



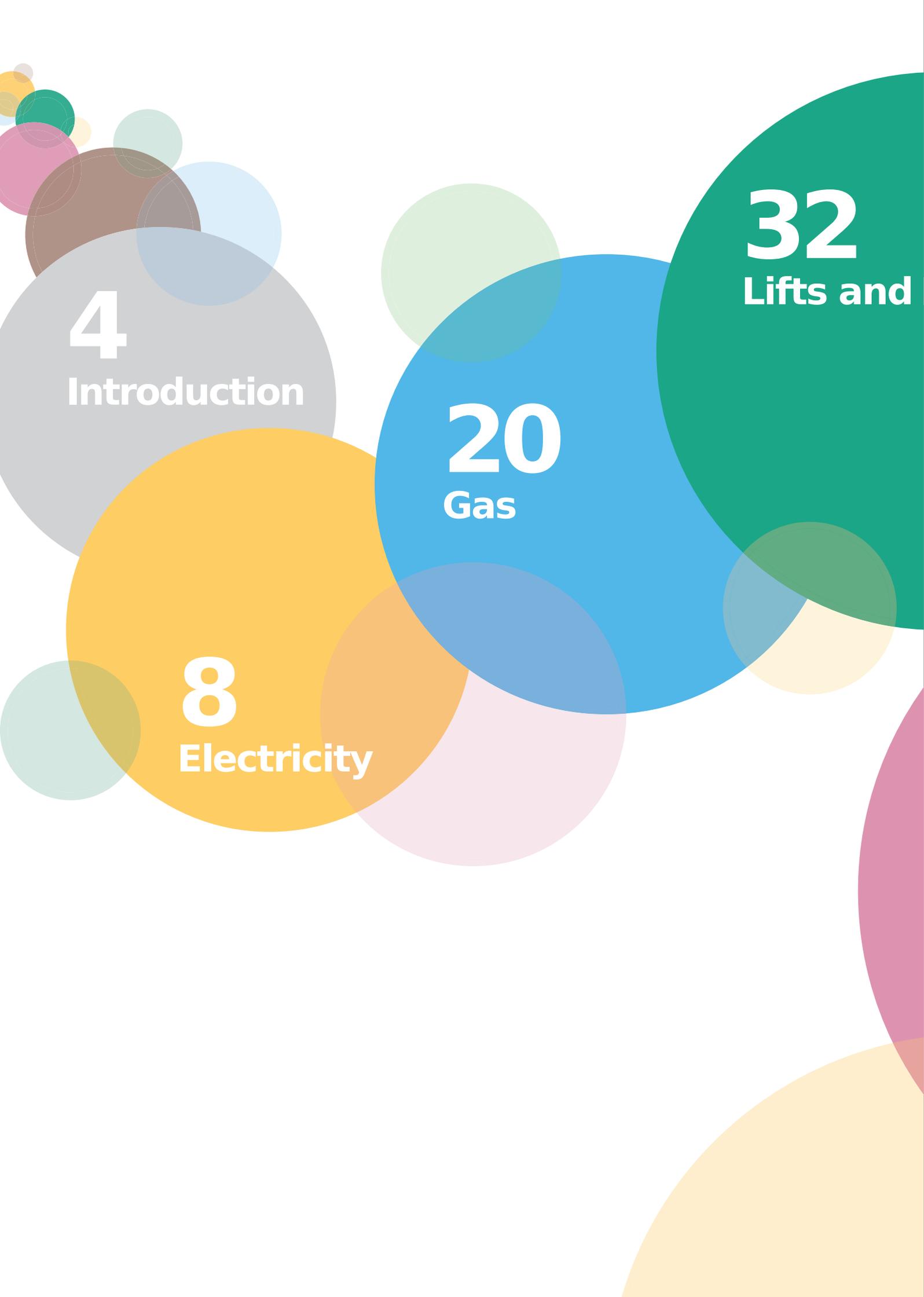
Electrical & Mechanical Safety

Liberal Studies Education Kit
for New Senior Secondary Curriculum



Electrical & Mechanical Safety

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for New Senior Secondary Curriculum



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Introduction

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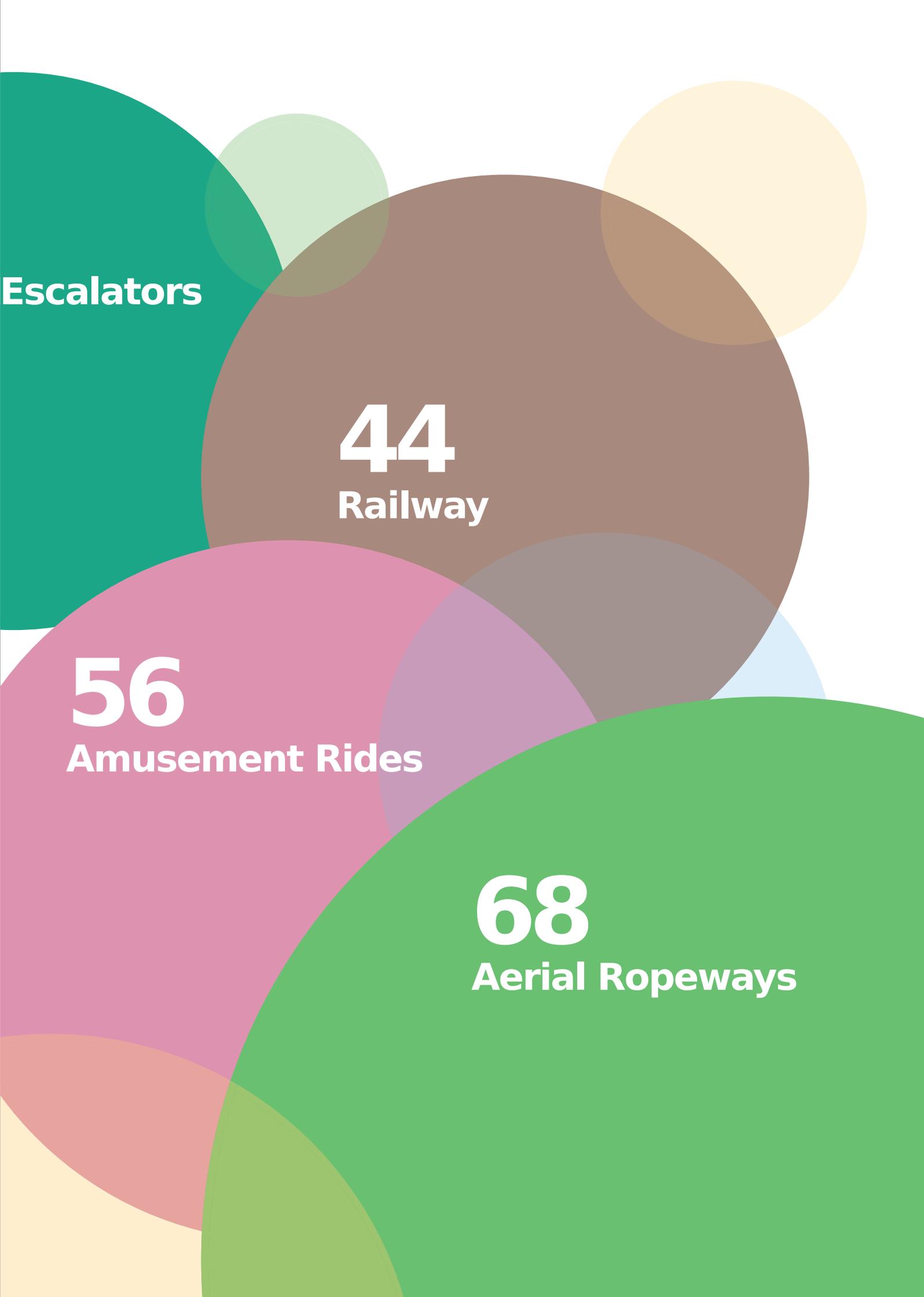
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Introduction

- This manual is designed for studies in Module 2 of the New Senior Secondary Liberal Studies Curriculum, “Hong Kong Today”.
- The content and activities in this manual are suited for the theme of Quality of Life of the module.

Core learning skills to be acquired

Learning to Communicate

- Cooperation
- Organisation
- Communication

Learning to Think

- Critical thinking
- Multiple-perspective thinking
- Informed decision-making
- Independent thinking

Building Character

- Reflective thinking
- Respect for evidence

Preparation for Citizenship

- Positive value and attitude
- Ability to contemplate about a citizen's identity, responsibility, and duty towards society, country, and the world

Living with Diversity

- Openness
- Respect for cultures

Preparing for a Global Society

- Material selection and evaluation
- Creativity

Acquiring Broader Interests

- Knowledge expansion
- Cross-curriculum learning

Preparing for a Career

- Arithmetic skills
- Problem-solving capability
- Use of information technology

Self-directed Learning

- Research skills
- Inquisitive learning
- Self management
- Independent learning
- Life-long learning
- Selection of research topic

Learning objectives

- To appreciate how electrical, mechanical, and gas safety contribute to our quality of life through six EMSD-regulated applications/installations (electricity, gas, lifts and escalators, railway, amusement rides, and aerial ropeways).
- To understand how the safety of these applications/installations is maintained, monitored, and regulated in Hong Kong.
- To learn about each individual's responsibilities in the safe selection, use, and maintenance of these applications/installations.

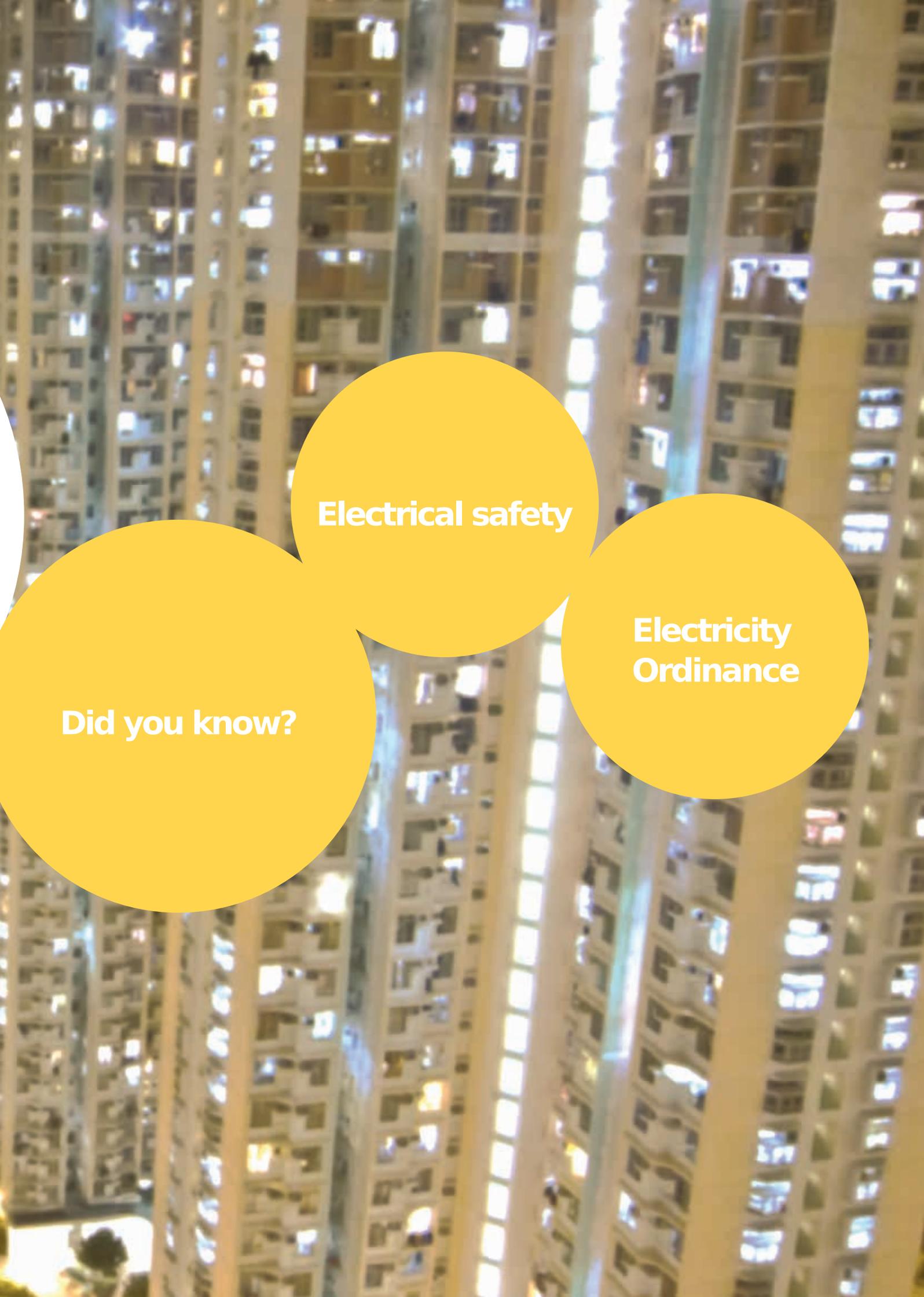
Recommended teaching plan

- 1.** As this teaching kit covers six EMSD-regulated applications/installations, learning, depending on class time, can be split into three sessions.
- 2.** The first session can cover the contents on applications of electricity and gas, the two major energy forms in Hong Kong that are closely related to everyone, and of which individuals play a “gatekeeper’s” role in maintaining safety.
- 3.** The second session can cover lifts and escalators, and railway, facilities that have significantly enhanced our physical mobility and allowed us to move across great distances, including vertical height, in short periods of time. In this session, we can learn about how individual’s responsibility in maintaining safety allows these facilities to provide the convenience that we enjoy.
- 4.** The third session can cover amusement rides and aerial ropeways. Students can appreciate how advancement in technology can also be applied for our leisure and for enhancing our quality of life. Yet behind the fun and amusement we derive from amusement rides and aerial ropeways, we must also share the responsibilities in ensuring the smooth and safe operation of these facilities, for the collective good.
- 5.** Before each session, in-class activities can first be played to encourage the students to reflect on how these applications/installations enhance their quality of life, before getting into the specific materials.
- 6.** As this teaching kit covers only six of the applications/installations regulated by the EMSD, feel free to select other applications/installations that are related to the quality of life of the students for further study. These may include tramways.



Electricity

Background



Electrical safety

**Electricity
Ordinance**

Did you know?



POP



?



?



?



Oh no!



I can't see in the dark!

My ice-cream is going to melt in the fridge!

I can't get on the in

It's going to be so hot in the room without a

Have you ever tried counting the number of electrical products you use in a day?

From the moment you switch on the lights when you wake up, turning on your music player, riding the lift and escalator, and taking the MTR; then at school, turning on the fan or air-conditioners, and using the computer; and at night watching TV, maybe helping to cook rice and do the laundry, and playing on your game console - we come across no less than a dozen electrical products every day, round the clock.

Electricity make our lives convenient and comfortable. It's something we can barely live without. Just imagine doing everything you counted above without electricity, do you think you can still manage it, and for how long? (Or recall the last time the power went out in your home, either due to maintenance or a breakdown of electrical installations. Was that a hassle!)

Electricity doesn't come without hazards. If we're not careful, and mishandle electricity, it could lead to accidents - fire, electric shock, injury, or even death.

In order to ensure that we enjoy a steady electricity supply, along with all the convenience and comfort it brings, without incident, we must use electricity safely.

While the electricity supply companies, electrical product suppliers, electrical contractors and workers, and owners of electrical installations are required by law to observe electrical safety requirements, it is often us, the end users, that will be the final gatekeepers in ensuring electrical safety.

Internet!

Air conditioning!

Did you know?

Whenever we need electricity, we just need to plug in our electrical products to the sockets, and we're good to go.

How does that happen? The process of electricity generation, transmission, and distribution in Hong Kong can be described as simply as this: electricity is generated by the two electricity supply companies – The Hongkong Electric Company Limited, for Hong Kong Island and Lamma Island, and CLP Power Hong Kong Limited, for the rest of Hong Kong. They produce electricity mainly from fossil fuels, coal and natural gas in particular, in power stations (with some generation from renewable energy sources). The electricity generated is transmitted to an extensive power grid that encompasses our city via underground cables and overhead lines. The electricity is then distributed through local power networks to electrical installations in buildings, and is finally supplied to our homes and offices for us to use.



With electrical products that are designed, manufactured and tested in accordance with the relevant international/national standards, and with proper usage and maintenance, we can enjoy these products as much as we wish.

In fact, Hong Kong's records in the reliability of electricity supply and electrical safety rank amongst the top in the world. That's something to be proud of as a citizen of Hong Kong!

For the above to happen, however, all stakeholders involved in electricity supply and usage must work together. It is only then that we can fully reap the benefits electricity brings.

Fun fact
 Over 76,000 electrical workers
 are registered with the EMSD, i.e.
 we have more than one registered
 electrical worker for every 100
 Hong Kong residents.



Why is electrical safety important? And how is safety ensured?

Indeed, in a metropolitan city like Hong Kong, where electricity permeate almost all aspects of life, we rely on a steady electricity supply to support our activities.

On the supply side, we need electricity to be uninterrupted and to be able to meet our demand, so that we won't experience a blackout or prolonged power outage. All generation, transmission, and distribution systems should function normally and safely, for electricity to be supplied safely and efficiently. Incidents, which inevitably do occur, must be quickly handled and rectified.

On usage, we need to ensure that consumer electrical products up for sale are safe, that does not leak electricity or overload circuits. And as end users and owners of electrical products and installations, we need to safely use and maintain them, and know when to seek for help fixing them in case of malfunction.

This is especially important, for while electricity brings many benefits, we must also be wary of electrical hazards. Chief of all being electric shock (or even electrocution) and fire, which may cause severe damage, harm, or even death. We don't want that.

Maintaining electricity supply reliability and electrical safety is an undertaking for all stakeholders. To ensure that everyone does his/her job properly, so as to maintain an electricity-safe environment for the collective good of Hong Kong, we have the **Electricity Ordinance (Cap 406)** and the Electrical and Mechanical Services Department (EMSD), the regulating authority of electrical safety.

The Electricity Ordinance sets out the responsibilities and obligations of all concerned parties, including electricity suppliers, owners of electrical installations, suppliers of electrical products, registered electrical workers and contractors, as well as the powers of the EMSD. Together with subsidiary regulations (covered in a later section), they govern the different aspects of electricity supply and usage.



For example, the Ordinance mandates that all electrical contractors and workers must be registered with the EMSD before they can undertake to do electrical work. The rationale is to make sure that these registered electrical contractors and workers possess a level of expertise that meets the standards required by law. So that no matter it is conducting periodic maintenance to electrical installations (which is a statutory obligation for

electrical installation owners) or carrying out electrical work, when we engage their help, we know that the job will be properly done, and in compliance with the law.

Regulating it all is the EMSD. It establishes safety standards, with the preparation and enforcement of legislation in all matters related to the Electricity Ordinance. Their responsibilities include: ensuring safe electrical installations, safe electrical products and the safe and reliable supply of electricity, as well as promoting safety practices and the safe use of electricity through public education. (Ever noticed comic characters such as Electricity Boy (易叻仔) promoting electrical safety?)

But while the EMSD ensures electrical safety through the enforcement of the electricity legislation, we, as end users, must also do our part, if for no other reason than protecting the safety of ourselves, those around us, and those who we care about. This is also why we're the final gatekeepers of electrical safety.

Here are some general safety guidelines for household electrical appliances and installations for us to follow:

General safety guidelines

- Use electrical appliances only fitted with 3-pin plugs, which comply with the safety requirements.
- Arrange registered electrical contractors to install electrical appliances not supplied through socket outlets.
- Adhere to operating procedures and safety precautions stated in user manuals.
- Check electrical appliances, including their plugs and flexible cords, for any damage before use.
- Do not connect any electrical appliance designed to operate at 110V directly to a socket outlet. (This type of appliances should carry warning labels).
- Switch on an electrical appliance only after plugging it into a socket outlet. Otherwise, sparks occurring at the plug may cause fire hazard.
- Allow sufficient space for heat dissipation to prevent electrical appliances from overheating, being damaged and fire hazard occurring.
- Keep children away from operating electrical appliances.



Maintenance of household electrical appliances

- Clean electrical appliances regularly according to user manuals.
- Unplug electrical appliances before cleaning.
- Arrange electrical appliances to be inspected and maintained regularly by experienced technicians.

Maintenance of Household Electrical Installations

- Arrange electrical installations to be maintained regularly to ensure safety.
- It is a legal requirement of owners to arrange periodic inspection, testing, and certification for electrical installations exceeding 100A at least once every 5 years.
- Arrange an electrical installation to be inspected immediately if its safety is in doubt (e.g. frequent tripping).
- Avoid adding to or altering electrical installations without the consent of the electricity supplier.
- Arrange all electrical work such as addition, alteration, inspection, testing, and maintenance to be carried out by registered electrical contractors. A list of registered electrical contractors/workers is available for reference at the EMSD Registration and Permit Office, Public Enquiry Service Centre of all District Offices and EMSD's website www.emsd.gov.hk.

Living in the twenty-first century, electricity has already become deeply embedded into our daily lives. In order to maintain a safe and reliable supply of electricity and its safe utilisation in Hong Kong, all stakeholders must do their part, so that we can all safely enjoy the benefits, and avoid the hazards, that electricity brings.

What else?

As mentioned earlier, subsidiary regulations under the Electricity Ordinance govern the different aspects of electricity supply and usage. The 5 major subsidiary regulations are:

A. For the safety and reliability of electricity supply:

- Electricity Supply Regulations (ESR)
- Electricity Supply Lines (Protection) Regulation (ESLPR)

B. For the safety of electrical installations:

- Electricity (Wiring) Regulations (EWR)
- Electricity (Registration) Regulations (ERR)

C. For the safety of electrical products:

- Electrical Products (Safety) Regulation (EPSR)

Fun fact

EMSD's ambassador Electricity Boy (易叻仔) promotes electricity safety via the website (Electricity Information Corner). The interactive web-corner features quizzes, games, household electrical safety tips, and general electricity knowledge, etc.

Electrical safety and EMSD

In addition to what's been covered above, the EMSD, in enforcement of the Electricity Ordinance, also:

- Maintains and administers registers of registered electrical workers and contractors, monitoring their performance in line with safety standards and taking disciplinary action when necessary.
- Ensures electrical safety through the inspection of electrical installations in buildings and of electrical product outlets, sample surveillance testing of electrical products, and investigation of electrical reports and accidents.
- Conducts prosecutions for offences under the Electricity Ordinance when necessary.
- Works with product suppliers in the recall of electrical products if they are found to be potentially dangerous in any way.
- Monitors electricity supply companies to ensure the safe and reliable supply of electricity in Hong Kong.
- For the protection of underground electricity supply cables, maintains and administers a list of approved competent persons for locating such cables.
- Promotes electrical safety and the statutory requirements of the Electricity Ordinance through a wide variety of publicity activities ranging from TV announcements, radio and newspapers, poster displays, talks, seminars, and carnivals, to the distribution of safety guidelines, information leaflets, newsletters, educational videos, and multimedia interactive games.
- Represents Hong Kong, China in its participation in the Asian Pacific Economic Cooperation's (APEC) Mutual Recognition Arrangement (MRA) on the conformity of assessment for electrical and electronic equipment.
- Develop a close and regular cooperation with the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) to ensure the safety of electrical and mechanical products and prevent unsafe products from being imported from the Mainland to Hong Kong.
- Provides support for nuclear contingency planning and technical advice on matters relating to electro-magnetic fields.

Fun fact

The first piece of legislation related to electrical safety in Hong Kong was enacted in 1911. 2011 is the centenary of the electricity legislation.



Having learned about electrical safety, list 3 potential safety hazards that you find at home. What are they, and how do you intend to correct it?

What is your usual practice in ensuring electrical safety?

Explain with examples.

References

Electricity Information Corner
eic.emsd.gov.hk/en/index.html

EMSD: Electricity Safety
www.emsd.gov.hk/en/electricity_safety/index.html

Household Electrical Safety Handbook
www.emsd.gov.hk/en/electricity_safety/publications/general/household_electrical_safety_handbook/index.html

EMSD's publications on Electrical Safety
www.emsd.gov.hk/en/electricity_safety/publications/index.html

Electricity Ordinance (Cap 406)
www.legislation.gov.hk/blis_ind.nsf/WebView?OpenAgent&vwpag=CurAllEngDoc*400*100*406.1

Further Reading

CLP Power Hong Kong Ltd. - Company History
<http://www.clpgroup.com/en/about-clp/company-profile/our-history>

The Hongkong Electric Company Limited - Company Profile
<https://www.hkelectric.com/en/about-us>

A Brief History on Hong Kong's Electricity Supply Development and on Hongkong Electric Holdings Ltd.
www.fundinguniverse.com/company-histories/Hongkong-Electric-Holdings-Ltd-Company-History.html

TV Announcements

Employ Registered Electrical Contractor for Electrical Work
www.isd.gov.hk/eng/tvapi/07_eg51.html

Inspect and Repair Electrical Installations Regularly
www.isd.gov.hk/eng/tvapi/06_eg48.html

Look After Your Fixed Electrical Installations
www.isd.gov.hk/eng/tvapi/07_eg46.html

Periodic Test For Fixed Electrical Installations
www.isd.gov.hk/eng/tvapi/07_eg56.html

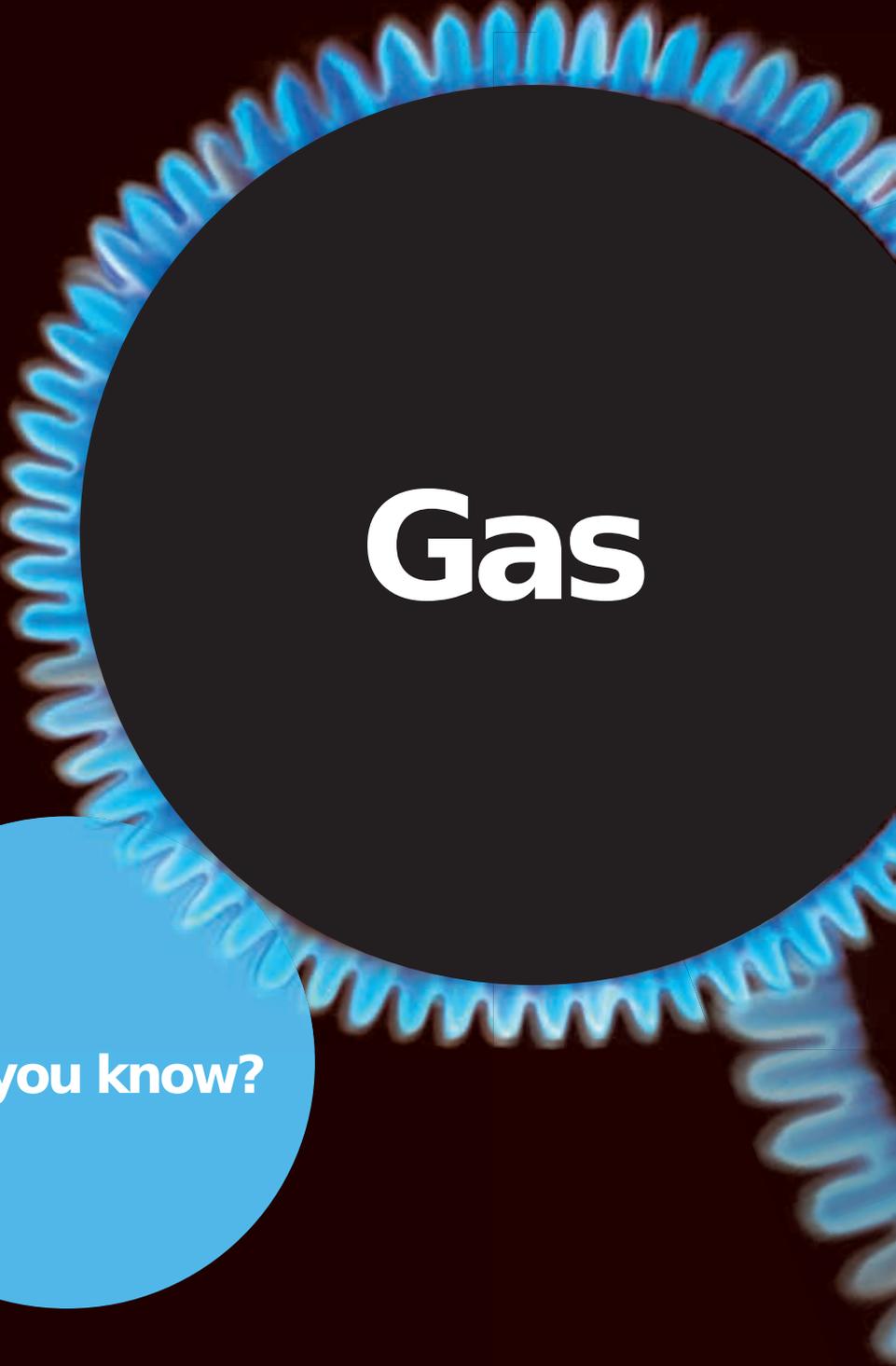
Proper Use and Maintenance of Electrical Appliances
www.isd.gov.hk/eng/tvapi/05_eg44.html

Safe Use of Electrical Appliances in Winter
www.isd.gov.hk/eng/tvapi/07_eg53.html

Safety of Electric Water Heaters
www.isd.gov.hk/eng/tvapi/06_eg45.html

Inspect and Maintain Electrical Appliances
www.isd.gov.hk/eng/tvapi/08_eg37.html

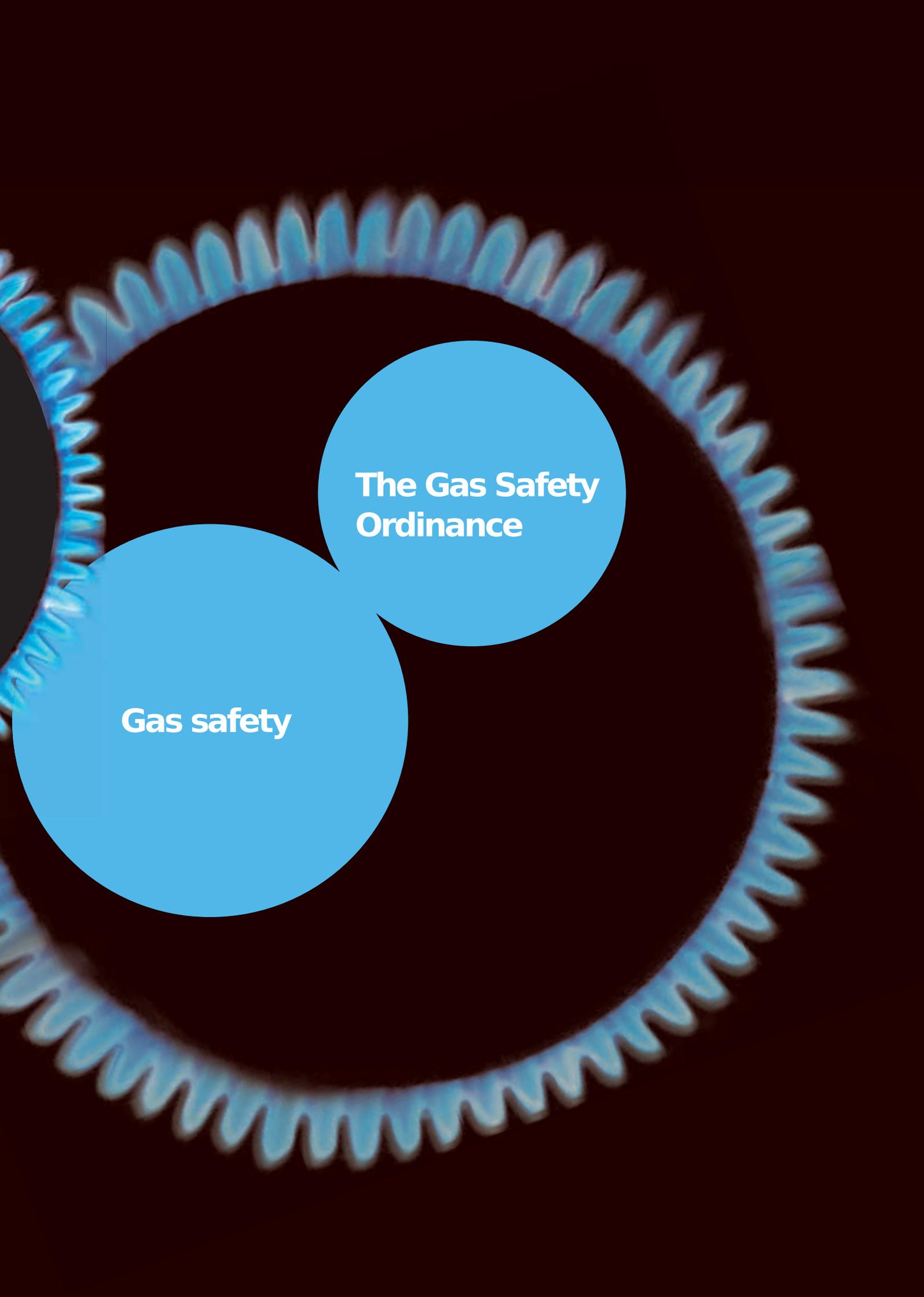
Safe Use of Electrical Appliances in Summer
www.isd.gov.hk/eng/tvapi/09_eg61.html



Gas

Background

Did you know?



**The Gas Safety
Ordinance**

Gas safety

His

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SSs



Oh no!

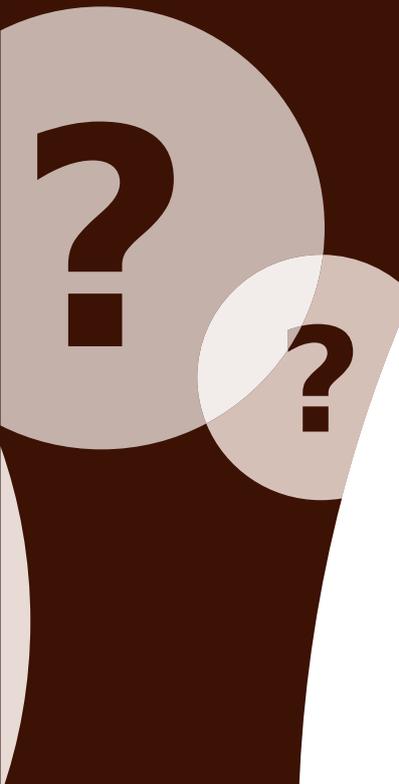


The gas is out?!

What do we do?

I am starving!

Do we need to take cold showers tonight?

A decorative graphic on the left side of the page consists of several overlapping circles in shades of brown and tan. Two of the circles contain large, dark brown question marks. The circles are arranged in a way that they appear to be floating or overlapping each other.

Gas is the second major energy source in Hong Kong, after electricity. Though we don't have as wide a variety of gas-related appliances as electrical ones, its penetration into our daily living is no less significant.

Can you think of the ways we use gas?

We cook with gas, we heat our water with gas, we use liquefied petroleum gas (LPG) as a kind of vehicle fuel, we use LPG cylinder for cooking, disposable LPG cylinder for hot-pot with gas cassette cooker, and we generate a portion of our electricity supply using natural gas. In a literal sense, gas is everywhere, and we can hardly live without it.

Of course, as we've been told since childhood, gas must be handled with care. **No matter how carefully gas products are prepared and delivered to us, if we fail to respect its safety as end users, we could pay a steep price for our negligence and recklessness.**

Did you know?

Do you know what are the main types of fuel gas used in Hong Kong? If you say town gas, liquefied petroleum gas (LPG), and natural gas, you are right.

They are the main types of fuel gas used in Hong Kong for domestic, commercial and industrial purposes. LPG is also used as a fuel by nearly all taxis and over 60% of public light buses; while natural gas is used for electricity generation and the production of town gas.

Hong Kong has about 2.3 million gas customers in the domestic, commercial, and industrial sectors, of which town gas and LPG respectively account for approximately 88% and 12% of the total fuel gas sold in these sectors.

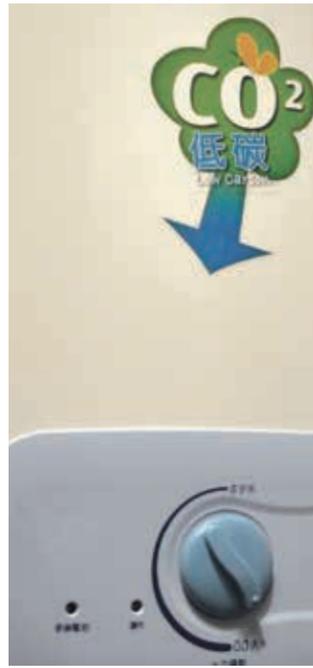
But how are the gases different?

Town gas is a flammable gaseous fuel made mainly from naphtha and natural gas, with the components of hydrogen, methane, carbon dioxide, and a small amount of carbon monoxide, nitrogen, and oxygen. You can probably tell from the composition of town gas that it is toxic. The density of town gas is about half of that of air, so it rises and dissipates in the air if leakage occurs. Town gas is manufactured at plants in Tai Po and Ma Tau Kok, and supplied to various parts of Hong Kong through a piping network.

LPG, on the other hand, is a mixture of propane and butane, which is non-toxic, asphyxiant, and heavier than air, and tend to accumulate at floor level. LPG is imported into Hong Kong by sea and stored at five terminals on Tsing Yi Island before being distributed to customers and LPG filling stations. LPG is usually pressurised and stored in liquid form and is supplied to consumers in various forms such as cylinders or piped LPG installations.

As for natural gas, as you've probably learned from your integrated science lessons, is a fossil fuel like oil and coal. Most commonly, natural gas is formed when organic matters such as the remains of plants or animals are compressed under the earth at very high pressure, temperature, for a very long time. Hong Kong imports natural gas from the Mainland via submarine pipelines to the Black Point, Castle Peak, and Lamma Power Stations for electricity generation, and to the Tai Po Plant as feedstock for production of town gas.

Because we cannot see gas, a special odour is added to let us detect such leakage easily. That's how we know we need to check our stoves when we smell a special odour!



Why is gas safety important? And how is safety ensured?

Both town gas and LPG are safe and reliable gaseous fuels. But as we've been told, and shown, again and again, inappropriate use can lead to serious gas incidents.

And that's not just about using gas carefully, remembering to provide adequate ventilation for combustion and removal of burnt gas during use, and switching off the stove after use.

Most of the gas incidents were caused by faulty gas piping, gas fittings, and gas appliances. By contrast, incidents resulting from improper use accounted only for fewer than 5 cases annually. And that's no wonder, as gas piping, fitting, or appliances problems are not things obvious for us to see. We just have to be more attentive to them. And we shall appoint a registered gas contractor to carry out regular safety inspection of domestic gas pipes and appliances every 18 months.

Because gas safety affects the well being of all of Hong Kong, governmental regulation has commenced since 1982. The Director of Electrical and Mechanical Services has been appointed as the Gas Authority under the **Gas Safety Ordinance (Cap 51)** to regulate gas safety. Under his direction, the Gas Standards Office (GasSO) of the Electrical and Mechanical Services Department (EMSD) actively work to establish gas safety standards and implement safe working practices in the importation, manufacture, storage, transport, supply, and use of town gas, LPG, and natural gas. The EMSD enforces the Gas Safety Ordinance, which came into effect in 1991, in monitoring, regulating, and controlling activities within the industry.

The EMSD also actively promotes safe use of different types of gas appliances to the public. Chief of all, is the implementation of the GU Mark Approval Scheme for Domestic Gas Appliances.

The GU Mark

When we see the “GU” Mark on gas appliances, it means that the appliance has been approved under the “Approval Scheme for Domestic Gas Appliances”. It signifies that such model has been produced in accordance with recognised international or national safety standards, and has passed the local basic safety assessments.

But purchasing approved appliances is not enough. According to the Gas Safety Ordinance, the installation, replacement, and maintenance of gas appliances must be carried out by registered gas installers employed by registered gas contractors. It is against the law to bring or import non-approved domestic gas appliances from the Mainland China or overseas into Hong Kong for use.

For safety reasons and for the effective performance of the gas appliances, consumers should follow the instructions of the manufacturers, and the EMSD’s safety guidelines, when using the appliances. Please refer to the EMSD’s website for further information.



Safe Use of Gas Cookers

- When gas cookers are used, windows must be open or exhaust fans must be turned on to maintain good ventilation, to supply adequate air for combustion, and extract flue gas to outside.
- Gas cookers should not be located beside windows to avoid the flames being blown out. Do not leave gas cookers unattended when they are in operation.
- Flammable objects, such as LPG cartridges, LPG lighters, and aerosol cans, etc., must not be placed beside gas cookers.
- Parents should also educate their children not to play with gas cookers.
- The length of the flexible gas tubing connected to the gas cooker must be as short as practicable and if it is made of a non-metallic material, it must not exceed 2 metres in length.
- The flexible gas tubing must be replaced prior to the expiry date of its service life.
- The public should use approved flexible gas tubing imprinted with the wording “EMSD APPROVAL GTXXXX” (XXXX means the approval number) and the expiry date of service life.
- Care must be taken not to expose the flexible gas tubing to undue heat/ impact damage, excessive bending, or contamination.

Safe Use of Gas Water Heaters

- Room-sealed type gas water heater is the only choice for new and replacement installation under the GU Mark approval scheme.
- The air intake and flue terminal of this type of heater are outside the external wall, so fresh air for combustion is taken from and combustion products are discharged to outside air.
- The heater also does not consume or contaminate the air in the room. This is because the combustion gas product is asphyxiating, and also unburned town gas contains carbon monoxide. If improper type of water heater is used, combustion gas product and carbon monoxide are released into the room, the people in the room will suffer from suffocation and/or carbon monoxide poisoning.
- Most apartments are provided with suitable flue apertures for the installation of room-sealed gas water heaters in bathrooms according to the buildings requirements.

Regular Gas Safety Checks

- Generally speaking, customers are obliged to arrange regular maintenance and inspection of pipes downstream of the gas meters, while gas supply companies are responsible for the maintenance and inspection of pipes upstream of the gas meters.
- Gas supply company would offer a service to carry out a gas safety check for domestic households every 18 months.
- Customers should make arrangements for a registered gas installer, who is employed by a registered gas contractor, to carry out the inspection every 18 months.
- The job record provided by the registered gas contractor would specify the details of the work carried out and the registered gas installer’s name and registration number for future inspection purpose.

*For more information on Gas Safety for different appliances, visit the website below for more information:
www.emsd.gov.hk/emsd/eng/pps/gas_pub.shtml*

Fun fact

In 2015,
 Hong Kong consumed
 28,404 Tera-joules of town
 gas and 4,034 Tera-joules of
 LPG as fuel gas. (You may like
 to know that 1 Tera-joule of
 energy is enough to run a
 standard clothes dryer
 for 312.5 years)

Gas is all around us. We cook, we bathe, we travel, and we generate electricity with gas. It has become an energy source we can't live without. Just as electricity, we're the final gatekeepers of gas safety. Once we understand the important aspects of household gas safety, comply with the Gas Safety Ordinance, and work with all stakeholders, we can consume gas, and enjoy gas use safely.

What else?

One of the main aspects of the Gas Safety Ordinance lies in the regulation of the purchase, storage, and usage of LPG cylinders.

According to the Ordinance, unless specifically approved by the Gas Authority, storing LPG cylinders with a total nominal water capacity of over 130 litres (about 50 kg) is prohibited (this includes empty cylinders, which are considered as full as far as storage is concerned).

LPG cylinders should be stored upright in a well-ventilated and readily accessible location and kept away from heat and flames, especially when you are exchanging cylinders. As LPG is heavier than air, to avoid accumulation of gas, LPG cylinders should not be used or kept below ground level, adjacent to drains, or in basements.

Moreover, for public safety, LPG cylinders should not be put unattended in public places.

Gas safety and EMSD

The Gas Standards Office (GasSO) was established in 1982 as a regulatory body for the gas industry. When the Gas Safety Ordinance came into effect in 1991, its role expanded into enforcement.

Today it is responsible for:

- Administering a register of gas supply companies, gas contractors and installers, monitoring their performance, and enforcing safety measures as necessary.
- Monitoring the operation of all gas installations and associated facilities, approving the construction work and use of notifiable gas installations as well as the inspection of these notifiable gas installations.
- Preparing and approving codes of practice, conducting regular inspections of gas installations, and approving domestic gas appliances.
- Conducting gas safety education programmes for the trade and the public via the media and GasSO publications, and leveraging events and competitions.

Fun fact

There are approximately 2.3 million household gas consumers in Hong Kong. About 81% of them are town gas consumers, while the rest are LPG consumers.



While “rotten-egg” smell of odourants are added to town gas and LPG, so that gas leaks can be detected easily by human beings, what should you do when you detect a gas leak, and how should you handle this emergency?

Please refer to “Gas Safety Tips to Users” in the EMSD website.

Hot-pot eating is very popular in Hong Kong, and often our hot-pot cooker uses disposable LPG cartridges for heating. What are the proper steps in exchanging the disposable LPG cartridges so that we can cook safely?

Please refer to “Gas Safety Tips to Users” in the EMSD website.

References

EMSD: Protecting Public Safety - Gas
www.emsd.gov.hk/emsd/eng/pps/gas.shtml

Gas Safety Tips to Users
www.emsd.gov.hk/en/gas_safety/gas_safety_tips_to_users/index.html

EMSD’s publications on Gas Safety
www.emsd.gov.hk/en/gas_safety/publications/index.html

Gas Safety Ordinance (Cap 51)
www.legislation.gov.hk/blis_ind.nsf/WebView?OpenAgent&vwpg=CurAllEngDoc*50*100*51.1

Further Reading

“A Shared Commitment” 30 Years of Gas Safety
www.emsd.gov.hk/filemanager/en/content_284/EMSD_GasSO30Year_24pp_v20090727a_FinalVersion.pdf

The Hong Kong and China Gas Company Limited - Company Profile
www.towngas.com/eng/corp/abtgtg/overview/index.aspx

NaturalGas.org
 - An educational website on natural gas
www.naturalgas.org

TV Announcements

Use a Safe Gas Water Heater
www.isd.gov.hk/eng/tvapi/10_eg42.html

Safe Use of Cylinder LPG
www.isd.gov.hk/eng/tvapi/10_eg65.html

Beware of Concealed Gas Pipes and Electrical Conduits
www.isd.gov.hk/eng/tvapi/08_eg58.html

Regular Maintenance of Gas Service Risers
www.isd.gov.hk/eng/tvapi/07_eg55.html

Approved Gas Distributors
www.isd.gov.hk/eng/tvapi/06_eg50.html

Domestic Gas Safety (Cassette Cooker)
www.isd.gov.hk/eng/tvapi/06_eg49.html

A photograph of an elevator shaft with a stainless steel door and a call button above it. The background is a textured wall. Three overlapping circles are overlaid on the image: a large white circle on the right containing the main title, and two smaller teal circles on the left containing sub-section titles.

Lifts and Escalators

Background

Did you know?

The background image shows a modern building lobby with two elevators. The elevators have stainless steel doors and are set against a wall of textured, grey stone panels. The floor is a polished, light-colored terrazzo. Two large, overlapping green circles are overlaid on the image, containing white text. The first circle is on the left and contains the text 'Lift and escalator safety'. The second circle is on the right and contains the text 'The Lifts and Escalators Ordinance'.

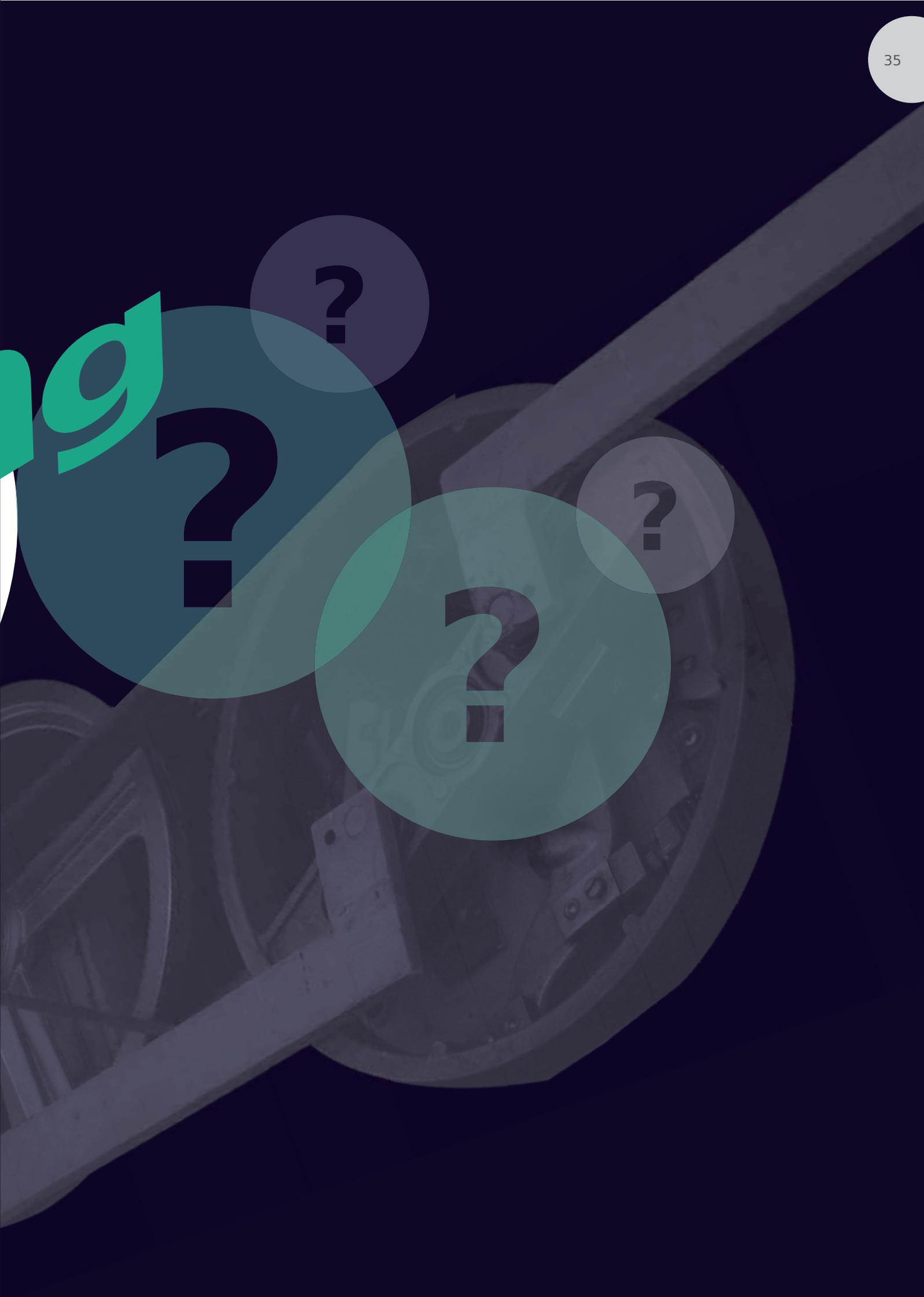
**Lift and escalator
safety**

**The Lifts and
Escalators
Ordinance**

KUN



ing



Oh no!



We have to walk?

We're carrying so many things!

We need to walk up 3

We're going to miss the TV show!



Since their introduction to Hong Kong over a century ago, lifts and escalators have become inseparable from our daily life.

Think of the number of times we ride on lifts and escalators on any given day - when we leave home for school, when we take the MTR, when we go shopping etc. - and we'll see how prevalent they are.

In fact, lifts and escalators are so ingrained in our daily life, that even a brief service interruption could cause great disruption. Have you ever been stuck waiting for a lift during rush hours because another lift was out of service, or needed to climb many flights of stairs because the escalators didn't work? It was frustrating, wasn't it?

That's because we've long factored lifts and escalators into our mode of living. We've grown so accustomed to using these facilities that we automatically assume that lifts and escalators will work properly.

When was the last time you gave a thought about how you (and thousands others) would get from an MTR platform to the concourse?

Maintaining the smooth and safe operation of lifts and escalators is the responsibility of all stakeholders: owners, trade practitioners, regulatory authorities, as well as you, the users. In this section we shall take a closer look at how it is done.

38 floors?

Did you know?

Lifts and escalators are magnificent machines, they allow us to build taller buildings and travel between greater distances with ease and comfort. There are about 60,000 lifts and 8,000 escalators in Hong Kong as at the end of 2015, serving a population of 7 million day in, day out.



Surprisingly, lifts and escalators are quite simple in design - both are pulley systems, one lifting a metal box*, while the other turning stair steps like a conveyor belt**. Yet what they're able to do far exceeds its engineering simplicity.

* A typical lift consists mainly of a driving motor and brake, suspension ropes, safety gear, guide rail, counterweight, and a controller.

** A typical escalator consists mainly of a driving machine and brake, driving chain, handrail, step, skirt panel, upper and lower floor panel, and a controller.

Why is lifts and escalators safety important? And how is safety ensured?

In order to keep our city moving and for us to maintain a good level of comfort, it is crucial that lifts and escalators are allowed to do their job, and to function with minimal hiccups. This can be achieved when all stakeholders do their job:

- **Owners of lifts and escalators** are to arrange registered lifts and escalator contractors and engineers to conduct periodic maintenance and examination, so that the machines run smoothly and safely, meeting the standards required by law;

- **Electrical and Mechanical Services Department (EMSD)**, the authority in charge of monitoring and regulating lift and escalator safety, to make sure that the owners and the contractors do their job properly and fulfill their statutory obligations, and penalise any wrongdoings;

- **And users, like you and I**, to use lifts and escalators responsibly and in accordance with all safety guidelines.

But you may wonder, **shouldn't it be the responsibility of lift and escalator owners, and the EMSD, to make sure that lifts and escalators are properly maintained and safe for use?** After all, non-professionals like us know little about the mechanical functioning of lifts and escalators to keep it working properly.

That's true, but only partially. Owners of lifts and escalators are required by law [**Lifts and Escalators Ordinance (Cap 618)**] to arrange qualified parties to conduct periodic maintenance and examination of their lifts and escalators to maintain operation and safety, or they may face prosecution.

Maintenance and Examination

- Inspecting, cleaning, oiling, and adjusting
- Periodic examination
- Periodic testing of safety equipment
- Full load safety test, overload device and brake tests

Escalator

Monthly

Half-yearly

Yearly

/

Lift

Monthly

Yearly

Yearly

5-yearly

But lift and escalator incidents are often resulted from passenger misbehaviour. For example, for lifts, it may be fingers getting trapped or hit by operating lift doors because the person stands too close to it; or people getting hurt when they rush into lifts and the doors close on them.

For escalators, it may be sandals, and toes, getting caught in the escalator because the person stands too close to the edge; people losing balance on escalators, falling over and injuring themselves when they hit the

steps; or foreign objects dropping into the escalator truss, jamming the escalator and stopping it. These are just some of the common user-induced incidents we hear about in the news.

It is therefore equally important that all stakeholders fulfill their responsibilities and help maintain a safe and smooth operation of lifts and escalators. Especially for users, because sometimes, even with the best mechanical precautions, a simple misuse can lead to grave consequences.

How to maintain lifts and escalators safety?

To ensure safe and normal operation of lifts and escalators, the condition of lifts and escalators and the associated equipment should be effective.

For instance, the safety edges and the light sensors of lift doors shall operate effectively. The floor indicators and/or operating buttons inside the car and on various floors shall operate normally. Their front panels are not loosed or damaged and no live parts are exposed. When the lift reaches a particular landing floor, the level difference between the car floor and any landing is not greater than the normal one. Emergency devices, including the alarm, intercom, and closed-circuit television system, shall operate normally.



General guidelines on safe use of lifts:

- Do not overload lifts.
- Do not interfere with lift doors and equipment.
- Do not play or jump inside lifts.
- Stay clear of lift doors, especially when they are opening or closing.
- Do not use the lift in case of fire.
- Children must be accompanied by adults when using lifts.
- When trapped inside a lift, keep calm and seek help by using the alarm bell and intercom. Wait for rescue and do not try to open the lift door by yourself.

General guidelines on safe use of escalators:

- Do not overload the escalator.
- Do not interfere with the escalator equipment.
- Hold the handrail and do not walk on the escalator to avoid accidents.
- Do not play or run on the escalator.
- Do not lean over the handrail.
- Keep your feet away from the skirting or yellow stripes.
- Keep trolleys, baby strollers or wheelchairs off the escalator.
- Do not play with the emergency stop button which is to be used only when under emergency situation.
- Children must be accompanied by adults when using the escalator.

As we have seen, lifts and escalators have already become inseparable from our daily life. They're also a critical facilitator of city development, allowing us to build taller buildings and travel between distances with ease and comfort. It is therefore the duty of all stakeholders - owners, trade practitioners, regulatory authorities, and users - to maintain the smooth and safe operation of these remarkable facilities, so that they can continue to contribute to our society, and to our quality of life.

What else?

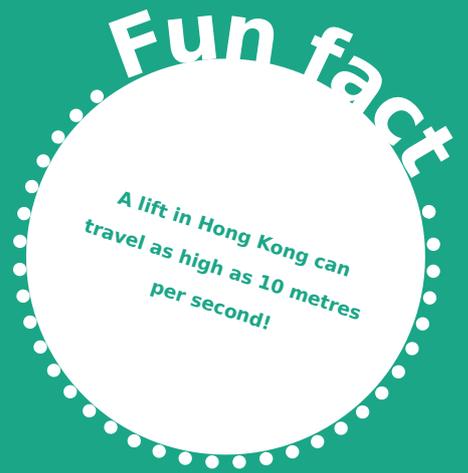
Although we've focused mainly on passenger lifts and escalators, there is actually a range of lifts and escalators in Hong Kong. For example, there are also dumbwaiters, mechanised vehicle parking systems, and stairlifts used by people with disability. Even with lifts there are also electric lifts and hydraulic lifts. The safety of all these installations is also regulated by the EMSD.

Lifts and escalators safety and EMSD

As empowered under the Lifts and Escalators Ordinance (Cap 618), the EMSD is the regulatory authority for the lift and escalator safety in Hong Kong.

This is achieved through the regulation of design and formulation of the codes of practice, and the registration of qualified lift and escalator contractors and engineers in Hong Kong, who carry out maintenance and periodic examination and testing of lifts and escalators.

In addition, the EMSD promotes public safety through educating the public on the safe use and operation of lifts and escalators.



Which of the following is the safe way to use an escalator?

- A. Walk or run on the escalator.
- B. Lean beyond the escalator.
- C. Keep clear of the step edge and do not brush your shoes with the brush bristles.
- D. Stand near or touch the step edge.

Which of the following is the right thing to do when trapped in a lift?

- A. Escape from the lift car by forcing open the lift car doors.
- B. Do not panic. Stay calm. Press the alarm button to seek help and wait in the lift car for rescue.
- C. Escape from the lift car by forcing open the emergency trap door on the ceiling of the lift car.
- D. Do not follow instructions. Do not wait in the lift car for rescue.

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Further Reading

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TV Announcements

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Lift Safety - Trapped in Lift
www.isd.gov.hk/eng/tvapi/09_eg60.html

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 [Chinese version only]
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Lift Modernisation
www.isd.gov.hk/eng/tvapi/14_eg79.html

A photograph of a railway station platform and tracks. The platform has a white corrugated metal roof and a yellow safety line. The tracks are made of steel rails on gravel ballast. In the background, there are trees and a building. A large white circle is overlaid on the right side of the image, and a smaller brown circle is overlaid on the left side.

Railway

Background



Did you know?

Mass Transit Railway Ordinance

Railway safety

SO CRE





tech

Oh no!



**The MTR is out?!
My worst nightmare!!**

The traffic is terrible at this time of the day, and the bad weather!

I'm going to be stuck in a traffic jam for
and I'm going to miss the exam th

My whole day will be r

Living in a cosmopolitan city like Hong Kong, every minute of our time is planned according to schedule in order to fit into our daily routines.

With the railway system, we can manage our time better because no matter how bad the weather or how serious the traffic jam is, there is still the railway, arguably the most reliable, efficient, and comfortable means of transportation. Hong Kong's road networks are extensive, but often congested. The only way we can safely estimate the travelling time we need to go from one place to another is by taking the railway.

For the public to enjoy a well-maintained railway service isn't merely the work of one party, the railway service providers, but the collective work of all stakeholders. To maintain the railway system's good condition, the government must formulate appropriate regulations and the relevant government departments must monitor the railway service providers as stipulated by the law. The railway service providers should regularly inspect and repair the railway system, to ensure railway safety and the stability of service.

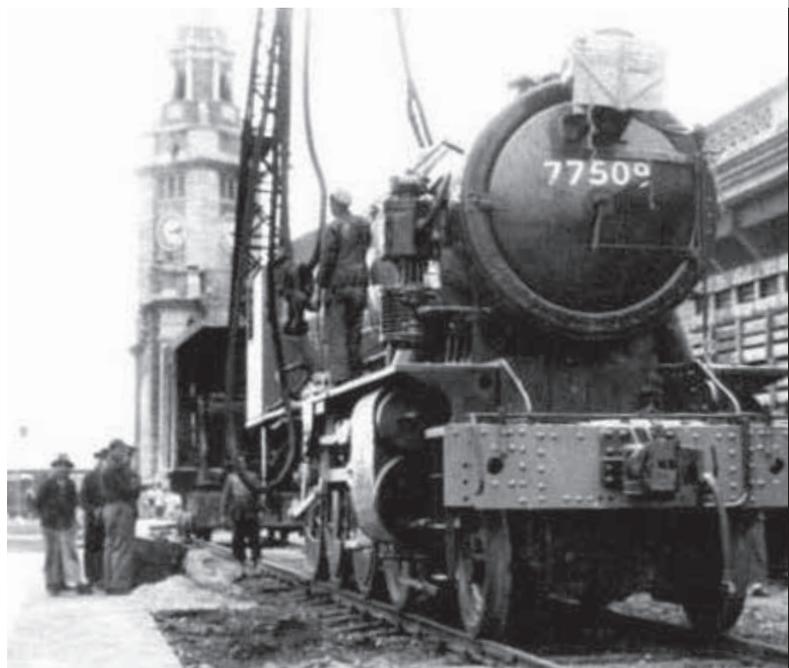
And for passengers like you and I, do we have obligations too to contribute to railway safety? Before you give your answer, **do bear in mind that there are frequent railway accidents caused by passengers' misconduct.** Slight ones such as jamming the train compartment doors and serious ones such as falling onto the railway tracks which all the same cause traffic delays and even casualties. **Therefore, for everyone to enjoy a pleasant trip also means for everyone to be a responsible passenger.**

hours,
is morning!

ruined...

Did you know?

Hong Kong's railway service has begun a little over a hundred years ago, in 1910, when the Kowloon-Canton Railway (KCR) offered single-track train service from Tsim Sha Tsui to Lo Wu, connecting Hong Kong to Mainland China.



Then in the 1960s, to address the traffic problems caused by rapid city development and population increase, the government decided to build rail lines to offer mass transportation for the city. Hong Kong therefore saw its first city railway service in 1979, in what became the Tsuen Wan line and Kwun Tong line today.

Hong Kong's railway network has been expanding ever since, addressing new demands from the four corners of the city. In 1988, the Light Rail Transit (LRT) was developed to serve the new towns of Tuen Mun and Yuen Long, later also Tin Shui Wai. The Tung Chung line and Airport Express in 1998. The West Rail line came into service in 2003, serving northwestern New Territories. The Ma On Shan line was added in 2004, and the Disneyland Resort Line in 2005. The West Island line commenced operation in 2014. More lines are in the pipeline. Soon we'll be able to ride trains to most of Hong Kong.

As you probably remember, in order to provide passengers with more seamless and efficient railway services, the daily operations of the rail networks of MTR and KCR Corporation were merged on December 2, 2007. The two corporations remain separate entities. MTR was granted a Service Concession to operate KCR Corporation's railway assets for 50 years (which may be extended) in exchange for annual payments being made to the KCR Corporation.



Why is railway safety important? And how is safety ensured?

The MTR currently operates 10 heavy rail lines (i.e. Kwun Tong, Tsuen Wan, Island, Tung Chung, Tseung Kwan O, East Rail, West Rail, Ma On Shan and Disneyland Resort lines and the Airport Express) and 12 light rail routes, and the average weekday patronage exceeds 5.4 million. The entire railway system comprises 87 railway stations and 68 light rail stops with total route length of about 221 km.

A simple calculation will reveal that the MTR is moving half of Hong Kong every weekday!

Railway can be a steadfast mode of transportation only as long as all stakeholders, including us, its passengers, make it safe and reliable. Because, as you can imagine, transporting such high volume of passengers efficiently and safely will take more than just operating trains efficiently and safely. Station facilities, contingency planning, train and facility maintenance, and passengers doing our part are just some components of a larger system.

Unfortunately, incidents or disruption to services are often the result of passengers' misconduct. For instance, incidents of passengers charging or blocking train doors or platform screen doors as they are closing happen almost daily. Have you ever seen someone

trying to force his/her way onto an over-crowded train compartment, or blocking a closing door with his/her handbag, rucksack or even his/her body, in hopes of not missing the train? Or perhaps you have tried it yourself?

If your answer is yes, you may perhaps luckily catch the train, but you may just as easily have got hurt. Your move may have blocked the doors from closing, but it will lead to train service disruption or even suspension. In the end, everybody is late because of the train's service disruption.

Indeed, train door and platform gap incidents are the top two passenger-induced accidents directly related to train operation. We all know how crowded a train station can be at peak hours, that's why the railway service providers has been engaging staff during peak hours across most station platforms to help passengers with boarding, alighting and to maintain general order. As a responsible passenger, you can always do your part too.

We should regard railway safety as our responsibility. Even if the service provider keeps the trains, the tracks, and trackside in good condition, by conducting track and trackside maintenance every night, the inappropriate behaviors of passengers might still cause severe incidents.

Here's a primer on railway safety, read through it, and see if you've been keeping our railways safe?

General requirements

- Smoking is not allowed
- Read notices, listen to announcements and always follow instructions
- Take extra care of children and the elderly
- Take extra care if it is raining, as the floor may be wet
- Never play, jostle, run or push anywhere in the MTR
- Contact MTR staff if you need help or assistance and inform staff immediately in the event of an accident
- Use safety and emergency facilities in the correct manner
- Never enter an MTR Restricted Area

Don't bring these items into MTR Stations:

- Bulky objects or goods exceeding the requirements
- Dangerous or flammable goods, e.g. paints, thinners, pressurized gas cylinders
- Metallic balloons
- Trolleys loaded with goods
- Animals, birds, or livestock (except guide dogs)

Entry/Exit Gates

- Before passing through an entry/exit gate, validate an Octopus card or insert a ticket to ensure that the arrow sign is illuminated and the "please enter" or "please exit" message is displayed
- Before passing through a wide gate, wait behind the yellow line until the gate area is clear; validate an Octopus card or insert a ticket and ensure that the arrow sign is illuminated and the "please enter" or "please exit" message is displayed
- Do not run through the gate
- Always look after young children
- Always give priority to passengers in need



On the platform

- Keep passageways, tactile guide path, staircases and escalators clear of obstructions
- Wait in line and only in areas indicated by arrows or queuing lines
- Do not wait or place belongings in areas marked to be kept clear
- Let passengers exit train cars before boarding
- Be aware of the gap between the platform and the train
- Do not rush in or force your way out of a train when the warning chimes sound or the doors are closing
- Do not let your body, handbag, rucksack or other personal belongings block the closing train doors/platform screen doors
- Never go beyond the barriers at the ends of platforms
- If help or assistance is required, use the Help Line to speak to MTR staff*
- In an emergency, use the Emergency Train Stop button to stop the train*

(* Not available for Light Rail)

Platforms without platform screen doors or automatic platform gates

- Stand behind the yellow line and form a queue
- Ensure all belongings are also behind the yellow line
- Take extra care if it is raining, as the floor may be wet

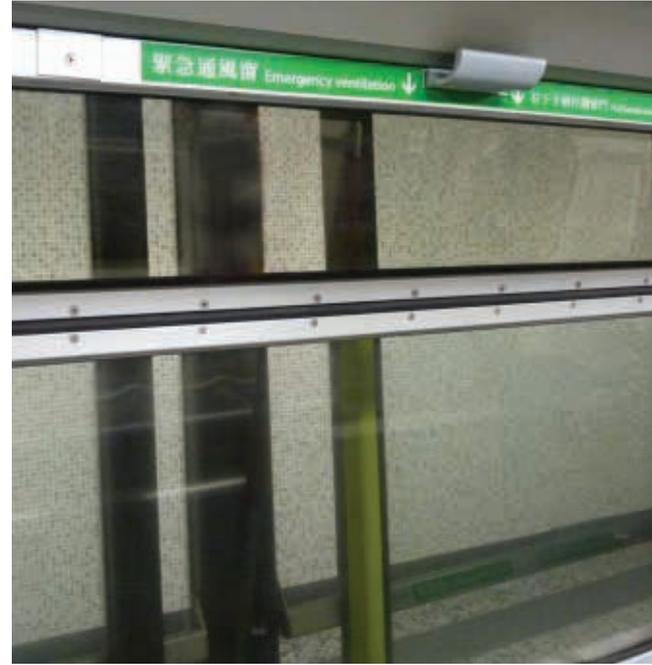
Platforms with platform screen doors

- Stand back and form a queue
- Do not lean against the platform screen doors
- Do not place your hand on any part of the platform screen doors

Platforms with automatic platform gates

- Stand behind the yellow line and form a queue
- Do not lean on the automatic platform gates
- Do not let any part of your/your child's body protrude beyond the gates
- Never sit children or place bags, or anything else on top of the gates





On the train

- Stand clear of the doors; keep hands and fingers clear of the gap between the train and the doors
- Do not let your body, handbag, rucksack or other personal belongings block the closing doors
- Move into the centre of the train compartment
- Do not lean against the grab poles
- Offer your seat to anyone in need
- Do not sit on the train floor
- Place baggage in designated areas; do not leave it where it might cause an obstruction
- Pay attention to on-board announcements and visual messages
- Only operate the Emergency Call handle/Call button in an emergency. If you feel unwell, ask station staff for assistance at the next station



Evacuation from the train

- Remain calm
- Pay attention to train announcements and visual messages
- Evacuation from the train will normally be carried out at the nearest station
- Only under exceptional circumstances will an evacuation take place between stations
- Follow the instructions and directions from MTR staff or emergency services personnel

Passengers with disabilities and those who require assistance

- Seek assistance from other passengers
- If safe to do so, wait for MTR staff or emergency services personnel

Fire

- Inform MTR staff immediately if you see smoke/fire or smell burning
- Offer assistance to anyone in need or persons with disabilities move to a safe location

Fire on a train

- Report the fire to the train captain by using the Emergency Call handle/Call button and speaking into the microphone

- If safe to do so, use the fire extinguisher placed on the train

- Do not open the ventilation windows unless instructed to do so

- In the event of a train evacuation, follow the instructions given by MTR staff

Fire in the station

- Report the fire to MTR staff or operate the fire alarm call point (break glass)
- Follow the instructions given by MTR staff or emergency services personnel to evacuate the station
- Do not use the lift



Fun fact

The total construction cost of the first MTR system was 6 billion Hong Kong dollars.

The continuous success in running a safe railway system requires not only a comprehensive and exhaustive set of safety standards, but also the support and co-operation of all stakeholders, including us, the passengers. As long as we do our part, we can make every journey on the railway a safe and enjoyable one.

Railway safety and EMSD

Empowered by the **Mass Transit Railway Ordinance**, **Mass Transit Railway Regulations** and the **Airport Authority (Automated People Mover) (Safety) Regulation**, the EMSD is the regulatory body of the railway lines operated by the MTR Corporation Limited and the automated people mover operated by the Airport Authority in the terminal buildings of the Hong Kong International Airport. The role of the EMSD is to oversee the safe operation of all the above railways. The main functions of the EMSD can be categorised into the following main areas:

- Investigating into safety-related railway incidents;
- Ensuring the adoption of appropriate safety practices by the railway operators;
- Assessing and approving new railway projects and modifications to the existing major railway facilities; and
- Following up the railway operators' improvement measures.

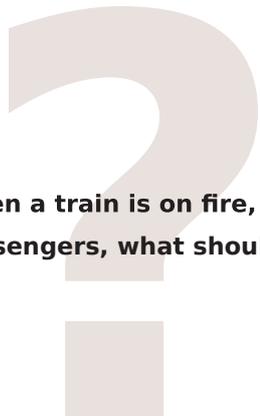
Relevant Ordinance/Regulations:

- Mass Transit Railway Ordinance (Cap 556)
- Mass Transit Railway Regulations (Cap 556A)
- Airport Authority (Automated People Mover) (Safety) Regulation (Cap 483C)

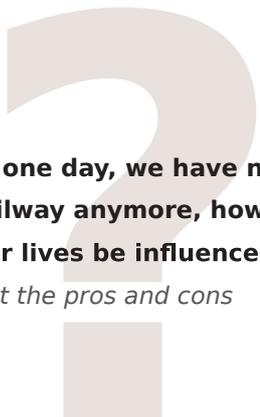
Fun fact.....

The traffic speed of Tung Chung Line and Airport Express can be up to 135km/h which is faster than the cheetah, the fastest land animal in the world.





When a train is on fire, as passengers, what should we do?



If, one day, we have no railway anymore, how will our lives be influenced?

List the pros and cons

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EMSD: Railway Safety

www.emsd.gov.hk/en/railway_safety/index.html

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www.railways.emsd.gov.hk/game.html

Frequently Asked Questions About Railway Safety

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MTR Train Services and Facilities

www.mtr.com.hk/en/customer/services/index.php



Amusement Rides

Background



Did you know?

**Amusement Rides
(Safety) Ordinance**

**Amusement rides
safety**





?

?

?

?



Oh no!



Out of service!

**We came all the way out here,
what do we do now?**

A holiday



Amusement rides have become the integral part of theme parks nowadays.

Would you like going to a theme park without roller coasters, Ferris wheels, merry-go-rounds, or any fun and exciting rides like the coffee cups, the Galleon ride, or the Turbo Drop? Probably not.

Amusement rides are perhaps the most common power driven equipment that we come across in our leisure time. It may be a personal experience for some - particularly those who ride the rides; while an “atmospheric” experience for the others - seeing and hearing the rides and the laughter of others, sharing the pleasure.

We can derive so much fun and amusement from the rides, including kiddie rides, because we know they’re safe. Those rides may panic us sometimes, but mostly we’re frightened about how we would handle the experience, rarely about whether the rides are safe to be on.

We can afford such luxury because all stakeholders do their jobs properly.

How exactly? Let’s find out.

ruined!

Did you know?

Most amusement rides are designed to deliver a full sensory experience, playing with our visual, auditory, and bodily senses. Climbing on a horse figure in a merry-go-round, seeing the beautiful, fairyland decorations around while enjoying the “gallop” and the scenery. Or speeding along on roller coasters, shooting through tight spaces and seeing how high up we’re from the grounds, before dropping in free-fall. All these are meticulously designed to maximise our amusement and excitement.

The majority of amusement rides involve motors and gears turning various mechanical components to produce concerted motions: rotating a platform with horse figures moving up and down; swinging a galleon from side to side and to increasing heights, or raising and lowering a block of “superman”, us on it, with music playing.



All rides play with physics. As you might have tried it yourself, the Turbo Drop raises a cradle of seats to the top of a tower and then releases it, letting gravity take over, before other mechanisms kick in and cushion the descend (such as magnetic braking). Or roller coasters, first pulled up to a high altitude, then letting the cars off a (steep) slope, followed by swirls, loops, and ups and downs, until the roller coaster reaches the station again*.

Because everything needs to work like clockwork for a large number of users, maintaining safety at all times is of paramount importance.

** Most roller coasters do so by accumulating potential energy by the rise in height, achieved by the power driven lift, and converting between potential energy and kinetic energy, over and over throughout the course of the ride. The whole journey is meticulously designed to keep the roller coasters moving till the end. Find out more about this “magic” yourself!*



Why is amusement rides safety important? And how is safety ensured?

Millions of citizens and tourists visit amusement parks and family amusement centres every year. If it wasn't for the effective regulation and close inspection of amusement rides, with the cooperation of the users, the potential damage, and casualty, that could result from amusement ride accidents could be catastrophic.

Most of the inspection and safety work start to take place long before the rides are open to the public. The requirements and standards set forth by the Ordinance and its subsidiary regulations are essentially high and comprehensive, that the design, the construction, the operation and maintenance, the contingency plans, and the personnel involved are all prepared ahead of time.

Amusement rides are regulated by the **Amusement Rides (Safety) Ordinance (Cap 449)**, with the Electrical and Mechanical Services Department (EMSD) being the regulating authority. All amusement rides in Hong Kong have to go through the close scrutiny of the EMSD and meet all the standards set forth by the Ordinance and its subsidiary regulations before they can be granted the permits to install and operate.

This procedure involves mainly two stages:

Before the ride owner is allowed to install the ride on site, he/she is required to demonstrate that the engineering design is sound and that it is capable of addressing the possible safety-related issues during ride operation.

A design document, containing details of the mechanical, electrical, and structural design, safety specification, and operating instructions, must be submitted to the Director of Electrical and Mechanical Services for approval. These details include the location map of the proposed amusement ride, design calculations and drawings, principle of operations, means of braking and stopping, passenger restraints and other safety equipment, fire safety, evacuation route and methods, programme of installation, and even the outline of the warning notice have to be submitted. Only when the design is approved by the EMSD can the installation of the ride commence.

After the ride installation has been completed, but before opening for public use, the ride owner will have to obtain the permit to use and operate from the EMSD.

For this the ride owner will have to:

1. **Provide Operational, Maintenance, and Emergency Manuals**, with details covering all the daily operation and maintenance issues to be carried out by the crew, as well as procedures for handling emergency situations.
2. **Arrange Ride Examination by an independent Surveyor**, to ensure that all construction/installation procedures are in conformance with the approved design and/or manufacturer's recommendations.
3. **Arrange Ride Inspection by the EMSD**, whose inspectors may carry out surveillance visits to the site from time to time during the ride's construction, and a final inspection with the EMSD officers on the completed ride.
4. **Assign a "Competent Person"**, who possesses the appropriate technical background and relevant experience of the ride. During the operational phase, the "competent person" will be the key person responsible for the management, including maintenance and operation, of the ride. He/she will need to be assessed on his/her competence.
5. **Perform a Rescue Drill** by the operational crew to demonstrate, in the presence of the EMSD inspectors, the adequacy of the rescue arrangement. For high-rise or special mechanical rides, where the Fire Services Department (FSD) may be called on to assist in emergency situations, a rescue drill in collaboration with the FSD must also be arranged.

It is only with all the above in place, and the permit to use and operate granted, can the ride be opened for public use. After that, annual in-service examination by an independent surveyor will have to be conducted too.

When the ride starts operating, the EMSD inspectors will regularly conduct surveillance inspections on the ride to check if it operates safely. **That's why we rarely read about accidents on amusement rides, thanks to such detailed planning and stringent requirements!**



While the owners and the authorities painstakingly do their job, we users should follow the guidelines below too, if we are to enjoy the amusement rides:

Eat and drink appropriately throughout your stay at the park or carnival

Read and obey the posted rules

Be in good health and sober

Do what your strength allows

Pay attention to dressing and belongs

Be vigilant on the ride conditions

Stay in "locked and loaded" position for the entire ride cycle

Remain seated and do not reach out

Stop riding before you get excessively tired

Take frequent breaks if you are riding high speed and demanding mechanical rides

Not to damage the ride

Report Hazards

Amusement rides are fun. We've all tried it. They're a part of the experience we long for and expect from amusement parks. But they're only fun because ride owners, regulators, and us users all fulfill our respective duties and responsibilities to keep amusement rides safe, so that we can truly enjoy ourselves while riding them.

What else?

In addition to “power driven devices designed to be driven or ridden by members of the public primarily for amusement purposes”, such as those mentioned above, “kiddie rides” also fall under the regulation of the Ordinance and the EMSD. “Kiddie rides” are amusement rides for use by children at the age of 12 or below, and having a motive power of not more than 1.1 kW and a total carrying capacity not exceeding 100 kg. These are the ones that we often see in shopping malls and outside restaurants. The ride owners have to obtain permits from the EMSD for these kiddie rides as well before they can be used by the members of the public.

Amusement rides safety and EMSD

The operation of any power driven devices, which could render any form of movement to its patrons who are members of the general public, and who are riding on it for amusement purposes, are regulated by the EMSD under the Amusement Rides (Safety) Ordinance (Cap 449).

The EMSD enforces the Ordinance and ensures public safety through close scrutiny of the amusement rides' design and installation, a well established licensing mechanism, and continuous monitoring of the operation and maintenance of these rides.

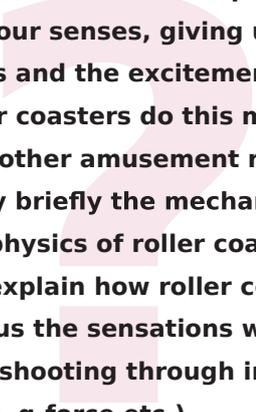
Fun fact

There are over 80 amusement rides and 470 kiddie rides in operation in Hong Kong as at the end of 2015.





What is your favourite amusement ride? What safety features on that ride can you think of?



Amusement rides like play with our senses, giving us the thrills and the excitement. Roller coasters do this more so than other amusement rides. Study briefly the mechanics and physics of roller coasters, and explain how roller coasters give us the sensations we feel. (e.g. shooting through inverted loops, g-force etc.)

References

EMSD: Protecting Public Safety - Amusement Rides

www.emsd.gov.hk/en/other_regulatory_services/amusement_rides/index.html

EMSD's publications on Amusement Rides Safety

www.emsd.gov.hk/en/other_regulatory_services/amusement_rides/publications/index.html

Amusement Rides (Safety) Ordinance (Cap 449)

www.legislation.gov.hk/blis_ind.nsf/WebView?OpenAgent&vwpg=CurAllEngDoc*446*100*449#449

Further Reading

How Roller Coasters Work

science.howstuffworks.com/engineering/structural/roller-coaster.htm

Amusement Park Physics

www.learner.org/interactives/parkphysics/

An aerial photograph of a coastal city, likely Dubai, featuring a cable car system. The image shows a large body of water in the foreground, with several cable cars suspended from a cable. In the middle ground, there are modern buildings, including a prominent skyscraper, and a cluster of white cylindrical structures. The background consists of a range of mountains under a blue sky with scattered white clouds. A large white circle is overlaid on the right side of the image, containing the title text. A smaller green circle is overlaid on the bottom left, containing the word 'Background'.

Aerial Ropeways

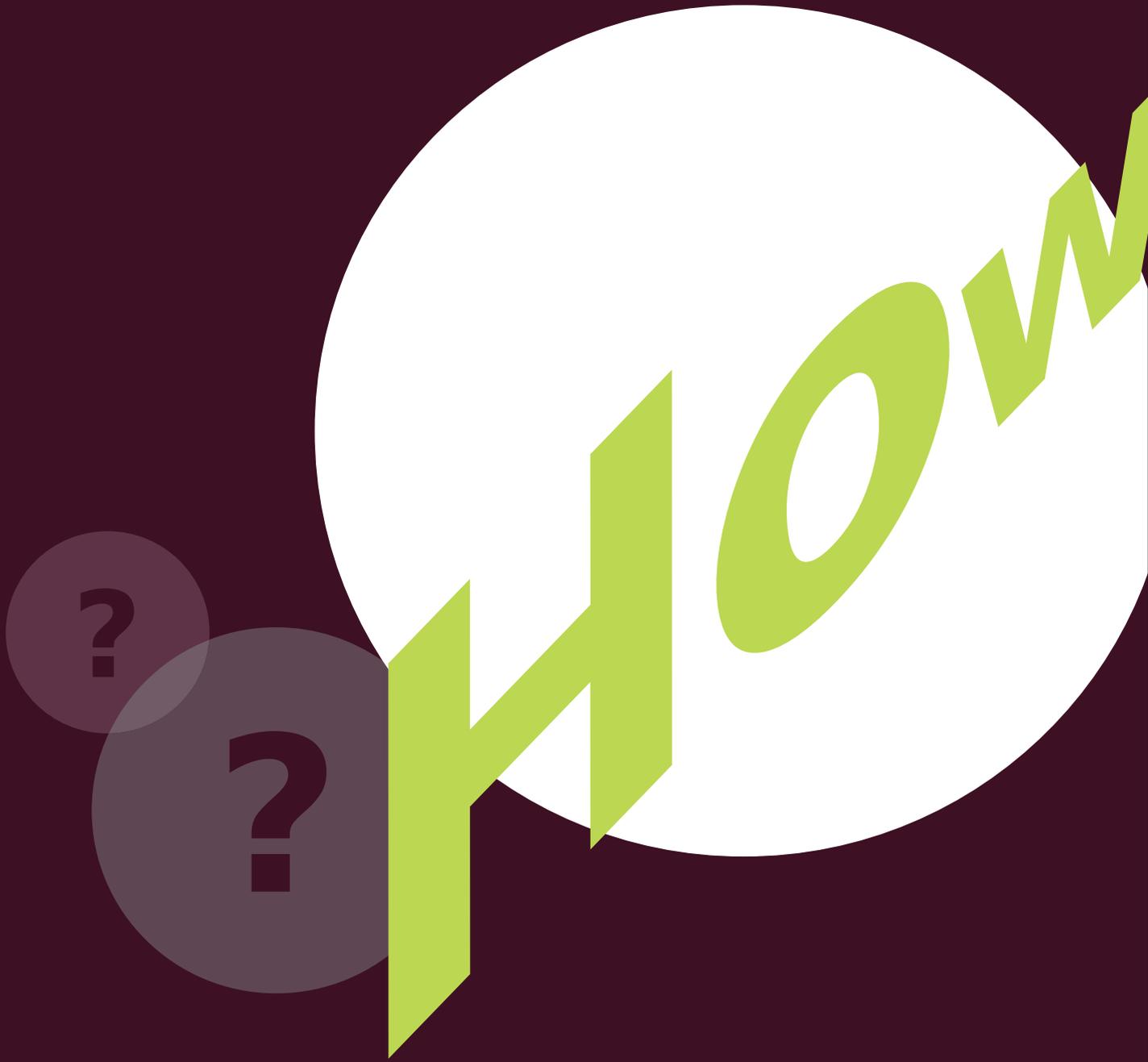
Background

A scenic view of a coastal city with modern high-rise buildings and a bay. In the foreground, a cable car cabin is suspended from a cable, carrying several passengers who are waving. The sky is blue with scattered white clouds. Three large, overlapping green circles are overlaid on the image, containing text.

Did you know?

**Aerial Ropeways
(Safety) Ordinance**

**Aerial ropeways
safety**





Oh no!

It's closed today!?

Such beautiful weather!

**I don't want to ride a car,
nor underground,
to get to the**



Have you ridden on a cable car before? Did you ride it at the Ocean Park, or on the Ngong Ping 360 (NP360)?

How did you like it? It was wonderful, wasn't it? A bit frightening maybe, but enjoyable nonetheless, especially if you rode it on a sunny day and saw the panoramic scenery from way up high.

In fact, the two cable car installations, or aerial ropeways, in Hong Kong are part of our touristic crown jewel, and rightly so. Taking such magnificent rides inside the cabins give us a totally different perspective and experience of Hong Kong like no other.

As with the other installations described earlier, for the cable cars at Ocean Park and NP360 to deliver these fascinating and enjoyable experiences to the Hong Kong citizens and to our guests, all stakeholders must perform their duties properly, to ensure the safe cable car operations.

Did you know?

Look at the photos above, what difference do you notice about the Ocean Park cable cars and the NP360, other than the cabin design?

It's the roping system of the cable cars.

Most aerial ropeways can be broadly categorised into either one of the two basic groups: **mono-cable ropeways** and **multi-cable ropeways**.

Mono-cable ropeways, like the one installed at Ocean Park, consist of a single steel wire rope arranged either in the form of a continuous loop which the cabins are attached to, or in the form of an open loop providing a to-and-fro cabin motion.

Multi-cable ropeways, on the other hand, make use of more than one steel wire ropes to support and pull (or haul) the cabins along. The NP360 at Tung Chung,



which is the “bi-cable” type cable car system, belongs to this group.

We could understand the term “multi-cable ropeways” better by using the NP360 as an example. Each cabin of NP360 relies on two wire ropes during operation. The rope situated on the top is called the “track rope”, which is a stationary rope that carries the weight of the cabins and provides a smooth track for the wheels of each cabin to move upon, like the train rails. The rope beneath and parallel to the track rope is the “hauling rope”, which is kept moving by a drive system, and it hauls the cabins along the track rope by means of a detachable grip.

The cable car installation at Ocean Park, being a mono-cable system, has only one wire rope, called the “carrying-hauling rope”. As the name suggests, the rope performs both functions of the track rope and hauling rope, and it is powered by a drive system.

The designs and constructions of these two cable car systems are different, so as to satisfy their specific operational requirements and considerations. These include aerial routes and side elevation, passenger-carrying capacities, ride safety and comfort, adverse weather conditions, structural and geotechnical constraints, and environmental conservation.



Why is aerial ropeways safety important? And how is safety ensured?

Because aerial ropeways operate mostly in the outdoor environment and often travel to remote places. To ensure the safety of aerial ropeways, the design, manufacture, construction, operation and maintenance of all the equipment and components installed at the cable cars, machine rooms, stations and towers have to be monitored and examined properly.

Different degrees of precautionary measures, such as reduced speed operation, stoppage of passenger boarding and suspension of cable car operation, are also adopted by the cable car personnel in the event of any adverse weather conditions like strong winds, heavy rainfall, and lightning during the operation.

In Hong Kong, aerial ropeways, including the cable cars at Ocean Park and NP360, are closely monitored by the Electrical and Mechanical Services Department (EMSD), the regulating authority, through the enforcement and administration of the **Aerial Ropeways (Safety) Ordinance (Cap 211)**.

Similar to amusement rides, the EMSD performs the assessment and approval of design submission for any new cable car installation. Operation of a new ropeway can only be commenced after approval by the Director of EMSD has been sought.





The operation, maintenance, and examination of cable cars are carried out by various qualified personnel employed by the cable car company. Approval of these qualified persons, including the surveyors, competent persons, controllers, and operators, are also performed by the EMSD.

To ensure a safe and reliable operation, every aerial ropeway installation is required, under the ordinance, to undergo periodic examinations conducted by competent persons or surveyors during its service. These include the quarterly examinations of ropes, cabins, drive system and safety devices (by competent persons), as well as the annual examination of the whole cable car system (by the surveyors). In addition, the EMSD will carry out surveillance and random inspections to ensure that the cable car systems in Hong Kong are operated and maintained in accordance with the established safety standards.

Needless to say, the co-operation of passengers also plays a vital role to the safety of cable car rides. Next time when you have a chance to ride the ropeways at the Ocean Park and NP360, do pay attention to the safety notices and messages posted at the terminals and cabins. Make sure you follow them, and enjoy the ride.

Some of the prohibited goods and behaviours as stipulated under the Aerial Ropeways (Safety) Ordinance are:

- No smoking in the cabins and the terminals of aerial ropeways.
- Livestock or pets are not allowed to be carried on the ropeways.
- Bringing any dangerous goods or objects on the ropeways which would likely cause inconvenience or annoyance to the passengers is forbidden.
- Do not act improperly to hamper the safety of ropeways (e.g. leaning out of the cabin windows, trying to open the cabin door when it is in motion, vandalise the cabins and cable car facilities).
- Consult the cable car operators or staff if you have any doubt on taking the ride due to the influence of alcohol or drugs, or being suffered from a contagious disease.

Aerial ropeways are enjoyable to ride on. They give us a unique perspective of our city and a memorable experience. They're also major tourist attractions in Hong Kong. But in order for us to be able to continue to enjoy it, all stakeholders must do their jobs in ensuring its safe operation.



Fun facts

Basic background information for cable cars at Ocean Park

Cable Car Operator:
Ocean Park Corporation

Type of cable car system:
2 sets of monocable type continuous circulating system

No. of cabins on line:
115 cabins, 2 cabins for persons with disability, and 1 working cabin on each line

Terminals (for passenger boarding):
Lower Terminal (also known as "The Waterfront Terminal") and Upper Terminal (also known as "The Summit Terminal")

Route length:
Approx. 1.4 km (horizontal)

Max. operating speed:
3.2 m/s (approx. 11.5 km/hr)

Traveling time per direction:
About 8 minutes (at 3.2m/s)

No. of passengers per cabin:
6 passengers (6 seats without standing places)

Max. load per passenger cabin:
450 kg

Theoretical passenger carrying capacity:
2,500 passengers per hour per direction per line.

Commissioning Date:
February 1976

Aerial ropeways safety and EMSD

The design, manufacture, installation, operation and maintenance of the cable cars at Ocean Park and NP360 are regulated by the Aerial Ropeways (Safety) Ordinance (Cap 211). Under the Ordinance, the EMSD carries out regular inspections of the systems to ensure that they are operated and maintained in accordance with established safety standards.



Fun facts

Basic background information for cable cars at NP360

Cable Car Operator:
Ngong Ping 360 Ltd.

Type of cable car system:
Bi-cable type continuous circulating system

No. of cabins:
Total 114 cabins, 2 work cars (max. 109 cabins to be put on line at the same time with others as standby)

Terminals (for passenger boarding):
Tung Chung Terminal and Ngong Ping Terminal

Route length:
Approx. 5.8 km

Max. operating speed:
5 m/s (approx. 18 km/hr)

Traveling time per direction:
About 28 minutes (at 5m/s)

No. of passengers per standard cabin:
17 passengers
(10 seats and 7 standing places)

No of passengers per crystal cabin:
10 passengers

Max. load per passenger cabin:
1,275 kg (standard cabin); 750 kg (crystal cabin)

Passenger carrying capacity:
2,500 passengers per hour per direction
(at 5 m/s, 109 cabins)

Date of official opening:
18 September 2006

What are the maximum cable car operating speed, route length (or riding time) and elevation for the aerial ropeways in Hong Kong? How do these figures of NP360 compare to other overseas cable cars systems?

Compare the advantages and disadvantages of mono-cable aerial ropeways (e.g. the Ocean Park cable car) and multi-cable aerial ropeways (e.g. the NP360). Which system will you choose to achieve different situations such as (i) higher passenger carrying capacity and more stable ride, (ii) operation under very windy condition, and (iii) lower capital and maintenance cost?

References

EMSD: Protecting Public Safety - Aerial Ropeways

www.emsd.gov.hk/en/other_regulatory_services/aerial_ropeways/index.html

Code of Practice for the Design, Manufacture and Installation of Aerial Ropeways

[www.emsd.gov.hk/filemanager/en/content_623/ar_cop\(2002_edition\)\(first_revision\)E.pdf](http://www.emsd.gov.hk/filemanager/en/content_623/ar_cop(2002_edition)(first_revision)E.pdf)

EMSD's publications on Aerial Ropeways Safety

www.emsd.gov.hk/en/other_regulatory_services/aerial_ropeways/publications/general/index.html

Aerial Ropeways (Safety) Ordinance (Cap 211)

www.legislation.gov.hk/blis_ind.nsf/WebView?OpenAgent&vwpg=CurAllEngDoc*210*100*211.1

Further Reading

An extensive article on the history, design, and construction of aerial ropeways around the world

www.lowtechmagazine.com/2011/01/aerial-ropeways-automatic-cargo-transport.html

The Information Center for Ropeway Studies

inside.mines.edu/LIB-Ropeway-About

Photos used in this education kit are courtesy of:

Hong Kong Disneyland Resort

MTR Corporation

Ngong Ping 360 Limited

Ocean Park Hong Kong



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