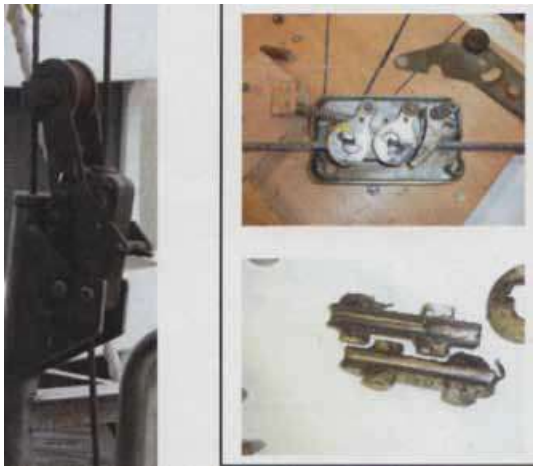
②

③

Case Analysis

The causes of the accident include:

- The automatic safety device of the SWP was ineffective.
- The worker did not wear a safety harness.



Lessons to Learn

- The SWP should be equipped with effective automatic safety device to prevent tilting.
- Every worker on the SWP must wear a safety harness and attach it to an independent lifeline with a fall arrestor.

Other Points to Note

- The owner of the SWP should ensure that:
  - the SWP is of good mechanical construction, fitted with all necessary safety devices for the safe operation of the SWP and free from patent defect;
  - the SWP is properly maintained in accordance with the instructions and advice stated in the operation and maintenance manual. A record of maintenance schedule should be made available for the use of the competent person or competent examiner during the routine inspection and periodic examination;
  - the SWP is properly installed and anchored to the building or structure in accordance with the manufacturer's specification and under the advice of professional engineers. The installation should be carried out under the supervision of a competent person in accordance with the manufacturer's specification and the plan approved by professional engineers;
  - the SWP is of suitable working capacity to perform the job. The SWP should not be restructured or modified without the prior approval from the manufacturer and certification by a competent examiner;
  - the SWP is load tested and thoroughly examined by a competent examiner before the SWP is put into use after installation, repositioning and periodically. The SWP is inspected by a competent person every 7 days. Moreover, each day, before operation is commenced, the SWP including the roof rig is inspected to see that it is sound and has not been interfered with in any way;
  - suitable and safe access and egress to the working platform are provided;
  - information concerning the details of the SWP, the operation and maintenance manual, the maintenance log book, history of repairs and test and examination records are available for the reference of the user, competent person and competent examiner. Notice specifying the safe working load, number of persons allowed on the working platform should be posted on the working platform;
  - the competence of the competent person in charge of the SWP is commensurate with his qualification, training and experience to that

particular type of SWP and that the personnel working on the working platform has received suitable training to operate the SWP and possess a valid certificate of training;

- the personnel on the working platform are wearing and using proper personal protective equipment, such as a safety harness and a helmet with chin strap;
- the information and instructions contained in the safe system of work are disseminated to all working personnel and necessary training in connection with the subject are provided to them; and
- suitable communication means are provided for the personnel working on the working platform.

- The competent person should ensure that:
  - the erection and dismantling of the SWP follow the procedures and recommendations specified in the manufacturer's assembly manual. In particular, he should ensure that the secondary protection such as tie backs to the roof rig is installed;
  - the lifeline is properly installed and anchored;
  - the suspension rope and safety rope of the SWP are free from kink, broken wires, flatten surface or any other patent defect;
  - a thorough inspection to the SWP is conducted before the SWP is first put into use after erection, at regular intervals, and after exposure to adverse weather;
  - machine parts and safety devices that are listed in the operation and maintenance manual, repair log books, and history of the SWP are in good working order;
  - any defect of the SWP is recorded and reported to the owner or the maintenance contractor if such defect is out of repair under his control; and
  - the SWP stops to operate if an unsafe condition or operation occurs to endanger the person working in or nearby the SWP.
- The person working on the working platform should:
  - exercise the general duty of care for his own safety as well as for other members working in or nearby the SWP;
  - properly take care of his hand tool and equipment;
  - ensure that the working platform is not so loaded with building

materials that may affect his foothold and handhold, and endanger the stability of the working platform;

- in case of emergency, know how to prepare himself for rescue and recovery;
- wear safety harness with its lanyard attached properly to the independent life line or specified anchorage so provided. The lanyard should never be anchored to any railings or fittings of the working platform unless they have been specified and tested for the purpose;
- make proper use of all safety devices, maintain them in functional positions, and never interrupt their assembly;
- have read and understood the safety procedure, relevant instruction and the arrangement for emergency preparedness as specified in the safe system of work;
- in the event of any malfunctioning or suspected defect, not attempt to put it right if he is not competent to do it. He should communicate and report any defect to the competent person for technical assistance;
- make full use of all facilities and proper means of access provided for him;
- keep the working platform clean;
- pay attention to projecting features on the building which could impede the movement of the working platform; and
- never attempt to extend any power lead of the working platform for convenience.

Discussion

- Construction of the SWP, including safety devices
- Safe and proper use of the SWP
- Inspection and maintenance of the SWP
- Difficulties encountered by the parties concerned, including the owner of the SWP, the competent person and the person working on the SWP, and their responsibilities.

Case 2

[Training course provider should provide an accident case associated with suspended working platforms (in particular those occurred during the five years preceding the conduct of the course) for case study and analysis in this section.]

[Reference can be made to the "Safety Alert" provided by the Labour Department's website]

Contents of case study and analysis should include:

Circumstances

- Brief description of the accident case.

Case Analysis

- Analyze the cause of the accident.

Lessons to Learn

- Precautionary measures to be taken to prevent recurrence of the accident.

Other Points to Note

- Points to note for the owner of the SWP.
- Point to note for the competent person.
- Points to note for the person working on the SWP.

Discussion

- Construction of the SWP, including safety devices
- Safe and proper use of the SWP
- Inspection and maintenance of the SWP
- Difficulties encountered by the parties concerned, including the owner of the SWP, the competent person and the person working on the SWP, and their responsibilities.

12. Hands-on Practice (Section 15 of the Lesson Plan)

[Reference teaching time for Section 12: 225 mins]

- At least one SWP (e.g. endless winder mode temporary SWP) approved by the Commissioner for Labour for the relevant training purpose should be provided for hands-on practice. The conditions of the SWP should meet the requirements of the Factories and Industrial Undertakings (Suspended Working Platforms) Regulation.
- The operation zone of the SWP should be fenced off. Only the trainer and those trainees who are going to practice are allowed to enter the operation zone. Other trainees should remain outside the fenced zone to observe and learn.
- Trainees can board or leave the working platform of the SWP only under the supervision of the trainer.
- For each set of hands-on practice procedures, maximum 2 trainees are allowed to stay on the working platform of the SWP. One trainee is responsible for operating the SWP to accomplish the procedures stated in Section 12.1 while the other trainee stays beside to observe and provide assistance.
- Every trainee should conduct at least one operation of the SWP to accomplish the procedures at Section 12.1 and stay at least once on the working platform to observe the procedures and provide assistance (If there is only one trainee, the trainer should assist the trainee to perform the procedures of hands-on practice).

12.1 Procedures of Hands-on Practice

[The trainer should demonstrate the procedures of the hands-on practice.]

[Depending on the conditions of the SWP, additional training items may be added to the procedures of the hands-on practice.]

[The training course provider should ensure that the personal protective equipment is clean and hygienic for use.]

(I) <u>Pre-use Checks</u>

- Check the integrity of the power cable and the plug.
- Check the wire ropes, anchorages and supports.

- Check the stability of the working platform and the integrity of the components.

- Check Form 1, Form 2 and Form 3 and their validity; the notices, the markings and fire extinguishers.
- Check the safety harness, fall arrestor and independent lifeline. (Before testing the functions of the components of the SWP, wear the safety harness and anchor the safety harness to the fall arrestor on the independent lifeline.)
- Test the effectiveness of the control panel and its components.
- Test the effectiveness of the automatic safety devices.
- Test the effectiveness of the brake systems and manual operation mode.

(Remark: The trainer may arrange all the trainees to go together to check the plug, anchorages and other devices which are far away from the working platform.)

(II) <u>Operation</u>

- Before starting operation, observe the environment around.
- Check the proper use of the safety harness, fall arrestor and independent lifeline.
- Render the working platform in a balanced state.
- Ascend and descend the working platform.
- Handle the power cable and wire ropes.
- Communicate with the persons working on the ground by using the communication device.
- Keep vigilant to the environment around.
- Leave the SWP and tidy up the SWP.

(III) <u>Emergency Response to Power Failure</u>

- Deal with the emergency stop button.
- Check the conditions of the safety harness, fall arrestor and independent lifeline.
- Operate the SWP manually.
- Simulate the re-starting of the SWP after power failure.

12.2 Conclusion of Hands-on Practice and Explanation on the Practical Examination Arrangements

- Conclude the key points of the hands-on practice.
- Explain the practical examination arrangement stated in Section 13.

13. Practical Examination (Section 16 of the Lesson Plan)

[Reference teaching time for Section 13: 165 mins]

- At least one SWP (e.g. endless winder mode temporary SWP) approved by the Commissioner for Labour for the relevant training purpose should be provided for practical examination. The conditions of the SWP should meet the requirements of the Factories and Industrial Undertakings (Suspended Working Platforms) Regulation.
- The operation zone of the SWP should be fenced off. Only the examiner (who may be trainer, serving as an examiner) and the trainee undertaking the examination are allowed to enter the operation zone. Other trainees should remain outside the fenced zone to observe and learn.
- A trainee can board or leave the working platform of the SWP only under the supervision of the examiner.
- For each set of practical examination procedures, only one trainee is allowed to stay on the working platform of the SWP. The trainee must complete the practical examination stated in Section 13.1.
- Every trainee should properly wear a safety harness.

13.1 Practical Examination Procedures

[Depending on the conditions of the SWP, additional assessment items may be added to the practical examination.]

[The Performance Report and Assessment Items for Suspended Working Platform Practical Examination at Appendix 1 should be used for assessing the performance.]

[The training course provider should ensure that the personal protective equipment is clean and hygienic for use.]

(I) <u>Pre-use Checks</u>

- Check the integrity of the power cable and the plug.
- Check the wire ropes, anchorage and support.
- Check the stability of the working platform and the integrity of the components.
- Check Form 1, Form 2 and Form 3 and their validity; the notices, markings and fire extinguishers.

- Check the safety harness, fall arrestor and independent lifeline. (Before testing the functions of the components of the SWP, wear the safety harness and anchor the safety harness to the fall arrestor on the independent lifeline.)
- Test the effectiveness of the control panel and its components.
- Test the effectiveness of the automatic safety devices.
- Test the effectiveness of the brake systems and manual operation mode.

(Remark: The examiner may arrange all the trainees to go together to check the plug, anchorage and other devices which are far away from the working platform.).

(II) <u>Operation</u>

- Before starting operation, observe the environment around.
- Check the proper use of the safety harness, fall arrestor and independent lifeline.
- Render the working platform in a balanced state.
- Ascend and descend the working platform.
- Handle the power cable and wire ropes.
- Communicate with the persons working on the ground by using the communication device.
- Keep vigilant to the environment around.
- Leave the SWP and tidy up the SWP.

(III) <u>Emergency Response to Power Failure</u>

- Deal with the emergency stop button.
- Check the conditions of the safety harness, fall arrestor and independent lifeline.
- Operate the SWP manually.
- Simulate the re-starting of the SWP after power failure.

Appendix 1

Performance Report and Assessment Items for Suspended Working Platform Practical Examination

Name（Chi）：_____ HKID No.：_____ Trainee No.：_____

（Eng）：_____ Date of Exam.：_____

Item No.	Details of Assessment Items	Good (5 marks)	Pass (3 marks)	Major Errors (0 mark)	Marks given	Remark
1	**Pre-use Checks**					
1.1	Check the integrity of the power cable and the plug					
1.2	Check the wire ropes, anchorage and support.					
1.3	Check the stability of the working platform and the integrity of the components					
1.4	Check Form 1, Form 2 and Form 3 and their validity; the notices, markings and fire extinguishers					
1.5	Check the safety harness, fall arrestor and independent lifeline（Before testing the functions of the components of the SWP, wear the safety harness and anchor the safety harness to the fall arrestor on the independent lifeline.）					
1.6	Test the effectiveness of the control panel and its components					
1.7	Test the effectiveness of the automatic safety devices					
1.8	Test the effectiveness of the brake systems and manual operation mode					
	（Depending on the conditions of the SWP, additional examination items may be added.）					
2	**Operation**					
2.1	Before starting operation, observe the environment around					
2.2	Check the proper use of the safety harness, fall arrestor and independent lifeline					
2.3	Render the working platform in a balanced state					
2.4	Ascend and descend the working platform					
2.5	Handle the power cable and wire ropes					
2.6	Communicate with the persons working on the ground by using the communication device					
2.7	Keep vigilant to the environment around					
2.8	Leave the SWP and tidy up the SWP					

	（Depending on the conditions of the SWP, additional examination items may be added.）					
3	**Emergency Response to Power Failure**					
3.1	Deal with the emergency stop button					
3.2	Check the conditions of the safety harness, fall arrestor and independent lifeline					
3.3	Operate the SWP manually					
3.4	Simulate the re-starting of the SWP after power failure					
	（Depending on the conditions of the SWP, additional examination items may be added.）					
	The full mark (A) **= Total number of assessment items X 5**	**Total marks given to trainee (B)：**				
	<u>Calculation of the mark relative to the full mark (C)</u>： **C = Total marks given to trainee (B) / Full mark (A)** **C ≥ 0.6 means Pass** **C < 0.6 means Fail**	**Relative mark of the trainee:** **(C) =**				**Pass** **Fail**
		Name of Examiner： Signature： Date：				

Occupational Safety and Health Branch
Labour Department

Annex 5

Course Contents for Revalidation Training Course for Persons Working on Suspended Working Platforms

Course Contents for
Revalidation Training Course for
Persons Working on Suspended Working Platforms

Section 17 of Factories and Industrial Undertakings

(Suspended Working Platforms) Regulation

Occupational Safety and Health Branch
Labour Department

The Course Contents are prepared by
The Occupational Safety and Health Branch
Labour Department

This Edition December 2019

Information on the services offered by the Labour Department and on major labour legislation can also be found by visiting our Home Page in the Internet.

Contents

1. Introduction to Arrangements of the Course

[Reference teaching time for Section 1: 5 mins]

1.1 Training Venue, Training Equipment and Examination Requirements

- To introduce briefly about the training venue, training equipment and the examination requirements

1.2 Introduction to the Course Contents

- To introduce briefly about the course structure and contents

1.3 Objectives of the Course

Suspended working platforms which are commonly known as gondolas are widely used in Hong Kong. They carry workers, site personnel, or engineers for working at height during the installation of curtain walls and windows, window cleaning, external renovation and decoration of buildings, bridges, chimneys, silos and other structures, etc. According to Regulation 17 of the Factories and Industrial Undertakings (Suspended Working Platforms) Regulation, the owner of a suspended working platform (hereinafter abbreviated as “SWP”) shall ensure that every person working thereon shall have undergone training that is either recognized by the Commissioner or provided by the manufacturer of the SWP or its local agent, on general construction of the SWP and how to operate it safely, and have obtained a certificate in respect of such training from the person who provided the training.

2. Relevant Occupational Safety and Health Legislation Applicable to Suspended Working Platform Work

[Reference teaching time for Section 2: 20 mins]

2.1 Occupational Safety and Health Ordinance and the Regulation (Chapter 509)

- The purposes include ensuring the safety and health of employees when they are at work, prescribing the occupational safety and health measures, improving the safety and health standards applicable to workplaces, and improving the safety and health aspects of working environments of employees.
- This ordinance covers almost all workplaces - places where employees work, including offices, shopping arcades, supermarkets, hospitals and construction sites, etc.
- Subsidiary regulations include Occupational Safety and Health Regulation and Occupational Safety and Health (Display Screen Equipment) Regulation.

2.2 Factories and Industrial Undertakings Ordinance and the Regulations (Chapter 59)

- Provide for the safety and health protection to workers in the industrial sector.
- Coverage of the Regulations includes factories, construction sites and catering establishments, etc.
- General Duties of Proprietors

  Every proprietor of an industrial undertaking must, so far as is reasonably practicable, ensure the safety and health at work of all persons employed by him. The matters to which that duty extends include providing and maintaining plant and work systems that do not endanger safety or health, and providing all necessary information, instruction, training and supervision for ensuring safety and health, etc.
- General duties of persons employed include that every person employed at an industrial undertaking must take reasonable care for the safety and health of

himself and others, etc.

- Subsidiary legislation under Factories and Industrial Undertakings Ordinance includes Factories and Industrial Undertakings Regulations, Construction Sites (Safety) Regulations, Factories and Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations, and Factories and Industrial Undertakings (Suspended Working Platforms) Regulation.

2.3 Factories and Industrial Undertakings (Suspended Working Platforms) Regulation (Chapter 59AC)

- **Application:** This Regulation applies to an industrial undertaking in which any SWP for carrying persons is used.
- **Construction and Maintenance:** A SWP shall be of good design and construction, adequate strength and made of sound material and free from patent defect. A SWP shall be properly installed or assembled, and it shall be properly maintained.
- **Anchorage and Support:** Adequate arrangements shall be made for fixing and anchoring the appliance to secure its safety. A SWP shall be adequately and securely supported. Every structure supporting it shall be of good construction and adequate strength, of sound materials and free from patent defect. All outriggers of a SWP shall be of adequate length and strength. They shall be properly installed and supported. All outriggers of a SWP shall be firmly anchored at the inner ends and securely fastened to any ballast or counterweights.
- **Suspension:** The points of suspension shall be at adequate horizontal distances from the face of the building or other structure so as to prevent the SWP from coming into contact with such face. Only wire ropes or chains shall be used for the raising, lowering and suspension of the platform. They shall be securely attached to the outriggers or other supports. They shall be of such length that the platform is capable of being lowered to the ground or a safe landing place. Adequate arrangements shall be made to prevent undue tipping, tilting or swinging of the platform and to secure it to prevent undue horizontal movement while it is being used.
- **Counterbalance and Counterweights:** Water or other liquids, earth, clay, sand, chippings or aggregates shall not be used as counterweights of a SWP.

Every portable counterweight shall have its weight permanently and distinctly stamped, engraved or embossed thereon. All counterweights shall be securely attached at the inner end of the outriggers to prevent tampering by any person. They shall be not less than three times the weight necessary to balance the load on the projecting part of the outriggers when the platform is fully loaded.

- **Platforms:** The platform of a SWP shall be at least 440 millimetres wide and of sufficient length to allow the number of persons using it to do so safely; except to the extent necessary for drainage, either closely boarded, planked or plated; provided on all sides with toe boards placed at a height not less than 200 millimetres above its floor level; and provided on all sides with guardrails of adequate strength. The guardrails shall be so positioned that the top guardrail is at a height between 900 millimetres to 1150 millimetres above the floor level and the lowest guardrail is not more than 700 millimetres above the top of the toe board.
- **Safe Means of Access:** Sufficient safe means of access and egress shall be provided to the platform of the SWP. Sufficient safe means of access shall be provided to those parts of the installation of the SWP requiring periodic inspection or maintenance.
- **Drums and Pulleys:** Every drum or pulley on which a rope is carried shall be of sufficient diameter and shall be of such design for the rope used. Every rope which terminates at the winding drum of a SWP shall be properly secured to the drum. The rope shall be long enough so that, at all times, at least 2 turns of the rope shall remain on the drum.
- **Brakes:** Every winch, climber or similar devices of a manually operated SWP shall be provided with an efficient brake which comes into operation when the operating handle or lever is released. Every winch, climber or similar devices of a power operated SWP shall be provided with 2 independent and efficient braking systems. Each of which is capable of preventing the SWP from falling out of control or in a dangerous manner.
- **Control Levers, Switches, etc.:** Every lever, handle, switch, or other device used for controlling the operation of any part of the SWP shall be provided with a suitable spring or other locking arrangement to prevent accidental movement or displacement (unless the lever, handle, switch or other device is so placed as to prevent accidental movement or displacement). The lever,

handle, switch or other device shall have clear markings to indicate its purpose and the mode of operation.

- **Protection of Climbers against the Effect of Weather, etc.:** Every winch, climber or similar devices of the SWP shall be adequately protected against the effect of weather, dust or material likely to cause damage to them that can result in a malfunction.
- **Safety Ropes and Safety Devices:** A safety rope having an automatic safety device mounted on it shall be provided at each suspension point of a SWP such that the safety rope with the automatic safety device will support the platform if the primary suspension rope, the winch, the climber or any part of the mechanism for raising or lowering the platform fails. The safety rope and the automatic safety device shall be properly maintained and kept in good working order. The requirement to provide a safety rope and an automatic safety device shall not apply when:
  - the platform is supported on 2 independent suspension wire ropes at or near each end such that, in the event of the failure of one rope, the other rope is capable of sustaining the weight of the working platform and its load and prevent it from tilting.
  - there is a system incorporated into the platform, which operates automatically to support the platform and its load in the event of the failure of the primary suspension rope.
- **Safety Belts, Lifelines, etc.:** A safety belt and an independent lifeline or an anchorage with fittings shall be provided to each person using the SWP. Each safety belt, lifeline, anchorage and fitting shall be properly maintained and shall be of such a design and so constructed as to prevent serious injury in the event of a fall to any person using it. Every person carried on a SWP shall wear a safety belt that is attached to the independent lifeline or an anchorage with fittings. A notice in English and Chinese in the following form shall be displayed prominently on the SWP:

  "Every person riding on a suspended working platform shall wear a safety belt properly attached to an independent lifeline or an appropriate anchorage
  吊船上的人員須佩戴安全帶；安全帶須繫於獨立救生繩上或穩固的繫穩物上"
- **Erection, Dismantling and Alteration:** A SWP shall not be erected or dismantled; or the structure, as originally designed, shall not be altered

except under the supervision of a competent person.

- **Trained and Competent Workers:** Every person working on a SWP shall be at least 18 years old; have undergone training that is either recognized by the Commissioner for Labour or provided by the manufacturer of the SWP or its local agent; and have obtained a certificate in respect of such training from the person who provided the training.
- **Use in Bad Weather Conditions:** No SWP shall be used under weather conditions likely to endanger its stability or cause danger to the persons carried thereon. After exposure to weather conditions likely to have affected the stability of the SWP:
  - the SWP shall be load tested and thoroughly examined by a competent examiner as soon as practicable thereafter and before it is again used; and
  - in the event of the anchorage, ballast, counterbalance or supports being found on examination to be unsafe, steps shall be taken to ensure again the stability of the SWP.
- **Inspections by Competent Persons:** Every SWP shall be inspected in the immediately preceding 7 days before its use by a competent person. A certificate in the approved form (Form 1), in which the competent person has made a statement to the effect that it is in safe working order, shall be obtained from the competent person. Besides, all suspension ropes and safety ropes shall be inspected and found in safe working condition by a competent person prior to commencement of daily work. A notice in English and Chinese in the following form shall be prominently displayed on the platform:

  "All wire ropes shall be inspected prior to commencement of daily work
  每日開工前須檢查所有繩索"
- **Test and Examination Prior to Use:** Every SWP shall be thoroughly examined by a competent examiner in the immediately preceding 6 months before it is put into use. The owner of the SWP shall obtain a certificate in the approved form (Form 2) from the competent examiner to certify that the SWP is in safe working order. Every SWP shall be load tested and thoroughly examined by a competent examiner during the preceding 12 months before its use. The owner of the SWP shall obtain a certificate in an approved form (Form 3) containing a statement to the effect that the SWP is

in safe working order made by the competent examiner in respect of the SWP after such examination. Every SWP has to be further load tested and thoroughly examined by a competent examiner when the SWP has subsequently undergone substantial repair, re-erection, adjustment to any member of the SWP (being an adjustment which involves changes in the arrangements for anchoring or supporting the SWP), failure or collapse. The owner of the SWP shall obtain a certificate in an approved form (Form 3) containing a statement to the effect that the SWP is in safe working order made by the competent examiner after the examination.

- **Marking of Safe Working Load and Number of Persons Allowed:** The platform of a SWP shall be clearly and legibly marked with the safe working load, maximum number of persons allowed and appropriate mark to distinguish it from other similar platform. The safe working load of a SWP shall not be exceeded except when tests of such appliance are being done by competent examiner. The maximum number of persons carried shall not be exceeded when the SWP is used.
- **Construction of Wire Rope:** A wire rope shall not be used for raising or lowering, or as a means of suspension or as a safety rope if in any length of 10 diameters, the total number of visible broken wires exceeds 5% of the total number of wires in the rope. A wire rope shall not be used if there is any kink, distortion, marked signs of wear or corrosion in the rope.
- **Keeping and Displaying of Reports:** A copy of the most recent certificate or report shall be displayed on the SWP. The certificates or reports shall be made available for inspection by an occupational safety officer at all reasonable times.
- **Prohibitions:** No person shall tamper or interfere with or render inoperative any safety rope and automatic safety device. No one shall use a SWP unless he wears a safety belt and keeps it attached to the lifeline or other anchorage.

2.4 Construction Sites (Safety) Regulations (Chapter 59I)

These regulations control the construction, maintenance, use and operation of hoists, scaffolds and working platforms. There are also provisions for the use of personal protective equipment for protection against falling of person, falling objects and drowning in a construction site. There are miscellaneous safety

requirements such as prevention of inhalation of dust and fumes, protection of eyes and the provision of first aid facilities.

Part VA of the Construction Sites (Safety) Regulations provides a greater degree of safety to persons working on construction sites, in particular in relation to preventing falls from heights. The contractors have the general duty to make and keep every place of work on a construction site safe, and in particular, to take suitable and adequate steps to prevent persons from falling from a height of 2 metres or more, for example, the provision, use and maintenance of working platforms, guard-rails, barriers, toe-boards and fences, coverings for openings, gangways and runs, etc.

2.5 Factories and Industrial Undertakings (Lifting Gear and Lifting Appliances) Regulations (Chapter 59J)

The regulations define the meaning of lifting appliance, lifting gear and crane. It is mandatory for the owner to ensure that the lifting appliance and lifting gear shall be examined and inspected by competent examiner and competent person periodically. A certificate shall be obtained from the competent examiner in the approved form in which he has made a statement to the effect that the lifting appliance is in safe working order.

2.6 Code of Practice

The Code has a special legal status. Although failure to observe any guidance contained in the Code is not in itself an offence, that failure may be taken by a court in criminal proceedings as a relevant factor in determining whether or not a person has breached any of the provisions of the regulations to which the guidance relates.

Codes of practice that are often used include:

- Code of Practice for Safe Use and Operation of Suspended Working Platform
- Code of Practice for Bamboo Scaffolding Safety
- Code of Safety for Safety and Health at Work in Confined Spaces

3. General Knowledge of the Suspended Working Platform

[Reference teaching time for Section 3: 30 mins]

3.1 Definition of Suspended Working Platform

"Suspended working platform" means a scaffold (not being a slung scaffold) or a working platform suspended from a building or structure by means of lifting gear and capable of being raised or lowered by lifting appliances (but does not include a boatswain's chair or similar device), and includes all lifting appliances, lifting gear, counterweights, ballast, outriggers, other supports and the whole of the mechanical and electrical apparatus required in connection with the operation and safety of such a scaffold or working platform.

3.2 Types of Suspended Working Platforms

There are two main types of SWPs, namely permanent SWPs and temporary SWPs.

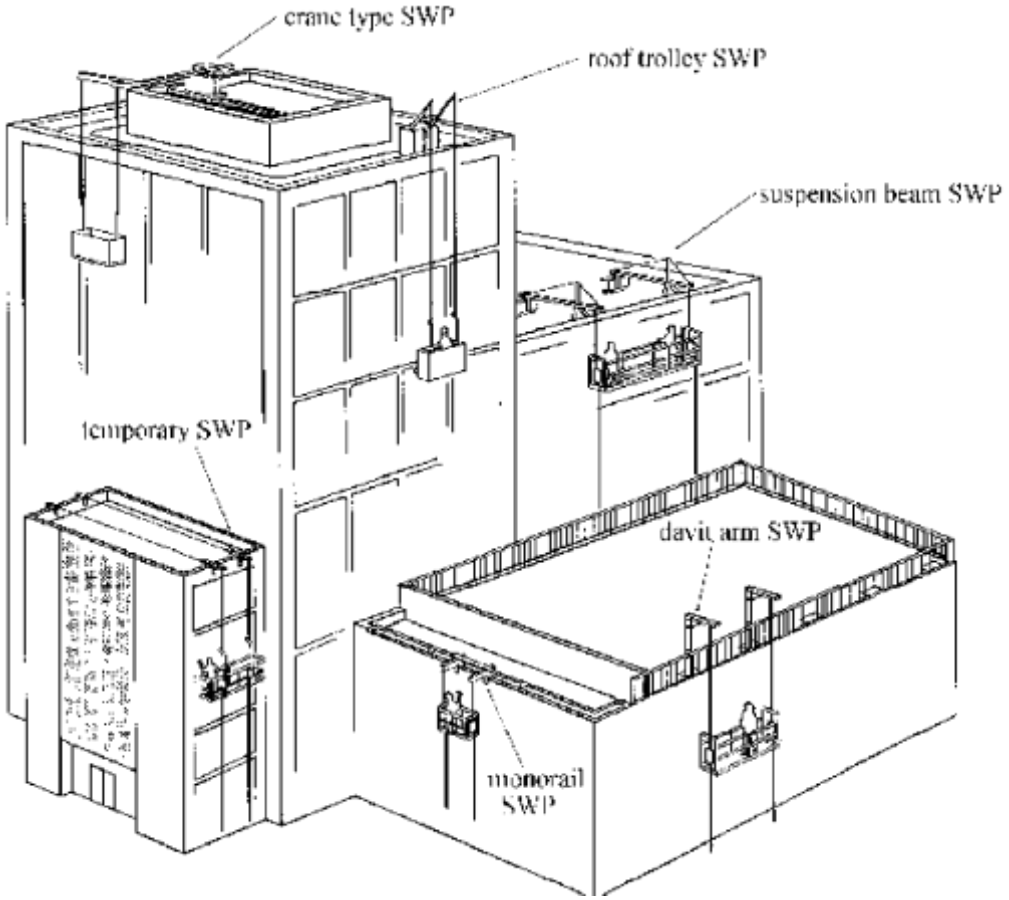
3.2.1 Permanent Suspended Working Platform

- A permanent SWP is designed especially to be permanently installed on a specific building or structure for the inspection, cleaning and maintenance of the facades.

3.2.2 Temporary Suspended Working Platform

- A temporary SWP is temporarily assembled on a building or a structure. It will be dismantled at the end of the work for which it was installed.

Figure 1: Permanent and Temporary Suspended Working Platforms



(various technical details such as independent lifelines,
safety ropes and automatic safety devices are not shown)

3.3 Basic Construction of Common Suspended Working Platforms

The basic construction of a common SWP comprises wire ropes, winches/climbers, drums and pulleys, a platform, control devices, safety devices and brake systems.

3.3.1 Wire Rope

- The wire rope or chains used in the suspension system should be in one continuous length and free from joints and repairs.
- Only wire ropes specified by the manufacturer of the working platform should be used.
- Where the suspension of a working platform is by means of four suspension

ropes, that is, two at each end of the working platform, 6mm diameter steel wire ropes would be the minimum acceptable requirement. Preferably, 8mm diameter steel wire ropes or above are recommended.

- Where the suspension of a working platform is by means of primary suspension ropes and safety ropes, wire ropes used for primary suspension ropes or safety ropes should be made of steel wire ropes of not less than 8 mm diameter and the diameter of the safety rope should not be less than the diameter of the primary suspension rope.
- Each suspension and safety rope should have a factor of safety of not less than 8, based on the maximum rope tension when related to the minimum breaking load of the rope, or such other higher factors as specified by the manufacturer of the winch or climbing device.
- Where the working platform is raised or lowered by a winch, there should be at least two turns of the wire rope remained on the drum when the working platform is at the lowest level.
- Where the working platform is raised or lowered by a climber or traction pulley, after the working platform has reached the ground or a landing place, the free ends of the suspension and safety ropes should have a minimum length of three metres measured from the discharge of the climber or traction pulley.
- Where a wire rope is fixed to a jib or outrigger arm, the rope termination should be attached to the outrigger or jib with a shackle or other suitable means. Where a wire rope is attached to a working platform, the rope termination should be attached to a structural load bearing portion of the working platform with a shackle or other suitable means. U-bolt grips should not be used.
- Wire rope termination should be suitable for their purpose and should have a strength of not less than 80% of the minimum breaking load of the rope. Any free end of rope should be finished to prevent unlaying.
- The end of the suspension rope other than that on or through the lifting device or winch should be fixed to the suspension point on the roof rig or on the working platform with a thimble eye splice or ferrule secured eye termination or other rope coupling device giving a strength of not less than 80% of the breaking load of the rope.
- Wire ropes should be properly maintained and lubricated to prevent

corrosion. Ropes with the following defects should not be used:

- ropes with kinks, birdcage or any other distortion;
- when the total number of visible broken wires exceeds 5 % of the total number of wires in the rope in any length of ten diameters of the rope;
- there is on the rope marked signs of wear or corrosion; and
- reduction of nominal diameter of more than 10 %.

3.3.2 Winch/Climber

- All winches, climbers, or other lifting appliances or similar devices should be adequately protected against the effect of weather, dust or material likely to cause damage to them that could result in a malfunction.

3.3.3 Drums and Pulleys

- When wire ropes pass over pulleys or round drums in winches and climbers, such pulleys or drums should have a pitch circle diameter of not less than 19 times the diameter of the rope.
- Where the rope terminates at the winding drum, the rope should be fastened on to the drum in the manner specified by the manufacturer.
- If the rope is to be wound on to the drum in more than one layer, the rope anchorage should be so located as to avoid interference with even winding. It should preferably be placed outside the drum flange and should be capable of sustaining twice the maximum force induced in the rope system.

3.3.4 Working Platform

- The working platform should be of sound material and the surface should be slip resistant.
- Any gap in the working platform should not exceed 6 mm in width.
- The working platform should be provided on all sides with suitable toe boards placed at a height not less than 200 mm above the level of the working platform.
- The working platform should be provided on all sides with suitable guardrails of adequate strength to a height between 900 mm and 1150 mm

above the level of the working platform. The space between any toe board and the lowest guard-rail above it does not exceed 700 mm.

- When being stationed or left in place between two periods of work, the working platform should be tied at each end into the building to prevent undue movement.
- The working platform should be kept clean at all times. Materials which would cause slipping hazards on the working platform or on the place of access to it should be removed. No materials should be stored on the working platform. Adequate precautions should be taken to prevent materials and hand tools from falling down at height.

3.3.5 Control Devices

- Requirements on control levers and switches
  - Every lever, handle, switch, or other device used for controlling the operation of any part of the SWP (being a lever, handle, switch, or other device the accidental movement or displacement of which is liable to cause danger) should be, unless it is so placed as to prevent accidental movement or displacement, provided with a suitable spring or other locking arrangement to prevent any such accidental movement or displacement.
  - Every lever, handle, switch, or other device for controlling the operation of any part of the suspended working platform should have either on or adjacent to it clear markings to indicate its purpose and mode of operation.
  - The control for the power unit and hence the climbing device should be such that when manual application is released, the power unit will stop.
  - Emergency stop device (e.g. emergency stop button) should be located at each operator control panel and other places where emergency stop may be required. It should be operative irrespective of whether the control station is in operation. The device should be in red colour.
- Common control panel in the working platform of a SWP
  - A control panel installed at the working platform of a SWP serves to control the operation of the winches/climbers. A common control panel usually have installed on it a selection switch, on/off switches and an

emergency stop button, etc. Some SWPs use a pendant control.

- Selection switch: The selection switch allows an operator to select between synchronized operation of the two winches/climber and operation of the left or the right winch/climber. Usually, the switch is labelled with “Left-Both-Right”(左-齊-右).
- On/off switches: When an on/off switch is pressed and held, the winch(es)/climber(s) would operate. When the on/off switch is released, it bounces back to its original position and the winch(es)/climber(s) will immediately stop operation. The on/off switches on the control panel are labelled with “Up”(上) and “Down”(下) to distinguish between their functions for moving up and moving down.
- Emergency stop button: When the emergency stop button is pressed under emergency circumstances (e.g. accident), all operations of the working platform will be stopped immediately. The control panel can resume its normal functions only after the emergency stop button is released to its original position. The emergency stop button is labelled “Emergency”(緊急停止).

3.3.6 Safety Device

- The automatic safety device must be designed to cover the following situations:
  - the breaking of one of the suspension wire ropes; and
  - the mechanical failure of one of the winches or climbers, causing a slow or rapid slippage of the wire rope. The maximum incline of the working platform deck should be less than 25% (i.e. 1:4).
- The automatic safety device should not be used to stop and hold the working platform under normal operating conditions. It should be engaged mechanically and must be operational after resetting. It should not be possible to release the device under load but should allow the working platform to be lifted.
- A lifting limit switch is installed at the top of a SWP. When the lifting limit switch touches a striker plate installed at the limiting position of a wire rope, the SWP would stop its upward movement.
- The SWP in its operating position should be designed to withstand the

sustained wind speed up to 14 metres per second and gust up to 31 metres per second.

- Adequate arrangements (e.g. traversing rope, slack rope device, or anti-tilt device etc.), should be used to prevent undue tipping, tilting or swinging of the working platform and to secure it to prevent undue horizontal movement while it is being used.
- For permanent SWPs, restraint systems and safety devices should be, as far as reasonably practicable, equipped to the SWP as recommended by recognized international or national standards.

3.3.7 Brake Systems

- Each winch, climber or other lifting appliance or similar device of the suspended working platform should be provided with the following braking system:
  - in case of manually operated appliances or devices, an efficient brake which comes into operation when the operating handle or lever is released; and
  - in case of power operated appliances or devices, two independent efficient braking systems, i.e. the primary brake and the secondary brake capable of preventing the suspended working platform from falling out of control or in a dangerous manner.
- Where a temporary suspended working platform is raised or lowered by a manually operated hoist, the hoist should be designed to have:
  - a positive crank force to lift and lower the load. The maximum force applied to the end of the crank or cranks for lifting the rated capacity of the hoist should not exceed 250N;
  - an interlocking device must be provided to prevent the release of the gripping mechanism when the suspension wire rope is under a load above 2% of the maximum safe working load; and
  - a means to prevent rapid handle movement, fast unreeling or uncontrolled descent.
- The primary brake should :
  - engage automatically in the event of power failure or interruption;
  - be capable of stopping and sustaining the working platform even when

the working platform is overloaded by 25%;

- be directly coupled to the drive train of the appliance or climbing device and not by using belts, pins, clutches, roller chain or rollers; and
- be capable of being released manually in the event of a power failure or emergency. The means of releasing the brake should ensure its immediate reapplication as soon as the control is released.

- The secondary brake should be mechanically operated independently of the primary brake. It should be capable of arresting and sustaining the working platform if the primary braking system fails and in the event of overspeeding of the working platform.
- Each climbing device should be provided with an automatic emergency type secondary brake that could stop and hold 125 % of the rated load of the climbing device. If such a secondary brake is of the instantaneous stopping type, it should stop and hold its total load before the device travels a vertical distance of 450 mm. If such a secondary brake is of the deceleration type, it should stop and hold its total load before the device travels a vertical distance of 1.2 m.
- Secondary brakes should be independent of the drive trains on all climbing devices. In normal operation, such a brake should not engage before the device is stopped by the primary brake.

4. Knowledge Relating to Electrical Apparatus Necessary for the Starting and Operation of the Suspended Working Platform

[Reference teaching time for Section 4: 15 mins]

4.1 Basic Knowledge of Power Units

- Temporary SWP should be regarded as heavy mobile plant and therefore a suitable power supply should be provided.
- An independent electrical power supply should be provided to temporary SWP. This electrical supply should be of adequate capacity in terms of voltage and current. The supply should be provided with a switch controlling a socket outlet.
- Cables feeding power from the main power supply point to the suspended platform should be of adequate length to allow for the planned movements of temporary SWP.
- The power supply to permanent SWP should form part of the maintained power supply for the building.
- A dedicated electrical supply should be provided to permanent SWP.
- Cables feeding electrical power from the supply points to suspension rigs or suspended platforms should be of adequate length to allow for movement of suspension rigs or suspended platforms of permanent SWP.

4.2 Electrical Safety and Danger of Shock

- The power cable connecting the roof trolley to the power supply point and the cable suspended from the roof trolley or davit arm to the working platform should be suitably sheathed and protected wherever possible from damage of breaking, and should have sufficient cable strength to avoid the cables from being damaged by its own weight. All other cables should be suitably protected against mechanical damage by being enclosed in conduit and/or trunking or other suitable means.
- Protection should be provided for all electrical parts, motors, cables etc. against accidental or environmental damage. All circuit panels should be locked when not in use.
- All electrical equipment should have adequate mechanical strength and

should be adequately protected against mechanical damages and water ingress under site condition. Cable terminations to the suspended working platform and electrical panels should also be the weatherproof type or higher rating to avoid ingress of water and moisture.

- All exposed metal parts or extraneous conductive parts of the roof trolley and of the working platform should be properly earthed.
- The rail tracks, davit arm brackets and other exposed and extraneous metal parts should be connected to the roof lightning protection conductor. All connections should be of negligible resistance, metal to metal and mechanically sound and with non-ferrous nuts, bolts and washers using clamps where necessary.
- All electrical equipment and wiring should be protected against overloads, short circuits and earth faults. Enclosure for electrical equipment which are exposed to open air should be protected from ingress of water or solid foreign. All terminals should be protected from corrosion.
- The power supply for the SWP should be provided with appropriate overload short circuit and earth-fault electrical protection. Power supply cables passing over parapets, edges of roofs or over the corners of beams or slabs should be protected from abrasion or other mechanical damage.
- Any plug and socket should be so placed that they would not be damaged by the intended movement of the working platform or by the accidental swinging of the working platform against the building.
- All control units and pendant controls should be so marked and identified that there is no confusion between the various controls. Their purpose and the direction of travel resulting from their operation should be clearly identified.
- Pendant controls should be so placed or fixed that they cannot be damaged by the intended movement of the working platform or by the accidental swinging of the working platform against the building. The control button or levers should be robust and require continuous light pressure to maintain powered movements, and the control units should be so designed as to prevent them from being operated accidentally, e.g. by the provision of shrouds.
- If 3-phase induction motors are employed as power drives of the SWP, protection devices should be provided to protect against single phasing and

wrong phase sequence.

- Cable reels or other suitable device should be used for the proper handling of the cables connected from the fixed building to the working platform. It is to minimize the risk of physical damage to the cables due to stress and strain. It also helps to eliminate the risk of trip and trap to the operators.
- Where electric arc welding and/or cutting is to be carried out from the working platform, special precautions should be taken to reduce the possibility of the welding current arcing through the suspension wire rope during the course of welding from the working platform and to prevent the transfer of stray welding currents to the suspension or safety ropes as this could impair their strength or cause their fracture.
- When portable electrical equipment is used by operatives on the working platform, electrical supply for these equipment should not be drawn from the power source of the SWP. Electricity should be supplied from an independent power source from the building.

5 Safe Operation Procedures

[Reference teaching time for Section 5: 20 mins]

[Endless winder mode temporary SWP should be cited to explain the content of this section.]

5.1 Pre-use Checks

- Prior to commencement of daily work, all the suspension ropes and safety ropes should be inspected by a competent person. The ropes should be in safe working condition before they are put into use. The inspection should ensure that no bolts are loose or have been removed and that all connections are sound.
- Every SWP should be inspected in the immediately preceding 7 days before its use by a competent person. A statement to the effect that it is in safe working order should be entered into an approved form (Form 1) by the competent person.
- The visual and physical inspection is to find out if there are any items having abnormal wear and tear, malfunction, oil leakage, overheating, corrosion, unusual noise, dislocation, misalignment, visual cracks, overloading, abnormal slackening or elongation, and excessive vibration etc. Any defect discovered during the inspection should be recorded in the maintenance log book and thereafter effectively remedied immediately.
- Any defect and abnormal function noted during the inspection should be recorded in the maintenance log book. Minor repairs such as tightening of bolts and nuts should be immediately carried out. If repairs involve the strength and stability of the suspended working platform, the effectiveness and efficiency of the driven mechanism, function of electrical equipment or proper function of the various safety devices, the suspended working platform should be removed immediately from service. The suspended working platform should be returned to maintenance contractor for repair and thereafter tested and thoroughly examined before put it into service again.
- Proper personal protective equipment should be used e.g. safety harnesses and safety helmets with chin straps, when conducting the checks.

5.1.1 Visual Inspection

- Visual inspection should cover the following:
  - any apparent defect in the hoist mechanism (e.g. the winch or climber, etc), wire ropes and shackles;
  - the condition of the braking system and the automatic safety device;
  - the condition of the outriggers, socket for the davit arm, parapet wall clamp and the tie-back;
  - any defect in the power cable, control button and plug;
  - incorrect fitting of lifeline, safety harness and their anchorages;
  - the condition of guardrails and toe-boards of the working platform;
  - Form 1, Form 2 and Form 3 of SWP:
    - ensure that the forms are all present and they are within their respective validity periods;
    - ensure that Form 2 and Form 3 shall be displayed on SWP;
  - notices and markings: the notices and markings on the working platform should be properly secured and free from patent defect; and display prominently the notices and markings as required by the regulation which include the following:
    - Notice: "Every person riding on a suspended working platform shall wear a safety belt properly attached to an independent lifeline or an appropriate anchorage
      吊船上的人員須佩戴安全帶；安全帶須繫於獨立救生繩上或穩固的繫穩物上。"
    - Notice: "All wire ropes shall be inspected prior to commencement of daily work
      每日開工前須檢查所有纜索"
    - the safe working load applicable to the SWP; the maximum number of persons that may be carried at any one time; and an appropriate mark to distinguish it from other similar SWPs; and
  - others: e.g. suitable fire extinguishers should be provided when flammable substances are used in the working platform.

5.1.2 Functional Test

- During the inspection, the competent person should switch on the power

supply to the SWP and carry out functional tests of the following items in accordance with the manufacturer's instructions:

- all operational control including emergency stop device;
- communication system;
- manual descend facility;
- all limit switches (e.g. the lifting limit switch);
- all electrical wiring and earthing component;
- automatic safety devices; and
- braking systems.

5.2 Start-up Procedures

When the pre-use checks are completed and the SWP is found in safe working condition, the SWP can be started up in accordance with the following procedures:

- Check and ensure that the safety harnesses is securely anchored to an independent lifeline or an anchorage.
- Board the working platform via the designated safe means of access and egress.
- Be aware of the environment around.
- Check again the power cable, wire ropes, independent lifelines etc. to ensure that they are not entangling with miscellaneous objects or the working platform.
- If all are found normal, the operator can start using the SWP.

5.3 Close-down Procedures

- Place the SWP to a designated parking location (e.g. a flat and stable ground).
- Leave the working platform via designated safe means of access and egress.
- Wind all the power cable, wire ropes and independent lifelines and place them on the working platform.
- Isolate the power supply (e.g. by disconnecting the plug from the socket).
- Properly cover the climbers, other lifting appliances or similar devices.

6. Explanation, Display and Demonstration of Personal Protective Equipment and Portable Fire Extinguishers

[Reference teaching time for Section 6: 20 mins]

[Training course provider should ensure that the safety equipment used in this section should comply with the requirements of relevant regulations, and recognized international or national standards. In addition, the manufacturers' instruction manuals on the proper use of the safety equipment should be strictly followed.]

6.1 Personal Protective Equipment

- Personal protective equipment (PPE) is intended to be worn or otherwise used by a person at work for protecting the person against one or more hazards to his/her safety or health. Use of PPE is the last resort when controlling the sources of accident is impracticable. PPE should be handled with care and stored properly when not in use. The equipment should be kept clean and maintained in good condition.
- Employers have duties on guidance, training and supervision with respect to use of PPE. They should ensure that their employees know why and when PPE is used, its maintenance or replacement schedule and limitations.
- PPE should be provided by employers. Employees must wear PPE for the entire period of exposure to hazards.

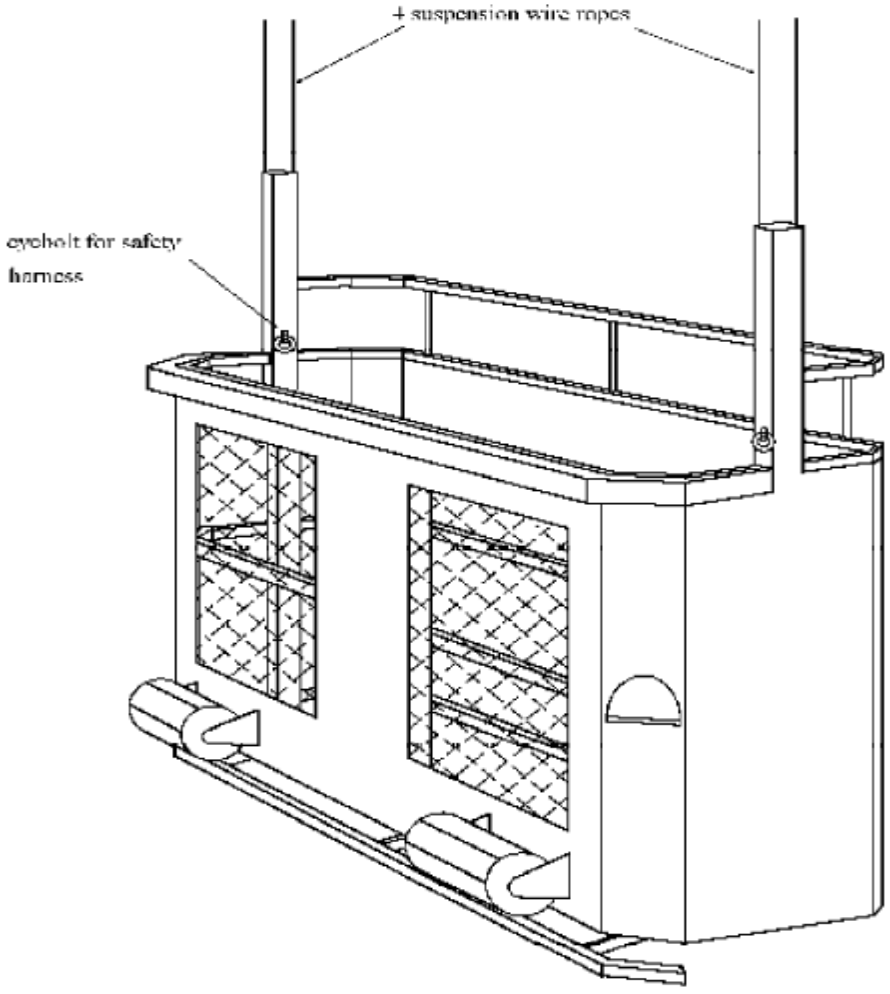
6.1.1 Safety Harnesses Attached to Independent Lifelines and Fall Arresting Devices **[Demonstrate using the real object of PPE]**

- Every person carried on a SWP should be provided with a suitable safety belt, an independent lifeline or suitable anchorage and fittings. Each safety belt, lifeline, anchorage and fitting should be of such a design, so constructed and properly maintained as to prevent serious injury in the event of a fall of any person using it.
- Full body harness meeting the specifications of a national standard should be used instead of a general purpose safety belt. The hook of the lanyard should be anchored to the rope chuck (fall arrestor) of an independent lifeline or a fitting of the working platform designed by the manufacturer. The hook

should be above the user's waist.

- Independent lifeline used for permanent SWP should be properly anchored to the structural member of the roof rig and should be independent of the suspension system.
- No part of the working platform including its railing should be used to anchor the lanyard of a safety harness. However, in case of a permanent SWP which is suspended by two suspension ropes at each end, the lanyard of a safety harness can be hooked to an eye bolt on the structural member of the working platform which is designed by the manufacturer (Figure 2). Where a permanent SWP involves the use of safety ropes and automatic safety devices, the lanyard of a safety harness should be anchored to an independent lifeline.

Figure 2: Safety Eyebolt for Safety Harness



- Independent lifeline should be used for anchorage of the lanyard of a safety harness for all temporary SWP. The lifeline should not be secured to any part of the roof rig, including the outriggers, parapet clamps or any counterweights. They should be secured to reinforced concrete beams or column, structural steel beams or other fixture which are sufficiently strong. It is not recommended to anchor the lifeline to railings or any member of a temporary scaffolding, bamboo scaffolding, or in any section of water, gas or drainage pipes of the building as these fixtures are not designed to withstand sudden shock or impact force.
- Each person on the working platform should be provided with a safety harness and an independent lifeline or an eye bolt. No more than one lanyard should be anchored to each independent lifeline or eye bolt.

6.1.2 Safety Helmets with Y-type Chin Straps **[Explain by means of the real object of PPE or powerpoint]**

- A safety helmet is primarily intended to protect the top of the head from being injured by falling objects.
- A suitable safety helmet should bear appropriate marking indicating the conformity to certain international/ national standards such as European Standard.
- A safety helmet should be equipped with a chin-strip.
- When using SWP to conduct construction work (e.g. external wall cleaning, renewal, etc), workers should wear safety helmets.

6.1.3 Safety Shoes **[Explain by means of the real object of PPE or powerpoint]**

- Safety shoes should have steel toe caps, steel soles, slip-proof and water-proof characteristics.

6.1.4 Ear Protectors **[Explain by means of the real object of PPE or powerpoint]**

- Ear muffs are the most efficient noise isolation ear protectors.

- Properly wear ear protectors according to the manufacturer's instructions.
- When there is a risk of hearing damage (and other control measures are not practicable), such as using concrete breaker to conduct external wall repairing work on a SWP, workers should wear suitable ear protectors.

6.1.5 Eye Protectors [Explain by means of the real object of PPE or powerpoint]

- Ensure that eye protectors are comfortable to wear, and keep clean.
- Replace damaged or defective eye protectors immediately.
- When there is a risk of eye injury (and other control measures are not practicable), such as using corrosive liquid to conduct external wall cleaning or repairing work on a SWP, workers should wear suitable eye protectors.

6.1.6 Breathing Apparatus [Explain by means of the real object of PPE or powerpoint]

- Protect workers against dust, fibres, hazardous gases and fumes, and prevent workers from oxygen deficiency.
- When using breathing apparatus, it must be properly fitted on the wearer’s face.
- When hazardous substances are present in the air (and other control measures are not practicable), such as dust produced when using concrete breaker to conduct external wall repairing work on a SWP, workers should wear suitable breathing apparatus.

6.1.7 Safety Gloves [Explain by means of the real object of PPE or powerpoint]

- Protect hands from getting injured by abrasion; cuts and punctures; contact with chemicals; electric shock and skin infection.
- Types of safety gloves include rubber gloves, steel mesh gloves, leather gloves, wrist and arm protective devices.
- Workers should not wear cotton gloves for operating a machine with revolving parts so as to avoid causing injury to hands due to entangling of

cotton gloves with the revolving parts of the machine.

6.2 Portable Fire Extinguishers [Explain by means of the real object or powerpoint]

- When flammable substance is used by persons working on the working platform, the flammable substance should be contained in a proper container. Fire extinguisher of a suitable type should be provided on the working platform (Table 1). Under no circumstances should any person be allowed to smoke on the working platform, nor any naked flame process such as gas welding work be conducted.

Table 1: Types of Fire Extinguishers for Extinguishing Fires Involving Different Materials

Type of fire / Type of extinguisher	Class 1 **Paper, Textiles, Wood, Plastic**	Class 2 **Flammable liquids, Solvent, Oil, Grease**	Class 3 **Electrical Appliances, Motors, Electrical switches**	**Notes**
Carbon Dioxide Gas	X	✓	✓	Vapours will asphyxiate. Withdraw to open air after use.
Water	✓	X	X	**Never** on fires involving electrical or flammable liquids or metals.
Dry Powder	✓	✓	✓	Discharged dry powder may reduce visibility and cause disorientation.
Foam	✓	✓	X	**Never** on electrical fires.

7. Safety Measures in Adverse Weather Conditions

[Reference teaching time for Section 7: 10 mins]

- Before commencement of work
  - Conduct risk assessment on working under inclement weather conditions, identify and analyze the hazards.
  - Formulate safety plans and emergency plans.
  - Appoint an overseer to monitor changes in weather conditions likely to affect the safety of employees.
- A SWP should not be used under weather conditions likely to endanger its stability or cause danger to the persons carried thereon.
- Wind conditions which arise during the use of SWPs can do damage to the buildings they serve and the ropes on which the working platforms are suspended. A SWP should not be used where there is thunder and storm in the vicinity, during rainy periods or when a strong wind signal is hoisted.
- When winds give rise to unsatisfactory working conditions, work should be stopped until the winds subside.
- All winches, climbers, or other lifting appliances or similar devices should be adequately protected from any malfunction caused by the effect of weather.
- The machinery of the roof trolley should be enclosed by weatherproof covers. They should be so designed and constructed to enclose the equipment and moving parts as completely as possible. Lockable maintenance access covers should be so fixed that they are not readily removable.
- A SWP should be docked at a safe place and securely anchored. All loose items of the SWP are securable to fixed structure so that during the typhoon conditions, the items will not be disintegrated or damaged.
- A SWP in its docked position should be designed to withstand the wind pressure as given in the Code of Practice on Wind Effects in Hong Kong.
- After exposure to weather conditions likely to have affected the stability of a SWP, the SWP should be load tested and thoroughly examined by a competent examiner as soon as practicable thereafter and before the SWP is used again. In the event of the anchorage, ballast, counterbalance or supports being found on examination to be unsafe, steps should be taken to ensure the stability of the SWP.

8. Signalling and Communication Systems

[Reference teaching time for Section 8: 5 mins]

- A person working on the working platform should maintain effective communication with other persons working on the ground.
- Communication devices generally include intercom systems, walkie-talkies and mobile phones, etc.
- When an intercom system is used, it is necessary to install properly an intercom cable on the working platform.
- If mobile phones are used, it should be checked that the phones have a signal; the phones are fully charged; and everyone concerned has a list of all relevant telephone numbers.
- If walkie-talkies are used, it should be checked that the devices are in good working order; they are set to the same frequency; and the batteries are charged.

9. Safe Working Load

[Reference teaching time for Section 9: 5 mins]

- Safe working load, in relation to a SWP, means the safe working load for operating it as specified in the current certificate of thorough examination or load test and thorough examination given by a competent examiner.
- The safe working load takes into account of the number of persons intending to use the working platform, and any other known weights generally required on the working platform. The design of all parts of the SWP should take into account of the possible grouping of the persons using the working platform at one end of the working platform adjacent to the point of suspension.
- Every SWP should be marked clearly and legibly on its working platform the safe working load applicable to the SWP.
- A SWP should not be used to carry any load greater than the safe working load except for the purpose of carrying out a load test.
- A SWP should not be used to carry a greater number of persons than the maximum number marked on the platform.

10. Emergency Procedures

[Reference teaching time for Section 10: 15 mins]

- A safe system of work should be established for every operation of a SWP by the owner. The safe system of work should include emergency preparedness including the recovery procedure of the plant and the personnel staying on the working platform.
- In the event of any malfunctioning or suspected defect, the person working on the working platform should not attempt to put it right if he is not competent to do it. He should communicate and report any defect to the competent person for technical assistance.
- When a SWP is being used and an emergency such as power failure, tilting of the platform or fire, etc. occurs, the person working on the SWP should keep calm and take the following measures:
  - Power failure
    - Keep calm if the SWP shuts down in midair due to power failure.
    - Press emergency stop button. Check the safety harness and the fall arrestor, and ensure that the safety harness is still securely anchored to an independent lifeline or proper anchorage.
    - Use the communication device to inform the persons working on the ground and wait for them to handle and give instruction.
    - The persons working on the ground should summon a competent person and/or the fire brigade to the scene for recovery and rescue.
    - When the power supply is resumed, check the environment around carefully. After checking the conditions of the SWP are safe, SWP can be operated again.
    - If the power supply cannot resume shortly, park or fix the SWP to a safe place according to safety instruction given, and then leave the SWP.
  - Tilting of the platform
    - Keep calm.
    - Press emergency stop button. Check the safety harness and the fall arrestor, and ensure that the safety harness is still securely anchored to an independent lifeline or proper anchorage.
    - Find a suitable position on the working platform and grasp the

guardrails to maintain the balance of the body. Stand calmly and don't try to climb along any rope.

- Use the communication device to inform the persons working on the ground and wait for them to handle and give instruction.
- The persons working on the ground should summon a competent person and/or the fire brigade to the scene for recovery and rescue.

■ Breaking out of fire on the platform

- If the situation warrants, disconnect the power supply (e.g. unplug the power of the control panel).
- Use a fire extinguisher to put out the fire.
- Use the communication device to inform the persons working on the ground and wait for them to handle and give instruction.
- The persons working on the ground should summon the in-charge person of the SWP and/or the fire brigade to the scene for recovery and rescue.
- If the situation warrants and it is safe to do so, leave the SWP as soon as possible.

(Remark: (i) Persons working on SWP should adhere to the established safe working procedures and observe the fire prevention measures, such as prohibition of smoking and any naked flame process in using inflammable substances, etc.

(ii) When a fire breaks out on SWP, persons working on the platform should first consider to evacuate from the platform in accordance with the established fire escape route. The adoption of above measures for handling of fire outbreak may be considered only if the situation warrants and it is safe to do so.)

11. Analysis of Common Serious Accidents involving Suspended Working Platforms

[Reference teaching time for Section 11: 20 mins]

[This section must be conducted in an interactive manner through discussion with trainees.]

[Play Video: Suspended Working Platform]

- Workplace accidents not only cause sufferings to the victims and their families, but also result in financial losses arising from stoppage of work, insurance claims, medical and rehabilitation expenses, etc.
- In fact, most of the workplace accidents are preventable. Very often, they share common scenarios and causes. These scenarios and causes should be properly understood in order that lessons are learnt and suitable measures implemented to prevent recurrence of such accidents.

11.1 Serious Accident Cases Involving Suspended Working Platforms

Case 1

A cleaner fell from a tilted suspended working platform.

Circumstances

- A cleaner who held a certificate for operating SWPs fell to the ground when the SWP he was working on suddenly tilted, causing his death.

①

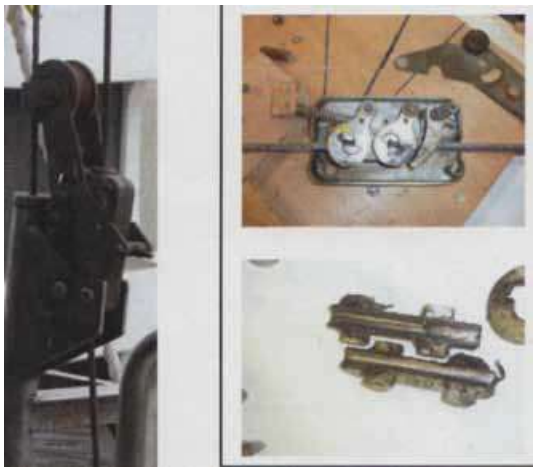
②

③

Case Analysis

The causes of the accident include:

- The automatic safety device of the SWP was ineffective.
- The worker did not wear a safety harness.



Lessons to Learn

- The SWP should be equipped with effective automatic safety device to prevent tilting.
- Every worker on the SWP must wear a safety harness and attach it to an independent lifeline with a fall arrestor.

Other Points to Note

- The owner of the SWP should ensure that:
  - the SWP is of good mechanical construction, fitted with all necessary safety devices for the safe operation of the SWP and free from patent defect;
  - the SWP is properly maintained in accordance with the instructions and advice stated in the operation and maintenance manual. A record of maintenance schedule should be made available for the use of the competent person or competent examiner during the routine inspection and periodic examination;
  - the SWP is properly installed and anchored to the building or structure in accordance with the manufacturer's specification and under the advice of professional engineers. The installation should be carried out under the supervision of a competent person in accordance with the manufacturer's specification and the plan approved by professional engineers;
  - the SWP is of suitable working capacity to perform the job. The SWP should not be restructured or modified without the prior approval from the manufacturer and certification by a competent examiner;
  - the SWP is load tested and thoroughly examined by a competent examiner before the SWP is put into use after installation, repositioning and periodically. The SWP is inspected by a competent person every 7 days. Moreover, each day, before operation is commenced, the SWP including the roof rig is inspected to see that it is sound and has not been interfered with in any way;
  - suitable and safe access and egress to the working platform are provided;
  - information concerning the details of the SWP, the operation and maintenance manual, the maintenance log book, history of repairs and test and examination records are available for the reference of the user, competent person and competent examiner. Notice specifying the safe working load, number of persons allowed on the working platform should be posted on the working platform;
  - the competence of the competent person in charge of the SWP is commensurate with his qualification, training and experience to that

particular type of SWP and that the personnel working on the working platform has received suitable training to operate the SWP and possess a valid certificate of training;

- the personnel on the working platform are wearing and using proper personal protective equipment, such as a safety harness and a helmet with chin strap;
- the information and instructions contained in the safe system of work are disseminated to all working personnel and necessary training in connection with the subject are provided to them; and
- suitable communication means are provided for the personnel working on the working platform.

- The competent person should ensure that:
  - the erection and dismantling of the SWP follow the procedures and recommendations specified in the manufacturer's assembly manual. In particular, he should ensure that the secondary protection such as tie backs to the roof rig is installed;
  - the lifeline is properly installed and anchored;
  - the suspension rope and safety rope of the SWP are free from kink, broken wires, flatten surface or any other patent defect;
  - a thorough inspection to the SWP is conducted before the SWP is first put into use after erection, at regular intervals, and after exposure to adverse weather;
  - machine parts and safety devices that are listed in the operation and maintenance manual, repair log books, and history of the SWP are in good working order;
  - any defect of the SWP is recorded and reported to the owner or the maintenance contractor if such defect is out of repair under his control; and
  - the SWP stops to operate if an unsafe condition or operation occurs to endanger the person working in or nearby the SWP.
- The person working on the working platform should:
  - exercise the general duty of care for his own safety as well as for other members working in or nearby the SWP;
  - properly take care of his hand tool and equipment;
  - ensure that the working platform is not so loaded with building

materials that may affect his foothold and handhold, and endanger the stability of the working platform;

- in case of emergency, know how to prepare himself for rescue and recovery;
- wear safety harness with its lanyard attached properly to the independent life line or specified anchorage so provided. The lanyard should never be anchored to any railings or fittings of the working platform unless they have been specified and tested for the purpose;
- make proper use of all safety devices, maintain them in functional positions, and never interrupt their assembly;
- have read and understood the safety procedure, relevant instruction and the arrangement for emergency preparedness as specified in the safe system of work;
- in the event of any malfunctioning or suspected defect, not attempt to put it right if he is not competent to do it. He should communicate and report any defect to the competent person for technical assistance;
- make full use of all facilities and proper means of access provided for him;
- keep the working platform clean;
- pay attention to projecting features on the building which could impede the movement of the working platform; and
- never attempt to extend any power lead of the working platform for convenience.

Discussion

- Construction of the SWP, including safety devices
- Safe and proper use of the SWP
- Inspection and maintenance of the SWP
- Difficulties encountered by the parties concerned, including the owner of the SWP, the competent person and the person working on the SWP, and their responsibilities.

Case 2

[Training course provider should provide an accident case associated with suspended working platforms (in particular those occurred during the five years preceding the conduct of the course) for case study and analysis in this section.]

[Reference can be made to the "Safety Alert" provided by the Labour Department's website]

Contents of case study and analysis should include:

Circumstances

- Brief description of the accident case.

Case Analysis

- Analyze the cause of the accident.

Lessons to Learn

- Precautionary measures to be taken to prevent recurrence of the accident.

Other Points to Note

- Points to note for the owner of the SWP.
- Point to note for the competent person.
- Points to note for the person working on the SWP.

Discussion

- Construction of the SWP, including safety devices
- Safe and proper use of the SWP
- Inspection and maintenance of the SWP
- Difficulties encountered by the parties concerned, including the owner of the SWP, the competent person and the person working on the SWP, and their responsibilities.

12. Hands-on Practice

[Reference teaching time for Section 12: 180 mins]

- At least one SWP (e.g. endless winder mode temporary SWP) approved by the Commissioner for Labour for the relevant training purpose should be provided for hands-on practice. The conditions of the SWP should meet the requirements of the Factories and Industrial Undertakings (Suspended Working Platforms) Regulation.
- The operation zone of the SWP should be fenced off. Only the trainer and those trainees who are going to practice are allowed to enter the operation zone. Other trainees should remain outside the fenced zone to observe and learn.
- Trainees can board or leave the working platform of the SWP only under the supervision of the trainer.
- For each set of hands-on practice procedures, maximum 2 trainees are allowed to stay on the working platform of the SWP. One trainee is responsible for operating the SWP to accomplish the procedures stated in Section 12.1 while the other trainee stays beside to observe and provide assistance.
- Every trainee should conduct at least one operation of the SWP to accomplish the procedures at Section 12.1 and stay at least once on the working platform to observe the procedures and provide assistance (If there is only one trainee, the trainer should assist the trainee to perform the procedures of hands-on practice).

12.1 Procedures of Hands-on Practice

[The trainer should demonstrate the procedures of the hands-on practice.]

[Depending on the conditions of the SWP, additional training items may be added to the procedures of the hands-on practice.]

[The training course provider should ensure that the personal protective equipment is clean and hygienic for use.]

(I) <u>Pre-use Checks</u>

- Check the integrity of the power cable and the plug.
- Check the wire ropes, anchorages and supports.

- Check the stability of the working platform and the integrity of the components.
- Check Form 1, Form 2 and Form 3 and their validity; the notices, the markings and fire extinguishers.
- Check the safety harness, fall arrestor and independent lifeline. (Before testing the functions of the components of the SWP, wear the safety harness and anchor the safety harness to the fall arrestor on the independent lifeline.)
- Test the effectiveness of the control panel and its components.
- Test the effectiveness of the automatic safety devices.
- Test the effectiveness of the brake systems and manual operation mode.

(Remark: The trainer may arrange all the trainees to go together to check the plug, anchorages and other devices which are far away from the working platform.).

(II) <u>Operation</u>

- Before starting operation, observe the environment around.
- Check the proper use of the safety harness, fall arrestor and independent lifeline.
- Render the working platform in a balanced state.
- Ascend and descend the working platform.
- Handle the power cable and wire ropes.
- Communicate with the persons working on the ground by using the communication device.
- Keep vigilant to the environment around.
- Leave the SWP and tidy up the SWP.

(III) <u>Emergency Response to Power Failure</u>

- Deal with the emergency stop button.
- Check the conditions of the safety harness, fall arrestor and independent lifeline.
- Operate the SWP manually.
- Simulate the re-starting of the SWP after power failure.

Occupational Safety and Health Branch
Labour Department

Annex 6

Answer Sheet for Training for Persons Working on Suspended Working Platforms

Answer Sheet
for Training for Persons Working on Suspended Working Platforms

Name of Course Provider : _____

Class Ref. (TRC1): _____ **Examination Paper Code :** _____

Date of Examination : _____ **Examination Start Time :** _____

Name of Trainee : _____ **Mark :** _____

Instructions to Trainees

1. **The examination paper consists of 20 multiple choice questions. Each correct answer carries 5 marks. Please answer all questions.**
2. **The passing mark of the examination is 60. The examination must be finished in 30 minutes.**
3. **Please read the questions carefully and put a tick in the answer box you choose for the question.**
4. **If you tick more than one answer box for one question, no marks will be awarded.**
5. **Please initial next to your final answer whenever amendment is made.**
6. **If you have any questions, please raise your hand and ask the examiner or invigilator.**

Question	Answer				Question	Answer			
	A	B	C	D		A	B	C	D
1					11				
2					12				
3					13				
4					14				
5					15				
6					16				
7					17				
8					18				
9					19				
10					20				

Please tick only one box to denote if the trainee has used the question paper reading service and also if it is read in English.

Not required ☐ **Read in English** ☐ **Read in language other than English** ☐

Signature of Trainee : _____ **Date:** _____

Name and Signature of Invigilator : _____ **Date:** _____