

A Casebook of Fatal Accidents in
Lift

Installation,

**Maintenance and
Repairing Work**

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A Casebook of Fatal Accidents in Lift **Installation**,

Maintenance and Repairing Work

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FOREWORD

Workplace accidents are not just causing sufferings to the victims and their families. They also incur costs arising from work stoppages, insurance claims, medical and rehabilitation expenses.

It is recognized that most workplace accidents are preventable. Very often, the scenarios and causes have common phenomena. If the causes of workplace accidents are properly understood, people could learn from them and take suitable precautions for improvements in safety and health at work.

This casebook gathers a collection of eight fatal accident cases in connection with lift installation, maintenance and repairing work. These cases are edited in a way for experience sharing in accident prevention. The casebook aims at providing precious lessons to workers and management personnel to enable them to understand why events happened, and take actions to make sure that they do not happen again.

Case 1 A technician was trapped between the wall of the lift shaft and the ascending lift car



Scenario

The deceased person (D/P) and two workmen were installing a lift in a building under construction. At the time of the accident, they were adjusting the clearance between the lift car and the lift shaft. The lift car was stopped half-way below the B5 floor level with both lift car and landing doors opened for the work. The D/P was standing at the B5 landing close to the top of the lift car and instructing the two workmen to adjust the clearance. Suddenly, the lift car doors closed and the lift car ascended. The D/P was dragged into the lift shaft and was trapped between the top of the lift car and the wall of the lift shaft at B4 floor level.

Case Analysis

1. The brick that jammed on the B5 lift car doors to keep them open was displaced, and the lift car doors closed automatically.
2. There were other work activities carried out by other workmen at the lift machine room. The control unit of the lift was tampered. When the lift car doors closed, the lift car responded to calls and ascended.
3. The D/P might have worked close to the lift car with his body leaned over the car top, and was trapped by the ascending lift car.

Lessons to Learn

1. Installation work to the same lift by different teams of workers should be well-planned and coordinated to prevent incompatible activities being performed at the same time.
2. As far as practicable, work at the lift machine room should be temporarily suspended with the doors locked to prevent interference to the system by other persons when work at the lift shaft is in progress.
3. The lift car should be rendered inoperative properly according to standard working procedures.
4. The workmen should be properly supervised to ensure that the safety rules are followed.

Case 2 A lift installation worker was dragged down the lift shaft by a falling wire rope



Scenario

Three workmen were installing the wire rope of a lift of a building under construction. One workman stayed at the machine room on the roof to manually lower the rope down the lift shaft. The deceased person (D/P) and another workman climbed on the bamboo scaffold in the lift shaft at 35/F and 15/F levels respectively to guide the rope down. The workman at 15/F left the scaffold when the lower end of the rope reached the bottom of the lift pit. At that moment, the rope suddenly slid down from the machine room, and the D/P was dragged by the falling rope from 35/F down to the lift pit on 1/F.

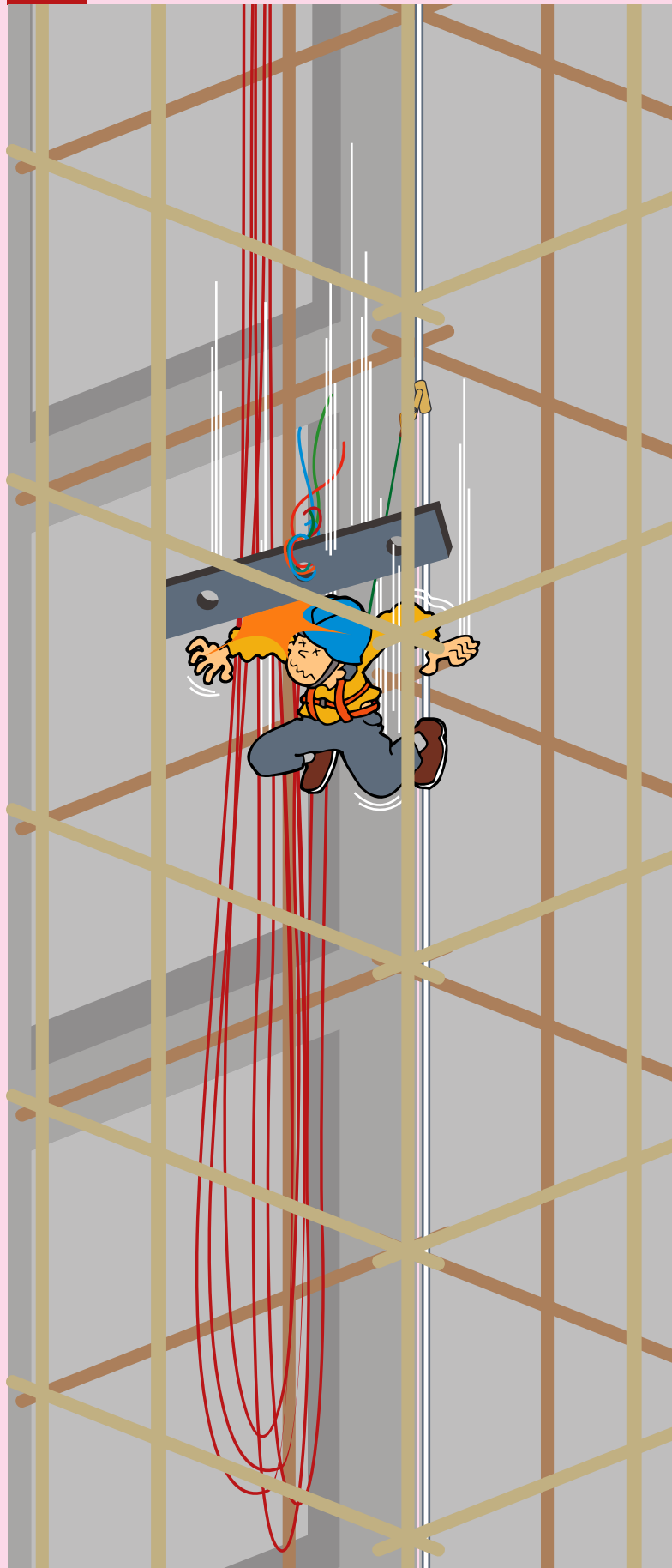
Case Analysis

1. No mechanical means was used to lower the rope down the lift shaft. In the course of its being manually lowered from the machine room, the rope might have slipped from the hands of the workman. As a result, it fell down the lift shaft.
2. No working platform was provided on the scaffold. The D/P had to climb on the scaffold to receive the rope and then attach it to a temporary suspension wire at the scaffold to support its weight after the lower end of the rope reached the bottom of the lift pit. The falling rope broke the temporary suspension wire and dragged the D/P off the scaffold down to the lift pit.
3. The D/P was wearing a safety belt but the lanyard was not attached to any anchorage.
4. There were no suitable anchorages for the attachment of safety belt.

Lessons to Learn

1. Risk assessments should be conducted to identify the hazards involved in the lowering of ropes down the lift shaft and the precautionary measures to be taken. As far as practicable, mechanical means should be used for the handling of heavy load.
2. Suitable working platforms should be provided for workmen working on the scaffold in the lift shaft.
3. When the provision of working platforms in the lift shaft is impracticable, safety harnesses and suitable anchorages should be provided to prevent the fall of persons.

Case 3 An electrician was struck by a metal plate tied at the end of a bundle of electrical wires inside a lift shaft



Scenario

Bundles of electrical wires were lowered from the machine room down a lift shaft of a building under construction. A metal plate was tied to the end of the bundles as a balance load to guide the electrical wires down. During their lowering, the metal plate was trapped at members of the bamboo scaffold inside the lift shaft. The deceased person (D/P) climbed onto the scaffold at 25/F level and tried to free the metal plate that was trapped at a higher level by pulling the loop of electrical wires that were slacking down from the above. In doing so, the metal plate became detached from members of the bamboo scaffold and fell down from floors above and hit onto the head of the D/P. The safety helmet worn by the D/P was broken by the strong impact. As a result, the D/P fell off from the scaffold but was arrested by his safety belt that was attached to an independent lifeline. The D/P subsequently died of head injury.

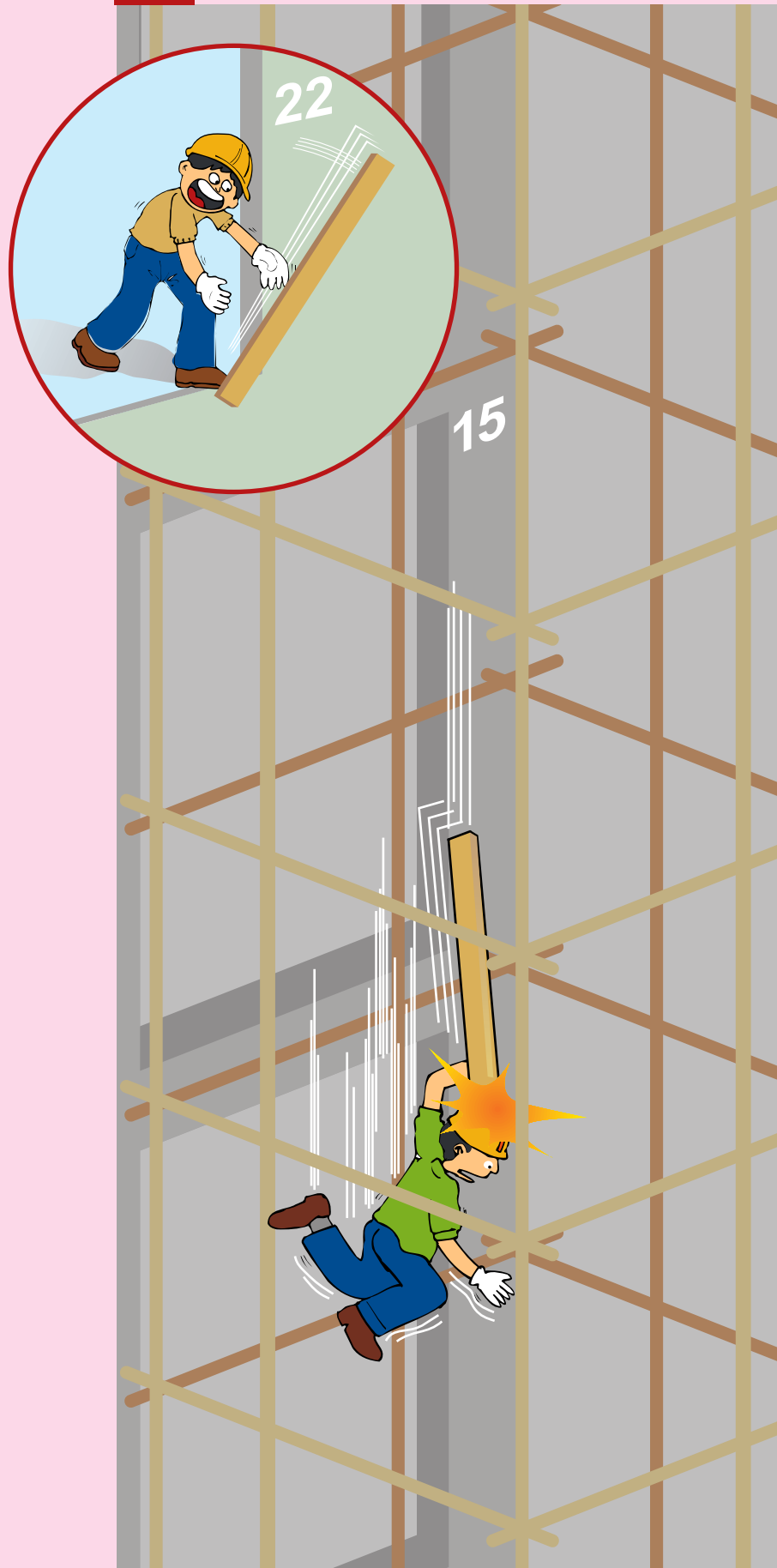
Case Analysis

1. No suitable equipment were provided for guiding the bundles of electrical wires down the lift shaft steadily.
2. The metal plate used for guiding the bundles of electrical wires down the lift shaft was irregular in shape and large in size and could easily get trapped at the scaffold during the lowering of the plate and wires.
3. No proper job method was provided for removing the metal plate that was stuck at the bamboo scaffold. The job was left to the free hands of the worker.

Lessons to Learn

1. A suitable balance load or guide rope should be used for guiding the electrical wires down the lift shaft to prevent the balance load or the electrical wires from being trapped at the scaffold.
2. The balance load or the electrical wires that were trapped at the scaffold should be freed at the point of entanglement and not by pulling the electrical wires from the floors below.
3. Suitable working platforms should be provided for workers working on the scaffold inside the lift shaft.

Case 4 A lift installation worker was struck by a plank fallen from height inside a lift shaft



Scenario

Two groups of workers were working at different levels inside a lift shaft on a building construction site. The plastering workers were breaking the concrete of the lift door entrances on upper floors while the lift installation workers were carrying out electrical fitting-out work at the lower floors. At the time of the accident, a plank of a temporary working platform inside the lift shaft on which the plastering workers were working fell from the 22/F level of the bamboo scaffold and struck onto a lift installation worker who was riding on the scaffold at the 15/F level below. As a result, the lift installation worker fell off from the scaffold down to the lift pit on G/F.

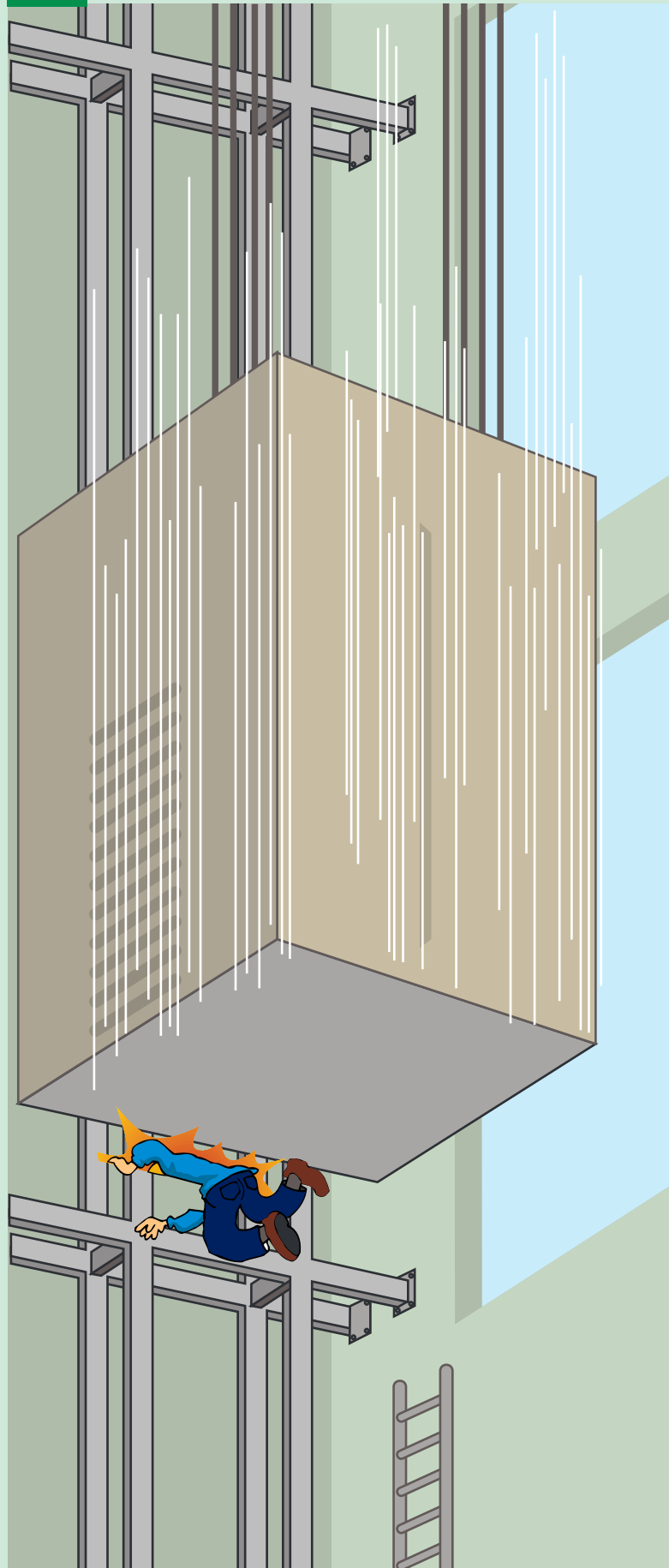
Case Analysis

1. There were no co-ordination and supervision for jobs inside the lift shaft to prevent incompatible activities from being performed by different parties at the same time.
2. No precaution was in place to prevent falling objects from endangering the workers working inside the lift shaft.
3. No proper working platform was provided on the scaffold inside the lift shaft to prevent the fall of persons and falling objects.
4. There were no personal protective equipment such as safety harnesses and fall arresting system provided to workers working at height.

Lessons to Learn

1. Incompatible work performed by different trades at the same workplace should be properly co-ordinated to ensure the safety of the workers and other persons at work.
2. Suitable arrangement should be provided to prevent falling objects from endangering the workmen working at the site.
3. Suitable working platforms should be provided for workmen working on the scaffold in the lift shaft.
4. When the provision of working platforms in the lift shaft is impracticable, safety harnesses and suitable anchorages should be provided to prevent the fall of persons.

Case 5 An apprentice was trapped between the metal structure at the wall of the lift shaft and the descending lift car



Scenario

The deceased person (D/P) was a lift maintenance apprentice. At the time of the accident, the D/P was standing on a cat-ladder at the bottom of a lift pit to open the lift landing doors at G/F manually. When he found the lift car approaching the G/F level from the top, he tried to stop the lift car by activating the emergency stopping device installed at a metal beam of the runway structure of the counter-balance adjacent to the cat-ladder, but was trapped there by the descending lift car.

Case Analysis

1. The D/P was assigned to work alone in the lift pit with the landing doors at G/F closed. No one assisted him to open the landing doors from the lift lobby. Thus, the D/P had to open the landing doors inside the lift pit by himself before the lift car descended to stop at the G/F landing.
2. Workers working at different locations could not see each other but they were not provided with any effective communication devices. They communicated with one another by shouting only.
3. The D/P had not been fully trained on the job and was inexperienced in tests and trial runs of the lift.
4. No supervision was provided on the tasks performed by the team of workers.

Lessons to Learn

1. Opening and closing of landing doors for entering or leaving the lift pit by workers should be safely arranged, and preferably be conducted at the lift lobby.
2. Effective means of communication, such as walkie-talkies, should be provided for the job.
3. Emergency lift car stopping device in the lift pit should be at a position such that workers can operate it safely.
4. Adequate training should be provided to the workers. As far as practicable, a worker should not be assigned to work alone and should be supervised from time to time.

Case 6 A technician was trapped between the runway and the descending counterweight



Scenario

The deceased person (D/P) was the team leader of a gang of three workmen. They were carrying out trial runs of a lift car after replacing the steel tape at the bottom of the lift pit. At the time of the accident, the lift car was stopped at the 1/F level. The D/P entered the lift shaft to make some adjustments. After that, he shouted to instruct his co-workers to ascend the lift car. When the lift car moved to the top level of the building, the counterweight, which was running in opposite direction to the lift car, reached the bottom of the lift pit and trapped the D/P who was staying at the runway of the counterweight.

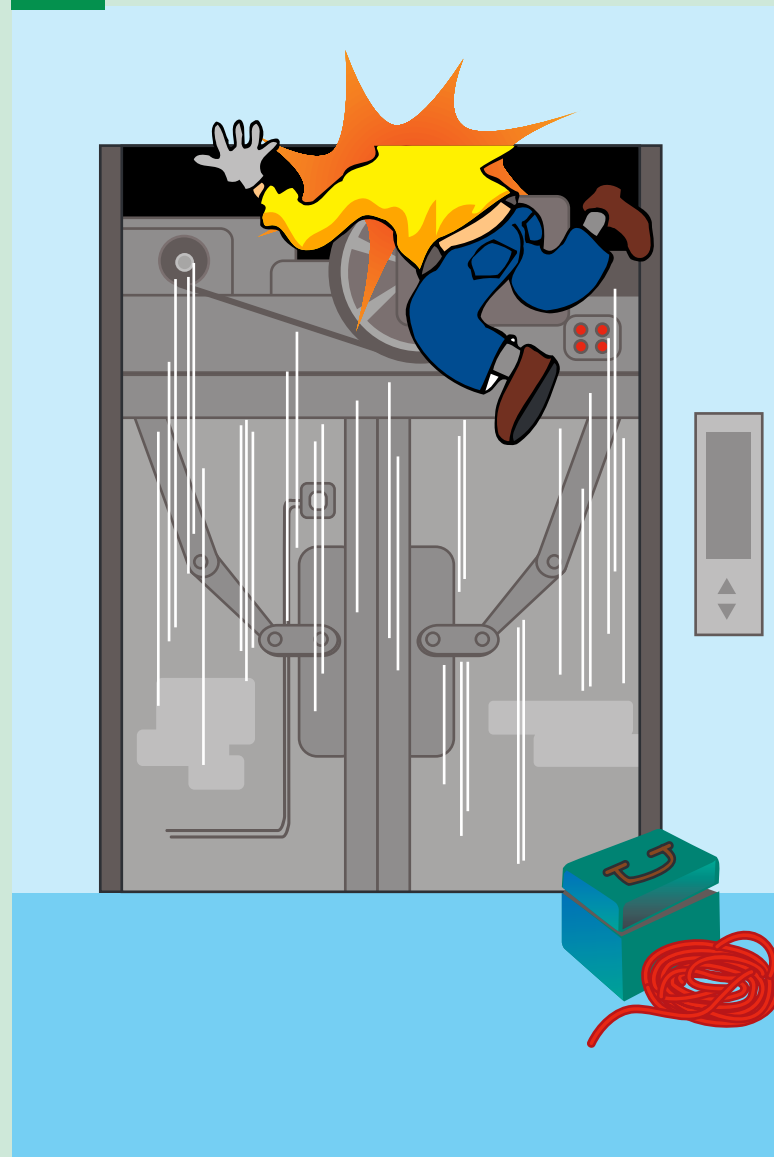
Case Analysis

1. The frame of the runway guiding the travel of the counterweight was only fenced from Upper G/F downwards. Trapping hazard existed between the frame and the moving counterweight for locations above Upper G/F.
2. There were no clear instructions and guidelines on the safe working positions for the workmen inside the lift shaft.
3. No communication devices were provided to the workmen working at different locations.

Lessons to Learn

1. Risk assessments should be conducted before the commencement of lift maintenance work to identify the hazards involved and the precautionary measures to be taken.
2. Detailed working procedures in connection with working inside the lift shaft should be devised and documented.
3. Trapping zone created from the moving parts of plant should be effectively guarded.
4. Safe working positions inside the lift shaft should be clearly marked and shown, and the dangerous zone should be demarcated.
5. Effective modes of communication should be arranged with appropriate devices provided.
6. Adequate information, instruction, training and supervision should be provided to persons engaged in lift maintenance work to ensure their safety.

Case 7 A worker was trapped between the header of the doorway and the ascending lift car



Scenario

The deceased person (D/P) was a lift maintenance apprentice. He was checking a lift together with a technician. The lift car was stopped half-way below the 1/F level. The landing doors were opened by bridging the interlock mechanism, and the control of the lift was switched to 'Inspection' mode. At the time of the accident, the technician left the site for a while, and the D/P attended the scene alone. When the technician returned, he found that the D/P was trapped between the top of the lift car and the landing door header of the doorway entrance. The control of the lift was found in the 'Normal' mode.

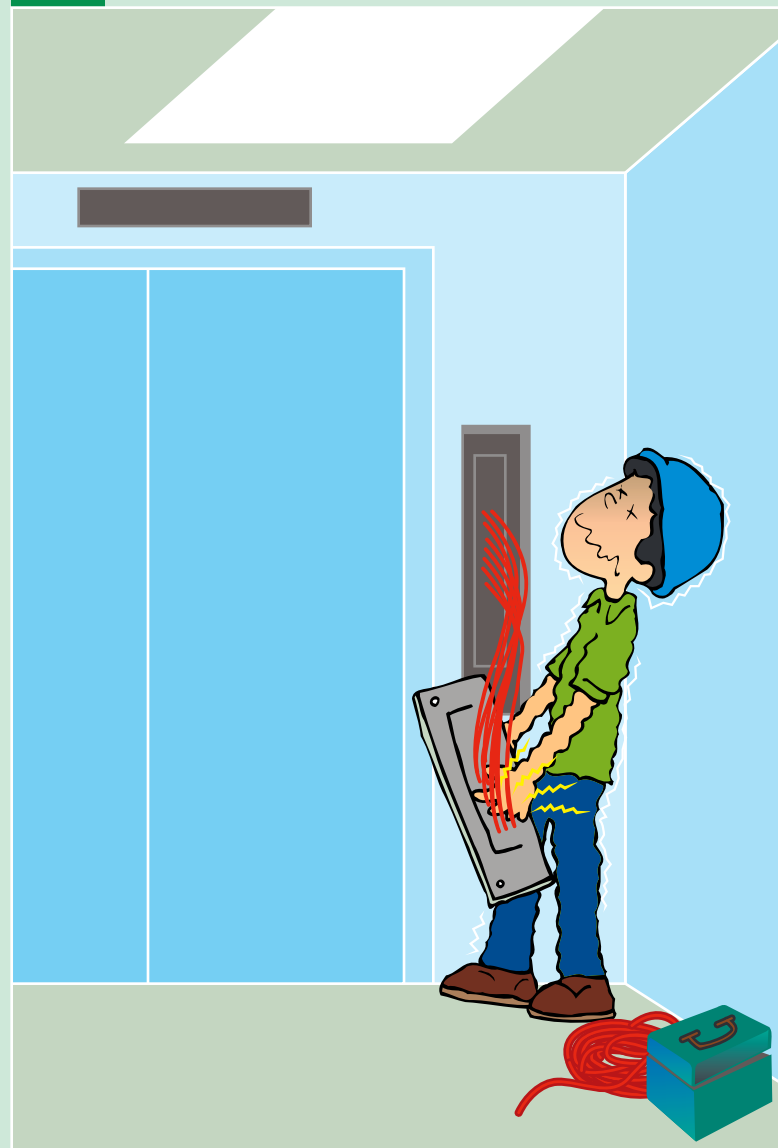
Case Analysis

1. The D/P had not been fully trained and was inexperienced, but was left alone to attend the scene with the landing doors opened.
2. The D/P might have unintentionally switched the control of the lift from 'Inspection' to 'Normal' mode of operation and might not be aware that the lift would respond to new calls from other floors.
3. The D/P might have leaned his body over the top of the lift car to operate the switches, and was trapped between the top of the lift car and the header of the doorway when the lift car ascended suddenly.
4. There were no notices posted at other floor landings of the lift to inform the occupants that lift maintenance work was in progress.

Lessons to Learn

1. Sufficient training, in particular the design and construction of lifts and the safety precautions associated with the maintenance work of lifts, should be provided to all workers.
2. No unskilled workers or apprentices should be left unattended in the lift machine room, on or adjacent to the top of the lift car.
3. Where the maintenance work of a lift is temporarily suspended, the landing doors should be kept closed and under lock to prevent any unauthorized entry into the car top control station.
4. A notice to prohibit the use of the lift should be posted at every floor before and during the lift maintenance work.

Case 8 A technician was electrocuted while repairing the electrical circuit inside the lift car



Scenario

The deceased person (D/P) was a lift maintenance technician. He was repairing the faulty alarm system of a lift with another technician. At the time of the accident, the D/P removed the control panel inside the lift car and checked the electrical circuit system behind. The other technician went into the lift pit to apply lubricating oil to the jammed mechanical parts of the switches at the bottom of the lift pit. The D/P was suddenly electrocuted by the exposed wire connection of the control panel which became live when the switches at the bottom of the lift pit resumed normal operation.

Case Analysis

1. As lighting was required inside the lift car, the main electrical supply to the circuit systems at the control panel of the lift was not switched off.
2. When the D/P was examining the control panel, he inadvertently touched the exposed conductor of the system which became live when the switches at the bottom of the lift pit resumed normal operation.
3. The D/P was not wearing any insulating hand gloves during work.

Lessons to Learn

1. The electricity supply to the control panel should be switched off before carrying out repairing work on it.
2. The electricity supply to electrical circuits of the lift car should only be switched on after all the repairing work had been completed.
3. Electrically insulating protective equipment such as gloves and mats should be provided to and properly used by the workmen engaged in electrical work.
4. Lighting independent of the electrical supply system to the lift car should be provided when the electricity supply to the lift car is switched off for repairing or examination work.

Enquiry

If you wish to know more about occupational safety and health information, you may contact Occupational Safety and Health Branch of the Labour Department through -

Hotline : 25592297

E-mail : enquiry@labour.gov.hk

Information on the services offered by Occupational Safety and Health Council can be obtained through hotline 2739 9000.