

***Code of Practice for Bungee Jumping
(Final Draft)***

This draft code of practice was prepared in July 2000 under the Amusement Rides (Safety) Ordinance for regulating the bungee jumping activities in Hong Kong. This code would be gazetted later subject to the decision of the Director of Electrical & Mechanical Services. For any enquiry regarding this code, please contact the General Legislation Sub-division of EMSD at 2808 3867.

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Draft

Code of Practice on Bungee Jumping

ELECTRICAL AND MECHANICAL SERVICES DEPARTMENT

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1. Introduction

This Code is issued under Section 49 of the Amusement Rides (Safety) Ordinance, Cap.449 (the Ordinance). This Code, unless the Director of Electrical and Mechanical Services (the Director) states otherwise, is applicable to all bungee jumping subject to the Ordinance.

2. Scope

2.1 General

This Code specifies the minimum safety requirements for setting up a bungee jumping operation in Hong Kong. It covers the site selection, design, testing and approval of equipment, the management of the operation, the operation procedures, maintenance works, the emergency provisions and procedures, qualification, training and registration of operating staff for a bungee jumping operation.

2.2 Allowable Bungee Jumping

The Code only covers bungee jumping from a fixed platform erected on a fixed permanent structure specially designed and built for the activity. Jumping from mobile platform or platform suspended from a crane, tandem jumping and catapult (reverse) jumping are, in principle, prohibited in Hong Kong SAR and will not be addressed in this Code. For any other special styles of jumping not falling within the abovementioned categories, consultation with the Director on the detailed requirement shall be sought.

3. Definition

In addition to those interpretations as stipulated in section 2 of the Ordinance, the following definitions will also be applied in this Code:

ACCIDENT

Any occurrence that results in injury or causes property damage.

AUTHORIZED PERSON

The Authorized Person as defined under the Buildings Ordinance.

BUNGEE CORD

The elasticated rope/cable that is attached, at one end, to a Jumper who is jumping from a height while the other end is attached to an anchoring point. A dynamic bouncing action is thus produced as the cord stretches and retracts alternately.

BUNGEE JUMPING

An activity in which a person jumps from a height and his descent is limited by a bungee cord attached to him.

CATAPULTING, LAUNCHING, NEGATIVE OR REVERSE JUMPING

The practice of stretching the bungee cord while the attached Jumper is being anchored. Upon releasing the anchor, the Jumper is propelled upward.

COMPETENT PERSON

The Jump Master or, where more than one Jump Masters are working on one jump site, one of the Jump Masters could be designated as the Competent Person, as defined in Amusement Rides (Safety) (Operation and Maintenance) Regulation, who shall have control over the whole operation.

DYNAMIC LOADING

The load sustained by the rigging and attachments due to the weight of the Jumper together with change of momentum associated with the bouncing movement.

G FORCE

The force exerted on a body, which is expressed in terms of a multiple of the gravitational force.

HARNESS

An assembly of straps and fittings which is worn by a Jumper and attached to a bungee cord.

HARNESS SYSTEM

The combination of harnesses that provides redundancy between the bungee cord and the Jumper.

HARNESSING AREA

The area distinguished from the jump point where the Jumper is prepared, harnessed and further briefed for jumping.

INCIDENT

An occurrence including injury or property damage.

JUMPING HEIGHT

The distance measured from the jump point to the bottom of the jump zone.

JUMP MASTER

A person responsible for the safety of all Jumpers from the time a Jumper enters the jump deck until the entire bungee jumping process is completed.

JUMP POINT

The designated location from which a Jumper jumps from the jump deck to commence the descent.

JUMP SITE

The area together with the associated facilities that have been approved by the Director for conducting the activity of bungee jumping.

JUMP SPACE

The jump zone plus a safety factor in all direction. That is "Jump Zone" plus "Safety Space".
(See Appendix B)

JUMP ZONE

The space bounded by the maximum designed movement of the Jumper. (See Appendix B)

JUMPER

The person who jumps from a height and is attached to a bungee cord.

KARABINER

A shaped metal device used to connect section of the jump rigging, equipment or safety gear.

LANDING AREA

The surface area of ground or water directly under the jump space.

LANDING PAD

The provisions of padding on the landing area on which the Jumper lands by means of the lowering devices or equipment.

MAXIMUM BUNGEE CORD LENGTH

The measurement of the theoretically designed maximum stretched length of a bungee cord system, dictated by the length of the safety line.

MAXIMUM DYNAMIC LOAD

The load required to stretch the bungee cord to the specified maximum extension.

OPERATION MANUAL

The document that contains the procedures and the necessary information for the daily operation of bungee jumping activity in a particular jump site.

OPERATION SYSTEM

The predetermined procedures of processing a Jumper through the jump methods used in a particular jump site. This includes registration, preparation, getting to the jump point, methods of attachment, the rigging and lowering system, the landing and recovery method.

STRETCHED LENGTH

The length of the bungee cord when it is stretched to its fullest designed length on the first bounce of the jumping.

RECOVERY AREA

An area beside the landing area where the Jumper may recover from the jump before returning to the public area.

RETRIEVAL AREA

The designated area where the Jumper is retrieved at the end of the jump.

RIGGING SYSTEM

The rigging system is a combination of components that connects the Jumper through the bungee cord to an attachment point on the structure or platform. The rigging system includes ropes, pulleys, karabiners, shackles and lowering equipment.

SAFETY FACTOR

Safety factor is the ratio of the ultimate breaking load of a component against the maximum allowable load that may be imposed on such component.

SAFE WORKING LOAD (SWL)

The maximum rated load, as determined by designer/manufacturer and certified by a qualified professional engineer, which can be safely handled under the specified conditions.

SAFETY LINE

A line used to connect a safety harness to an anchor point in order to safeguard the personnel from the potential risk of falling from height, especially when they are working or getting prepared for the jump at jump deck.

SAFETY SPACE

The additional space, as a safety margin, extending beyond the jump zone in all directions.

STATIC ROPE

Non-dynamic climbing rope of kernmantle construction.

SURVEYOR

A third party, who is appointed by the Owner, and is approved by the Director for carrying out the periodic examination of the bungee jumping under the Amusement Rides (Safety) (Operation & Maintenance) Regulation by the reason of his personal knowledge and relevant practical experience in this field.

TANDEM, TRIPLE OR DOUBLE JUMPING

The practice of two (2) or more Jumpers harnessed together to the bungee cord and jumping simultaneously from the same jump deck.

TESTING AUTHORITY

An organization acceptable to the Director for purpose of testing the performance of the bungee cords and other associated equipment.

THREAD

A single strand of material used in a bungee cord that is made of a varying number of threads.

UNLOADED LENGTH

The length of a bungee cord laid on a horizontal flat surface without load or stress being applied.

4. Procedures and Submissions

By virtue of section 6 and section 10 of the Ordinance, the Owner shall seek the Director's approval on the design before setting up any jump site in Hong Kong and thereafter obtain his permission for commencement of operation for jumping involving the members of public. The procedures and submissions required for compliance with the Ordinance, in the context of bungee jumping, are outlined in Appendix A of this Code.

5. Selection and Set Up of the Jump Site

5.1 *Fundamental Principles*

There are two general principles that shape the bungee code of safe practice. They are the principles of competence and redundancy, which shall be applicable within the context of equipment, procedures and personnel.

(a) Competence :

Only when a person has performed the bungee jumping procedures a certain number of times and demonstrates that he understands the importance and reasoning behind all these procedures, could such person be considered as competent.

(b) Redundancy :

Redundancy is applicable to equipment and procedures. The principle of redundancy shall be considered wherever there is a possibility of failure in a component that could cause an accident. All such components shall be backed up in parallel with a second similar component. If that primary unit fails, the second unit shall secure the Jumper safely. The principle of redundancy also applies to operating procedures by means of double checks. For instance, when a Jumper is hooked up ready to jump, a second operative reaffirms all the hook up procedures so as to ensure that there has been no overlooked connection or any fault in the procedures that might cause injury or death.

5.2 Basic Requirements

The following basic conditions shall be observed for all bungee jumping to be conducted in Hong Kong.

- (a) Bungee jumping shall be performed over water or over land. If jumping is performed over water with “water touching”, there shall be safety precaution to prevent injury to the Jumper arising from “dipping” in water, such as ingress of water into the nose of the Jumper. If jumping is performed over land, there requires an air bag of approved design under every Jumper.
- (b) There shall not be tandem or catapult (reverse) jumping.
- (c) The design and construction of the jump platform and tower structure shall comply with clause 5.4 of this Code.
- (d) A floating jump on a barge in the waters of Hong Kong will also require the approval of Director of Marine.
- (e) A new bungee cord and its end attachment, Jumper's harness and free fall rope have to be tested and examined by an approved Surveyor before use.

5.3 Selection of Jump Site

The site for bungee operation shall be free of any debris and obstacles that could be unsafe for bungee jumping. Due consideration shall be given to the effects of nearby structures, land use, means of communication and transportation to the nearest hospital. If the site is over water, the depth of water and marine access shall be adequate. There shall be a suitable area secured or blocked off from the spectators for retrieving Jumpers. The preparation area for jumping shall be away from the jump point. The jump zone shall be secured when there is opportunity of public entering the area designated for jumping.

5.4 Jump Platform

- (a) The jump platform shall be a static platform being integrated with a permanent structure such as a tower. The entire tower structure together with the cantilever jump platform, if any, shall be properly designed by an Authorized Person. Any lift or devices for elevating the Jumper to the static platform shall be designed, constructed, maintained and used in accordance with the Lifts and Escalators (Safety) Ordinance, Cap.327. The Code of Practice on the Design and Construction of Lifts and Escalators issued by EMSD shall be complied with.
- (b) The safe working load (SWL), with a safety factor of five (5), shall be determined according to the maximum number of people and the equipment on the jump platform. If the jump equipment is attached to the jump platform rather than any other distinct structure, the total design load of the jump platform shall then be the SWL just mentioned plus three (3) times the maximum jump weight stated in the operation manual. Under all circumstances, the safety factor of the jump platform with respect to the total design load shall not be less than five (5).

- (c) If the platform is not an integral part of the structure, then the attachment devices, and the part of the structure they are attached to, shall have a safety factor of at least five(5) times the total design load.
- (d) The Jumper's weight shall not exceed 135 kg.
- (e) The safe working load (SWL) of the platform shall be displayed conspicuously on the platform.
- (f) The floor surface of the jump platform shall be slip resistant.
- (g) The size of the platform shall have sufficient working space to accommodate different kinds of operation and the movement of the operatives and the Jumper in a safe manner.
- (h) The platform shall have anchor points or suitable mounting rails, designed and located to best suit the operator's movement, for attachment of the safety lines, The anchor point shall be able to take up a force of not less than 15kN in the directions of any possible falls.
- (i) The platform shall be fitted with a permanent fence to restrict the entry of public and to confine the Jumper in an area isolated from the jump point for preparation of the jump. There shall be a toe-board of not less than 100mm high around the periphery of the platform except for the jump point, which shall remain clear from any obstructions apart from a barrier gate in front of the jump point.
- (j) A wind speed meter shall be mounted at the top of the jump platform. The wind speed shall be displayed at the jump platform as well as the ground level. The jumping operation shall be stopped when a wind speed, which may affect the safe operations on the jump platform and/or the landing recovery system, is attained.
- (k) The entire jump platform and associated structure shall be protected by a lightning protection system.

5.5 *Jump Zones and Safety Spaces*

The horizontal cross section of the jump zone shall be defined by the x and y-axis of jump direction and lateral direction (See Appendix B). The requirement of jump zones and safety spaces for the given scenarios are set out as follows. Nevertheless, the Director shall be consulted if there is any other scenarios which have not been addressed in this Code.

(a) *Top Safety Spaces*

The top safety space shall be more than 7 % of the jump height and shall at least be 2 metres high.

(b) *Bottom Safety Spaces*

The bottom safety space shall be:

- (i) for jump over land or a solid surface, a vertical safety distance of:-
 - 4 m where the jump height ≤ 40 m ; or
 - 5 m where the jump height > 40 m.
- (ii) for jump over water where the depth of water provides the total bottom safety space, the vertical distance (as measured from the point of maximum immersion) shall be:-
 - 2.7 m where the jump height ≤ 40 m ; or
 - 3.4 m where the jump height > 40 m.
- (iii) for jump over water where the depth of water provides only part of the bottom safety space, the calculation of the bottom safety distance shall be as follows:-
 - (depth of water x 1.5) + (remaining air space) = 4 m, where the jump height ≤ 40 m; or
 - (depth of water x 1.5) + (remaining air space) = 5m, where the jump height > 40 m.

Where the solid surface or the highest part of the surface at the bottom of the jump space is not level over the whole jump space area, the bottom safety space may be curved to match the designed maximum arc of the bungee cord, with Jumper attached.

(c) *Side Safety Space*

A horizontal distance extending outwards from the edge of the jump zone which shall not be less than 20% of the corresponding distance between any point on the edge of the jump zone to the point projected directly under the jump point.

(d) *Forward Jump Clearance*

The forward jump clearance in a jump zone shall be:-

- at least 6 m where the jump height ≤ 40 m ; or
- at least 8.5 m where the jump height > 40 m.

(e) *Backward Jump Clearance*

The backward jump clearance in a jump zone shall be:-

- at least 8 m where the jump height ≤ 40 m; or
- at least 10 m where the jump height > 40 m.

(f) *Lateral Jump Clearance*

The lateral jump clearance in a jump zone shall be:-

- at least 3.5 m at any points below the jump point on each side of the jump point, where the jump height ≤ 40 m; or
- at least 4 m at any points below the jump point on each side of the jump point, where the jump height > 40 m.

Besides, the jump zone shall allow for at least a 20° off line lateral movement from the jump direction.

(g) *Entry to the Safety Space*

Whenever a Jumper get into the safety spaces, the jumping activities shall be suspended immediately until the cause(s) could be identified and the remedies to the equipment, rigging and/or the procedures are made. Any entry into the safety space shall be recorded as an incident in the site operation logbook and reported to Director accordingly. The remedial action which has been taken shall also be recorded in the logbook.

5.6 *Registration Area*

In the registration area, all the restrictions for jump as detailed in section 8.4 of this Code and the potential risks associated with bungee jumping shall be clearly displayed for the attention of public such that everybody should have read all the notices before the payment is made. Besides, the registration clerk shall further explain the details to every Jumper who shall be required to sign on a registration form confirming that he/she is not bounded by any constraints in respect of his/her medical or physical capability and is willing to accept the risks associated the activity of bungee jumping.

5.7 *Landing/recovery area*

(a) Over land

The landing/recovery area and access shall be free from obstructions at all times. It shall be fenced, and of sufficient size to allow for safe landing. Once the Jumper starts preparing on the jump point, the landing/recovery area shall also be free from any equipment or staff until the bungee has rebounded twice. A landing air pad or air bag shall be in position before Jumper preparation commences on the jump platform. The Jumper shall be lowered into a clean, smooth and padded surface. The area of landing pad shall be at least 3 m². The Jumper shall be allowed to recover before moving off the landing air bag. A resting place for recovery shall be provided close to, but outside, the landing area.

(b) Over water

If bungee jumping is performed over water (sea, harbour, river or reservoir), permission from the Director of Marine shall be obtained and there shall be safety provisions to prevent injury to the Jumper arising from dipping into the water. The jump space and landing area shall be free from other vessels, floating and submerged objects and the public. Adequate precautions, such as display notices and marker buoys of suitable size, shall be taken to delineate the limit of the jump space and the landing area. A landing and recovery vessel shall be available to safely manoeuvre in the conditions of the water where the bungee jumping is held so that the staff could pick up the Jumper or anybody who has fallen into the water. The vessel may be operated by one person if use of power for positioning is not required; otherwise, one more operator shall

be provided solely for piloting and manoeuvring the landing vessel. Both the vessel and landing/recovery operators shall wear life jackets or buoyancy aids. The vessel shall be equipped with spare life jackets, buoyancy aids and marine rescue equipment. The landing and recovery vessels shall be kept outside the landing area until the bungee cord has rebounded twice. The vessel may then enter the landing area and stay at a particular position to perform the landing procedures. The landing vessel shall be equipped with a landing pad of at least 1.5 m² and the pad shall be within and lower than the sides of the vessel.

Where the landing area for bungee jumping is part of a swimming pool, the pool size shall meet the requirements for jump space. The jump space and landing area shall be fenced to exclude the public. Rescue equipment shall be available and only the jump operators or the persons authorized by the Jump Master are allowed to enter the jump space and landing/recovery area.

5.8 Fences

The viewing areas shall be fenced off to prevent people falling to a lower level and to prevent entry of adults and children into the operating and landing areas. The height of the fence shall be not less than 1000mm and not more than 1150mm with intermediate rails at the middle. Where there is hazard of falling object which may injure people at a lower level, toeboards of 200mm high shall be extended from the floor. If wire mesh is provided between the top rail of the fence and the toeboard of the floor, intermediate rails may be omitted but the size of perforation shall be smaller than 150mm.

5.9 Equipment Storage

All the equipment, both on site and off site, shall be properly stored and organized for easy and orderly access, with protection from physical, chemical and ultra-violet ray damage. Storage shall be secured against unauthorized entry. All unserviceable equipment shall be removed from the jump site and storage facilities. All equipment should be air dried before stored in dry place.

5.10 Lighting

The lighting level in the jump platform and preparation area shall not be less than 450 lux whereas a minimum lighting level of 250 lux shall be provided in all public viewing, parking, access ways, jump & launch space, and the landing/recovery areas. For operation at night, spotlight shall be available on the platform to spotlight the Jumper during the course of jumping and landing/recovery.

5.11 Communication

The following provisions and measures shall be provided and implemented.

- (a) A public address system to cover the entire site area.
- (b) Direct communication links between
 - platform and the landing/recovery area or vessel; and
 - registration area and the platform where they are more than 30 metres apart.

- (c) Uniform or similar clothing should be worn by all staff for easy identification by the operators and the public.
- (d) Instructions to Jumpers and the public shall be put in positive terms to avoid misinterpretation and mistakes.
- (e) A fixed local network telephone line shall be available on site to allow for contact with hospital, fire stations and police for seeking emergency services.
- (f) Back up hand signals, if required and appropriate, should be explained in the operation manual.
- (g) The Jump Master supplemented with the Jump Operator working on jump deck, if any, shall be fluent in Cantonese, English and Mandarin so as to ensure all the instructions are fully understood by the Jumper and any questions raised by the Jumper are answered before the jump. For Jumpers who could not effectively communicate with any operatives working on the jump deck, special arrangement including the provisions of a translator at the jump deck shall be considered.

6 Equipment and Apparatus

6.1 General

- (a) All equipment used for bungee jumping shall have at least one back-up system. Where the provision of a second system is not feasible, a safety factor of five(5) for the maximum dynamic loading shall be required.
- (b) Modification of the equipment must be carried out by the manufacturer.
- (c) Modification of the rigging system shall only be carried out by the Competent Person and noted in the operation manual.
- (d) All stipulated inspection procedures shall be carried out before a jump is launched.
- (e) Competent Person shall be ultimately responsible for the maintenance and condition of all equipment under his supervision.
- (f) Due consideration shall be taken in design and selection of equipment so as ensure that it is impossible for the Jumper being caught or entangled in the mid-air.

6.2 Bungee Cord

6.2.1 General

- (a) Bungee cords shall be designed and undergone various testing within the prescribed limits of stretch and loading as required in this section.
- (b) Bungee cords shall be made of natural or synthetic rubber or blends.
- (c) The stretched length of the bungee cord shall be consistent every time the same loading is applied to the bungee cord.

- (d) When multiple cords are used, they shall be entirely enclosed in a protective sheath or bound together in such a manner as to prevent the insertion of an appendage between cords. Whereas a single cord system is used, the bindings shall hold the cord threads in their designed positions. In both cases, the sheath or bindings shall not infringe the cord performance.
- (e) Details of the bungee cord design, specification, manufacturing & testing data as well as the following information shall be submitted for approval.
 - Calculation of the maximum G force exerted by the cord on a Jumper within the proper weight range.
 - Maximum allowable usage of bungee cord expressed in number of jumps.
 - Maximum allowable deterioration or damage to cords before they must be destroyed.
 - Expiry date of the bungee cord.
- (f) Bungee cords shall not be modified, tampered with or repaired by anyone other than the manufacturer.
- (g) Approved bungee cords shall only be made available to qualified operatives and the Owner shall be responsible for its update and safe keeping of the cord.
- (h) The Owner shall immediately stop using and destroy the bungee cord that has become out of date or has been used up to the maximum number of jumps. The Owner shall also be responsible for the disposal of a cord if it exceeds its safety margin in deterioration.

6.2.2 Cord Binding

The cord binding shall hold the cord threads together in their designed positions. Characteristics and specifications of the binding material shall be similar to the cord material. The cord binding shall be free from any defects prior to commencement of the operation everyday. If adjacent cord bindings break during a day's operation, the cord shall be withdrawn from use until the bindings are repaired.

6.2.3 Shock Load on the Jumper

The selection of an appropriate bungee cord for a particular range of Jumper's weight shall comply with the following requirements in order to minimize the shock load on the Jumper.

(a) $2.5 \leq \frac{\text{Stretched Length}}{\text{Unloaded Length}} \leq 4$

- (b) The designed extended length of the cord at static condition ≥ 2 times of its unloaded length

6.2.4 Type Test for New Design of Bungee Cord

- (a) Each bungee cord shall be constructed by a standard method of manufacture. To establish an approved cord design and method of production, specimens of the bungee cord inclusive of the end attachments shall be tested by a testing authority to be approved by the Director. A bungee cord design which meets the required test standards should be issued with a type test certificate. Each bungee cord shall be manufactured in accordance with a type tested design.

- (b) Details regarding the cord specification and method of production of cord having been tested shall be listed out expressly in the type test certificate issued by the testing authority.
- (c) Any change in bungee cord specifications that may affect the performance of the threads or cord, or any change in end attachments, or manufacturing methods of equipment, shall require new type test and approval.
- (d) The cord specifications herein mentioned include but not limited to the following:-
- (i) Construction material used.
 - (ii) Thread specifications detailing the stress at 300% elongation, the tensile strength and the elongation at failure as determined by BS 903: Part A2.
 - (iii) Dimensions and number of threads in a cross section of the cord.
 - (iv) Method of construction.
 - (v) Method of binding.
 - (vi) Equipment used for the end attachments.
 - (vii) Unloaded length of the cord.
 - (viii) Designed operating height of the cord.
 - (ix) Operational Jumper weight range for producing the extension from 2.5 to a maximum of 4 times the unloaded length of the cord.
 - (x) Designed range of the dynamic loading during operation and total number of jumps allowed before replacement (jump life).
 - (xi) A permanently marked unique manufacturer's identification number.
 - (xii) Equipment used for the end attachment and its test compliance specification.
- (e) A bungee cord of at least 2 m in length together with the end attachments, produced in accordance with an approved manufacture method, shall be tested to establish the curves of applied load against extension and thereafter determine
- the range of Jumper's weight which the corresponding extension is within the limits of 2.5 to 4 times the unloaded length of the cord; and
 - the total number of jumps allowed before replacement.
- (f) In regard of the abovementioned extension range requirement, the cord shall be subject to 3 repeated tests to ensure the consistency of the test results. At least 6 sets data points shall be obtained to establish the relationship of load versus extension in a graphical form for each test. The 3 resulting curves shall coincide within a deviation range of 5% . All tests conducted shall have 3 to 10 minutes recovery time between the extensions for the cord to recover to its unloaded condition.

- (g) The cord shall be subject to a destructive test with 5 times the maximum dynamic load for duration of at least 5 minutes and then checked for any thread breakage or deterioration. The bungee cord after this test shall be destroyed as it had already stretched beyond its elastic limit.
- (h) Two samples of bungee cord with a test length of 1 metre shall be subject to a cycle frequency test to establish the jump life of the cord as per clause no. 6.2.9. The test authority shall state expressly whether the samples could achieved a test result of more than 3 times the designed jump life of the cord.

6.2.5 **New Bungee Cord (to be used on site)**

- (a) The Owner shall only use those bungee cords that are manufactured in accordance with the specification of a type tested design in all aspects as stated in the above clause 6.2.4. In this regard, the Owner shall obtain from the manufacturer the necessary documentary proof for compliance.
- (b) Permanent markings of the following information shall be engraved on both ends of each bungee cord.
 - (i) Manufacturer identification number.
 - (ii) A unique serial number.
 - (iii) The date of manufacture.
 - (iv) The expiry date of the bungee cord. (basing on the expiry date of the cord material or 6 months from the date of manufacture, whichever is earlier)
 - (v) Maximum allowable stretch and weight ranges for which the cord was manufactured, with the designation scheme indicated in the site manual.
- (c) The Owner shall ensure that the usage and the actual conditions of individual bungee cords in their possession always conform to the original approved cord design in respect of:
 - (i) the type of construction material;
 - (ii) the thread specifications as per clause no. 6.2.4(d)(ii);
 - (iii) the equipment used for the end attachment;
 - (iv) the unloaded length of the cord; and
 - (v) the cord withdrawal criteria as per clause no. 6.2.7.
- (d) The manufacturer's serial number, the unloaded length, maximum stretched length as well as the cord usage (no. of jumps performed) shall be recorded in the operation log book.
- (e) Every new bungee cord, at a particular setting of rigging system, shall be subject to the following three extension tests in its intended jump site so as to ascertain every new cord does meet its intended design extension range (i.e. 2.5 to 4 times its unloaded length) in the presence and to the satisfaction of the Surveyor before it is put in use for the members of public.

- Test 1 - with a dummy load equivalent to the minimum designed Jumper weight of the cord
- Test 2 - with a dummy load equivalent to the maximum designed Jumper weight of the cord
- Test 3 - a trial jump performed by an operator whose weight is within designed weight range of the cord

6.2.6 Bungee cord end attachments

- (a) Each end of a bungee cord shall have an end attachment for connecting to the rigging and the Jumper's harness respectively. The end attachments shall be designed to prevent inadvertent release and their dimensions shall be sufficient to allow for easy attachment. The minimum breaking load of an end attachment shall be 2000 kgf and has a strength of not less than two(2) times the ultimate tensile strength of the bungee cord.
- (b) All end attachment points shall be designed to minimize wearing.
- (c) Where there is possibility of injury to the Jumper from hard ends or attachments, they must be covered by a protective but detachable padded jacket for the allowance of inspection.
- (d) End attachment shall be tested by recognized testing authority to be approved by the Director.

6.2.7 Testing of cord for withdrawal from use

Each bungee cord shall be visually inspected over its whole length and the whole circumference at the start and the end of a day's operation. For cord fitted with protective cover, its cover shall be opened up so as to fully expose the external and innermost surface of the cord, its bindings and both ends for inspection and the cover shall thereafter be replaced.

A bungee cord shall be withdrawn from use when it reaches its designed jump life (See clause 6.2.9). Besides, early replacement shall also be required in any of the following circumstances.

- a) The cord is exposed to daylight for more than 250 hours, except where the cord is protected against ultra-violet exposure by a protective cord cover.
- b) A period of 6 months has been elapsed since the manufacturing date.
- c) The expiry date recommended by manufacturer is exceeded.
- d) 10% of the threads of the cord exhibits wear, such as bunched threads, uneven tension between threads or thread bands.
- e) 5% of the total number of threads over the length of the cord is broken.
- f) As the bungee cord stretches over the course of its jump life, it deteriorates and the dynamic load required to extend the cord to four(4) times its unloaded length will reduce gradually. The cord shall be discarded when the extension at the maximum designed loading exceeds three(3) times its unloaded length.
- g) After contact with unknown chemical, solvents, corrosive substances or contamination with abrasive material.
- h) Any other situations warranted by the Competent Person after any incident that may lead to a negative sub-standard performance of the cord or its attachments.

Bungee cords to be disposed shall be destroyed by cutting it into lengths of less than 1 metres.

6.2.8 Daily Checks of the Cord by Competent Person

At the beginning and during a day's operation, the Competent Person shall carry out the following:

- a) Visual checking, of at least 4 times a day, on the entire length and circumference of the bungee cord for signs of wear, with the protective cover being removed, if any.
- b) Check if there are any abnormal changes in the cord length at the static and the dynamically extended conditions during jumping.
- c) Replace the cord immediately when unexpected changes in cord extension characteristic occurred and check the cord against those abnormalities as mentioned in clause 6.2.7.

6.2.9 Cycle Frequency Test Procedures and Jump Life of a Bungee Cord

The following are the details & procedures for carrying out a cycle frequency test which is used to establish the approved jump life of a particular cord design, expressed in terms of allowable number of jumps.

- a) Carry out a cycle frequency test until either one of the following conditions happen.
 - (i) The dynamic load at 4 times unloaded length reduces below the maximum designed dynamic load; or
 - (ii) there is evidence of more than 10 % of threads exhibiting wear, such as bunched threads, uneven tension between threads or thread bands; or
 - (iii) there are broken threads exceeding 5 % of the total number over the length of the cord.
- b) Record the changing characteristics of the cord in the course of cycle frequency test including :
 - (i) unloaded length of the cord;
 - (ii) broken threads as observed from a surface examination and expressed as a percentage of total threads; and
 - (iii) the value of the reduced load to achieve the specified extended length (4 times of unloaded length).
- c) A cycle will consist of one extension of the bungee cord to 4 times its unloaded length.
- d) The cord shall be idle at no load for 3 minutes \pm 10 seconds between cycles.
- e) Test Conditions :
 - (i) Temperature : Typical ambient temperature.
 - (ii) Atmospheres : As in a normal outdoor environment in the absence of any abnormal Ozone.

6.3 Jumper Harness and Ankle Strapping

- (a) Only full-body harness specifically designed for bungee jumping shall be used.
- (b) The Jumper's harness shall be manufactured by an organization approved to manufacture similar body harness to an approved code e.g. AS 1891.

- (c) Ankle strapping shall securely hold the Jumper's ankles together and secure the Jumper to the cord attachment. The ankle strapping/harnesses shall not allow the Jumper's ankles to collide or cause bruising on the Jumper.
- (d) All harness shall comply with the following requirements.
 - i) The Jumper shall be secured to the bungee cord at two separate points on the Jumper's body.
 - ii) A full body harness with a different and separate attachment to a waist harness.
 - iii) The minimum breaking strength of a harness shall be 2000 kgf.
 - iv) The minimum safety factor of any harness shall be five(5).
 - v) Harnesses shall be available to fit the range of Jumper size as specified by the manufacturer of the harness.
 - vi) Harness that only secure the limbs, without a back up harness securing the torsos shall never be used.
- (e) Nevertheless, additional requirement for different styles of harness system may be imposed on individual jump site and consultation with EMSD shall be required.

6.4 *Ropes, Life Lines and Safety Harnesses*

- (a) Rope used for holding or lowering the Jumper shall have a minimum diameter of 11 mm of kernmantel construction with a minimum breaking load of 2700 kgf and a safety factor of 5. Ropes shall be made of nylon or similar synthetic material to allow for stretch and shock loading.
- (b) Life lines shall be securely anchored and attached to all operators, working within 1.5 m from the jump point, or in all circumstances where falling from heights could occur. All lifelines shall have a minimum breaking load of 2200 kgf.
- (c) Operatives shall always wear safety harness (full body or sit harness) whenever they are working on the jump platform.

6.5 *Hardware and Webbing*

- (a) Karabiners shall be the screw gate type with a minimum breaking load of 2000 kgf and a safety factor of 5.
- (b) Pulley and shackles shall have a minimum breaking load of 2000 kgf or a minimum safety factor of 5 times the maximum dynamic load. All pulleys shall be compatible with the rope size and shall have a minimum diameter of not less than 10cm.

- (c) Webbing shall be those of flat tubular mountaineering webbing or equivalent with a minimum breaking load of 2000 kgf and a safety factor of 5. When fully sewn joints are not used on webbing, tape knots shall be used on all webbing and the ends shall be stitched down or be greater than twice the width of the tape.

6.6 Rigging System

- (a) Rules of redundancy and competence shall be strictly implemented in every aspect of the rigging equipment/system.
- (b) Alternative procedures for retrieving the Jumper shall be available to cater for any malfunction in primary lowering system.
- (c) In rescue operation where the Jumper will be retrieved back to the jump deck, the Jumper shall always be secured in the position he is staying by means of an independent locking devices until the holding force on the retrieval rope is released.
- (d) The bungee cord shall always be secured to the jump structure at two anchor points. The minimum safety factor at each anchor points shall be five (5).
- (e) For the anchor ropes, knots shall be either a double-loop figure eight or a recognized modified version, followed by an overhand or fisherman keeper knot.
- (f) All shackles shall be safely wired or cotter pinned and all screw gate karabiners shall be turned to point downwards.
- (g) Pulley shall only be used for change of rope direction. Any pulley between the bungee cord and the anchor point of the rigging system shall be prohibited.
- (h) The practice of leaving a bungee cord with an unanchored end on the jump deck shall be prohibited.
- (i) Rigging of equipment shall be carried the Competent Person/Jump Master or an authorized person.
- (j) If the rigging may be adjusted to change the jump height for individual Jumpers, the rope or webbing that connects the bungee cord to the rigging shall be calibrated or marked to facilitate the selection of the required adjustment.
- (k) One of the people on jump platform, either the jump operator or the Jump Master, shall operate the lowering system. The remaining person shall be responsible for observing the lowering process and physically stop the lowering process if necessary.

6.7 Testing and Inspection

- (a) All rigging, harnesses, lowering/braking system and safety gear shall be regularly inspected and tested as per the site operation manual and this Code. Inspection, findings and actions taken shall be recorded.
- (b) The rated load bearing capacity of all rigging, harnesses, lowering/braking systems and safety gears shall not be inferior to the standard set out in this Code.
- (c) Any hardware subject to abnormal loading or the impact of any hard surfaces, or having surface damage, shall be replaced.

- (d) Any ropes, having been subject to abnormal shock load, shall be replaced.
- (e) All ropes, webbing and bindings shall be inspected, under the direction of the Competent Person, both visually and by feel, for signs of wear, fraying, or exposure to corrosive or damaging substances. The criteria for scheduling inspections shall be specified in the operation manual.
- (f) Criteria for the periodic replacement of ropes, webbing, harnesses and hardware shall be specified in the site operation manual.
- (g) Personal protective equipment shall be inspected daily to the satisfaction of the Competent Person.
- (h) Gloves having any symptom of reduction in the protection area shall be replaced immediately.

6.8 *Spare Parts for Rigging and Equipment*

- (a) At the beginning of each day's operation, full set of spares including the following shall be available on site, or readily accessible from the operator's storage facility for replacement if necessary:
 - Bungee cord(s)
 - All ropes
 - Harnesses - ankle and body for Jumpers and staff
 - Gloves
 - Life lines and clips
- (b) Any sub-standard equipment, rigging or personal protective equipment, once it is discovered, shall be replaced immediately.
- (c) Jumping shall be ceased immediately if any sub-standard items, for whatever reasons, cannot be replaced or rectified immediately.

6.9 *Identification of Parts and Equipment*

- (a) Each pieces of equipment, tools or parts shall have a unique identification mark and /or tag.
- (b) Due care shall be exercised in marking the equipment so as to ensure that material properties will not be affected.
- (c) The marks shall be put on conspicuous positions for the attention of the operators when they are using the equipment in their daily operations.
- (d) The identification of each items shall be properly documented in a special items log sheet.
- (e) Colour coding shall be adopted for easy identification on the cord. Prior consent of Director on the proposed colour scheme shall be obtained.

7 Staffing Requirement

7.1 Staff Duties

(a) *Competent Person*

The Competent Person shall be the one having control over the whole operation and shall take up the duties as required in the Ordinance. Where more than one Jump Master are working on the same site, one of the Jump Masters could be designated as the Competent Person provided he/she satisfies relevant requirements in clause 7.3(a).

Duties of the Competent Person, among the others mentioned in this Code, include:

- Responsible for the safety of the crew and Jumper from the time they enter the site until the time they leave. This includes proper concern for the traffic movement, observation areas, equipment storage and transport, facilities and disputes.
- Direct and organize the staff.
- Double check the rigging works carried out by the crew.
- Make sure every trainee within his jump site are trained properly.
- Sign off all trainees when they complete the training and acquire the qualifications.
- Make sure all equipment information is recorded in the log book.
- Update and teach the site manual to the crew.
- Cease the jump operation immediately whenever any requirement in the site manual or this code of practice is not complied.
- Make sure that all the abnormalities or incidents are reported to the Director through the Owner.
- Responsible for correct selection of the cord.

(b) *Jump Master*

Duties & Responsible of the Jump Master(s) include:

- Responsible and accountable for the operation of the jump site.
- Shall have a thorough knowledge of the site, its equipment, procedures and staff.
- Has complete control in the course of jumping.
- Responsible for training of the other staff.
- Re-check all the works carried out by the Jump Operator.
- Verify to the Jump Operator that the jump check is complete for jumping.
- Check the size and security of the harness before the bungee cord is attached to the Jumper.
- Select the bungee cord and adjust the rigging, but in case this job is taken up by the jump operator, check whether the cord selection and adjustment of rigging are correct or not.

- Before the Jumper is allowed to step onto the Jump point, check all attachments of the rigging system to the bungee cord as well as the attachment of the bungee cord to the Jumper's harness system. (Checklist as stated in clause no. 8.3(e))
- The Jump Master shall be the only one person who takes the Jumper through the final stages to the jump take-off.
- Initiate the final countdown signal for the Jumper leaving the platform.
- Ensure all required information in connection with every jump is put down in the log sheets.
- Lead the crew in rescue operations under an emergency situation.
- Ensure every Jumper knows what to do and what not to do during the course of their jump.
- Supervise, or take part in, the process of retrieving the Jumper.
- Communicate with the ground crew.

(c) *Jump Operator*

Duties of the Jump Operator include:

- Assist the Jump Master to assure all the redundancy requirement is fulfilled.
- Assist the Jump Master when the Jumper is preparing for the jump.
- Attach the Jumper to ankle bindings or harness.
- Check the size and security of the harness before the bungee cord is attached to the Jumper.
- Check all attachments of the bungee cord to the Jumper's harness before Jumper is allowed to step onto the jump point.
- Assure every Jumper knows what to do and what not to do during the course of their jump, and answer to any questions raised by the Jumper.
- Visually verify and double check the hook up procedures as stated in clause 8.3(e).
- Operate the lowering and retrieval system.
- Where the Jump Master is only to check the correct selection of bungee cord and adjustment of rigging, the Jump Operator shall be required to select the bungee and adjust the rigging.

(d) *Harnesser*

The Harnesser is responsible to make sure that everybody including the crew is fitted correctly with the proper harness and all harnessing equipment does conform to this Code as well as the manufacturer's instructions. The following guidelines regarding the harnessing procedures shall always be followed and observed:

- Harnessing shall always be carried out by a qualified harnesser or under the direct supervision of a qualified harnesser.
- Once a person is fitted with the harness, no one can adjust the harness unless he is a qualified harnesser.

- Harness shall be complete, in good condition and double checked by a Jump Master.
- Harness shall be correctly worn and tightly fastened without feeling uncomfortable by the Jumper.
- Everybody in the jump deck shall wear harness at all times which shall be either connected to a secured safety line or attached to the bungee cord.
- Harnesses having signs of cutting, serious contamination, fraying, loose stitching, damaged or incorrectly fitted buckles, or the likes shall be removed from the jump site until the fault is corrected.

(e) *Landing/Recovery Operator* (for land and/or water operation)

Landing/Recovery Operator is responsible for overseeing the recovery of the Jumper and assisting the Jumper to land on the landing pad. His duties include:

- Ensure area directly below the Jump Space is free from any objects or debris.
- Give lowering instructions to the Jump Master and Jump Operator to ensure a safe retrieval.
- Detach bungee cord from the Jumper's harness, and signal to the Jump Master retrieving the bungee cord.
- Talk to and calm the Jumper.
- Ensure the Jumper is safely escorted away before leaving the recovery area.
- Assist in controlling the public in the vicinity of the landing/recovering area.

(f) *Registration Clerk*

Duties of the Registration Clerk include:

- Registration of the Jumper.
- Obtain/decide on the medical clearance.
- Weighing and marking of weight on the Jumper.
- Control movement of Jumpers to jump platform.
- Control or assist in crowd control.
- Explain to prospective Jumpers the restrictions and possible risks associated with bungee jumping.

7.2 *Number of Staff*

(a) Having regard to the specialty of individual site, the site operation manual shall specify, among the others, the scale of the operating team led by a Competent Person, which shall consist of not less than four staff for taking up the following job posts by different individuals.

- Minimum 1 no. of Jump Master. (1 Jump Master could be designated as Competent Person)
- Minimum 1 no. of Jump Operator.
- Minimum 1 no. of Landing/Recovery Operator.
- Minimum 1 no. of Registration Clerk.

Nevertheless, this requirement shall not derogate from the power of the Director vested on him by section 8(1)(b)(ii) of the Amusement Rides (Safety) (Operation and Maintenance) Regulation.

- (b) If any staff is required to carry out the duties of more than one job post, the Competent Person shall pay more attention to the pace between the jumps and adjust it from time to time as appropriate, so as to ensure that every task as required for each job post is properly done in accordance with the requirements laid down in this Code and the site operation manual.

7.3 *Qualification, Experience and Training*

The following should be treated as a guideline for setting out the selection criteria of the key operating staff. Subject to the acceptance of the Director, they should be extended and refined to suit the requirement of individual jump sites, and eventually be incorporated in the site operation manual. The training as described hereunder should be certified and equivalent to the standard of internationally recognized organizations of bungee jumping.

(a) *Competent Person*

Qualification & Experience :

- Being a qualified Jump Master.
- Having performed a minimum of 50 jumps.
- Having practiced for more than 200 hours or 1000 jumps incident-free operation as acting Jump Master in jump sites of equivalent size as the one in concern, with additional experience of at least 20 hours or 100 jumps in each of the other positions.
- Holder of the first aid certificate and rock climbing instructor certificate.
- Having the full knowledge of the site manual and being qualified as a Competent Person under Cap. 449.
- Holder of the lifeguard certificate where jumping over the water is involved.
- With those skills and qualities as required for Jump Master.

Training Attended :

- The dynamics of attitudes, work and safety.
- Team building and conflict resolution.
- Limitations of bungee.
- Emergency training.
- How to train new employees.
- Qualifications, recruitment and termination of the team members.
- Log and maintenance of bungee and equipment.
- Review & Updating of the site manual.
- Equipment dynamics.
- Others attended by Jump Master.

(b) *Jump Master*

Qualification & Experience :

- Having performed a minimum of 20 jumps, 5 in each harnesses offered.
- Having practiced for more than 200 hours or 1000 jumps incident-free operation as acting Jump Master in jump sites of equivalent size as the one in concern, with additional experience of at least 20 hours or 100 jumps in each of the other position.
- Holder of the first aid and rock climbing instructor certificate.
- Holder of the lifeguard certificate where jumping over the water is involved.

Personal Skills & Qualities :

- The ability to lead staff in a calm and effective manner.
- The ability to organize the jump operation.
- The ability to control staff to achieve compliance with the procedures and standards as set down in the operation manual and the code of practice.
- The ability to control Jumpers who may be in a highly excited state.
- The ability to train staff for all positions in the jump operation team.
- The ability to test equipment, rigging and bungee cord to standards stated in this Code and the operation manual.
- The ability to make decision particularly in maintaining the safety standards.
- The ability to respond to emergency situations in an effective way.

Basic Training Received :

- Cord strengths.
- Cord dynamics (rebounds, weight to stretch, safety lines).
- Hazards of bungee jumping.
- Familiarization with their jump site.
- Dispatch and retrieval procedures.
- Rescue procedures.
- How to recognize overly scared Jumpers.
- Skill of teaching the jumps (of all styles offered).
- Safety points and procedures to be given in a class.
- Communication and management of people.

(c) *Jump Operator*

Qualification :

- Having performed a minimum of 10 jumps.
- Having practiced for more than 100 hours or 500 jumps incident-free operation as an acting Jump Operator under direct supervision of a qualified Jump Master.
- Holder of the first aid and rock climbing instructor certificate.
- Holder of the lifeguard certificate where jumping over the water is involved.

Basic Training Received :

- The pre-jump checking procedures on attachment and harness as per the clause 8.3(e).
- The breaking strengths of all equipment used at the jump site.
- The health problems that would keep someone from jumping.
- The weight ranges of the bungee cords.
- How to inspect equipment for errors or defects.
- How to store equipment properly.
- How to perform double-checks in rigging and jumping.
- Use of the rescue equipment at the jump site in question.

(d) *Harnesser*

Qualification :

- Having received proper training on harnessing.
- Knowledgeable in the procedures and specification of harnesses involved.
- Having jumped for every style of harness offered at least once.
- Having worked for this position for at least 4 days.

Basic Training Received :

- How to check for faulty harnesses.
- How to fit someone with every style of harness.
- The attachment point of every harness.
- Breaking strengths of every harness.
- What to do with damaged equipment.
- What can cause damage to equipment.

(e) *Landing/Recovery Operator*

Qualification & Experience:

- Having practiced for more than 40 hours or 200 jumps incident-free operation as an acting Landing/Recovery Operator under direct supervision.
- Having jumped for every style of harness offered.
- Holder of the first aid certificate.
- Holder of the lifeguard certificate where jumping over the water is involved.

Personal Skills & Qualities :

- The ability to work in calm and effective manner.
- The ability to work methodically and accurately.
- The ability to control Jumpers in an excited state.
- The ability to assist Jumpers after completing a jump.
- The ability to respond to emergency situations in an effective way.

Basic Training Received :

- Attachment points of every style of harness.
- How to detach a bungee cord from every style of harness.
- The hazards within a jump zone.
- How to calm down a Jumper.
- Emergency rescue and/or retrieval procedures.
- Hand communication signals to be used with Jump Master and others.

(f) *Vessel Operator*

Qualification & Experience:

- Holder of a current appropriate certificate.
- Holder of the first aid & lifeguard certificate.
- Having at least 30 hours experience of operating a vessel in the varying water conditions at the jump site or in very similar water conditions.
- Other qualification & experience as may be required by the Marine Department.

Personal Skills & Qualities :

- The ability to operate the vessel in the range of conditions likely to occur at the jump site.
- The ability to pilot the vessel in normal and emergency conditions in a competent manner.
- The ability to operate in a calm and effective manner in varying circumstances.

7.4 Staff Training

Training, relating to the present or future posting of individual in the crew, shall be provided to every staff. A proper record of training given to individual team member shall be maintained. Staff who are working in a training mode shall be directly supervised at all times and training shall be conducted by, or under the supervision of, a Jump Master. A training manual, covering the critical tasks in the operation, maintenance and testing procedures, shall be available on site. The training shall require achieving mastery of the specified skills and knowledge.

8 Operation and Management Systems

8.1 General Policy & Continuous Review

- (a) The operators shall conduct pre-scheduled inspections of the site, equipment and procedures. The information gathered, reporting and investigation of injury, damage and near miss events shall be analyzed and reviewed by management on a regular basis. Procedures, equipment, rigging and structures shall be corrected accordingly in order to reduce the likelihood of reoccurrence of the incidents.
- (b) A comprehensive emergency plan shall be worked out, practiced and maintained.
- (c) The site operation manual shall contain the rules and policies concerning the health and safety of the employees and the public.
- (d) There shall be a written policy and a written purchasing procedures to ascertain the compliance with the standards for equipment, rigging, bungee cord and other related materials.
- (e) Regular meetings among all the members of the operating team shall be held to review various matters using the sectional headings mentioned in this Code as a framework for discussion.
- (f) The standards contained in the site operation manual should be reviewed on an annual basis.
- (g) Management and operating staff should take precautions to minimize any distractions that may hinder the implementation of the correct procedures.
- (h) Third parties risk insurance coverage shall be provided to the Jumpers participating in the bungee jumping activity as well as the operatives working in the jump site. Adequacy of the insurance policy should be reviewed on a regular basis.

8.2 Pre-operational Examination

- (a) Bungee jumping shall only take place when the Competent Person is at the sight and the weather condition is suitable.
- (b) All equipment must be in good condition, safe in all aspects, correctly rigged and double checked by the Competent Person before jumping commences.
- (c) Jumper shall not be allowed to jump until the complete preliminary checking procedures on attachment and harness as per clause no. 8.3(e) have been performed.
- (d) Jumping shall not be commenced until every member of the crew has consensus on the safety, work positions and rigging.

8.3 Pre-jump Procedures and Checking

- (a) The Jumper shall be weighed and then checked again before the weight is marked on his/her body and recorded on a log sheet. All these weighting procedures shall not be carried out on the jump deck.
- (b) The Jumper shall be briefed and harnessed before stepping onto the jump point.

- (c) The Jumper shall always be secured with a safety line once he/she put on the harness on the jump platform until the bungee cord has been attached to the harness.
- (d) The safety line shall not be detached from the Jumper unless all attachments and connections have been double-checked.
- (e) The Jumper shall not be attached to the rigging system until both the Jump Master and Jump Operator have checked and verified the following.
 - The security and proper fitting of the harness system.
 - The adjustments of the rigging system in accordance with the Jumper's weight.
 - The selection of the bungee cord.
 - The attachment of the bungee cord to the rigging system.
 - Both Jump Master and Jump Operator shall check and verify the proper attachment of the bungee cord to the Jumper's harness making reference to the following generic checklists for ankle strapping and a particular type of full body harness with attachment point at the waist. In case of other checking procedures being required as a result of the variant in harness design, the Director's prior consent shall be sought.

<u>Step</u>	<u>Waist Connection</u>	<u>Ankle Connection</u>
1	Big D on waist	Big D on ankle
2	Twist on bungee	Safety on Bungee
3	Harness double back tightness	Check 1 st ankle for tightness
4	Leg 1 tight	Check 2 nd ankle for tightness
5	Leg 2 tight	Waist harness double check
6	Chest harness (no twists)	Legs tight
7	Jump Master double check	Jump Operator double check
8	Safety line off/pillow on	Safety line off/pillow on

8.4 Restrictions for Jumpers

Jumpers shall be questioned on their age and medical conditions. Jumping shall not be allowed under certain unfavourable conditions related to individuals that may increase the risk of safety in bungee jumping. A sign shall be erected listing out the medical, age or any other restrictions for Jumpers. Such a sign shall be placed in a prominent position for the attention of the public who intend to participate in the activity of bungee jumping.

(a) Medical Conditions

Only those people who declare themselves not suffering from unfavourable medical conditions and appear to the Competent Person to be so fitted for the activity could be allowed to step onto the jump platform and participate in bungee jumping. The unfavourable medical conditions herein referred include, but not limited to the following:-

- Asthma/Respiratory disorder.
- Pregnancy.

- Epilepsy.
- Cardio/Respiratory disorder.
- Hypertension.
- Skeletal weakness.
- Joint or ligament problems.
- Being beyond the weight limits of all the bungee cords available at the jump site.
- Other medical conditions that would preclude the Jumper from participating in any other active sports in a normal way unless the Jumper possess a medical certificate, signed within the previous 30 days, supporting on their intention to jump. The medical certificate, or a copy of it, shall be retained by the Competent Person.
- Persons in an intoxicated state or under the influence of drugs.
- Any persons who has just received any operations or injuries shall not jump until he is considered fit to do so again by the Competent Person.

(b) Age Limits

The minimum age for jumping shall be 13 years old. Jumpers under the age of 18 years shall have the written consent of a parent or guardian who is in attendance at the jump site.

8.5 *Other Restrictions*

(a) Adverse Weather Conditions

The Competent Person shall cease the bungee jumping on the occasions of violence or the following adverse weather conditions that could pose hazards to the health or safety of jumping and retrieval procedures :

- High wind speed.
- Heavy rains.
- Thunder storm.
- Typhoon signal no. 3 or above is being hoisted.
- Dust storm, hail or related conditions that could impair or diminish one's vision.

(b) Other Limitations

- The bungee jumping operation requires concentration, alertness and rapid response to stimulus at all times. It is essential that adequate breaks are taken by the operatives. On occasions of prolonged operation, adequate back-up staff shall be available for rest replacement.
- As a general guideline, a rest period of 30 minutes should take place no more than 5 hours and no operatives shall work more than 11 hours in a day.
- Jumping shall not be allowed if there are obstacles that might be dangerous to the Jumper.
- All attachment to the bungee cords must be made by a licensed second party (no self hook ups shall be allowed).

8.6 Injury, Damage and Incident Events

(a) The Owner shall report to the Director in the following occasions:-

- All injury, damage or near miss events shall be reported in the daily log and notify to the Director in writing immediately together with the outcome of the investigations within a reasonable time.
- Damage and near miss events to structures, equipment and plant shall be recorded and notify to the Director in writing immediately.
- For incidents resulting in injury to the Jumper upon jumping, the rigging system shall be retained until the investigation is completed by the Competent Person/Surveyor and thereafter being released by the Director.

(b) Damage to the landscape and environment can be irreversible, or slow to recover. All such losses or near miss incidents shall be immediately reported (with notification to Director), investigated, recorded and analyzed.

(c) The following shall be part of the daily procedures and tasks to be undertaken or arranged by the Competent Person:-

- All injury treatments shall be recorded in a first aid treatment record book.
- An analysis of all reports, recorded losses and near misses shall be undertaken every 3 months by the Competent Person himself.
- An analysis of all reports, recorded losses and near misses shall be undertaken, among the other things in the annual examinations, by a qualified Surveyor annually with a copy submitted to the Director for consideration in accordance with the Amusement Rides (Safety & Maintenance) Regulation.

8.7 Site Operation Manual

Each jump site shall have an operation manual, which shall be updated from time to time by the Competent Person. At least one control copy of the operation manual and the latest edition of this Code shall be retained on site for the access of every staff working in the jump site. The following framework (section (a)) set out the minimum scope that are required to be addressed in the operation manual. Whereas in the subsequent sections (b) to (d), the requirements for the operation procedures in terms of different work areas, various stages of the process, and close down procedures are further elaborated as a terms of reference.

(a) Scope

- A site plan.
- A description of operation system and equipment.
- Job procedures for each task in the operation system.
- Job descriptions.
- Job post specifications - qualification and experience required.

- Staff selection procedures.
- Maintenance standards and procedures.
- Testing procedures and recording.
- Criteria for periodic replacement of rigging, hardware, bungee cords, harnesses and lifelines.
- Criteria for the regular inspections on the ropes, webbing and bindings.
- Purchasing procedures.
- Emergency plan and rescue procedures.
- Reporting of injuries, damage and incidents.
- Requirement for logs, including i) Site; ii) Equipment & rigging; and iii) Personnel.
- Records to be kept.
- Requirements for analysis of records.
- Inspection procedures, standards and follow up action.
- Examples of forms to be used.

(b) Daily Operating Procedures

The operating procedures shall include :

- Preparation, setting up the site equipment and public amenities written in forms of a check list.
- Inspection, testing and checking.
- Items of equipment.
- Communication system(s).
- Jump equipment and rigging.
- Jump procedures.
- Performing test jumps.
- Checking the bungee cord performance.
- Staff briefing for the day's operation.

(c) Procedures in a Typical Jumping Process

The handling procedures throughout the entire process of jumping, including but not limited the following items, shall be established and stated in the operation manual as follows :

- Ensure the exclusion of the public from the operating areas.
- Registration of Jumpers.(including Name; Medical factors & exclusions; Age limits; Weight & marking)
- Jumper briefing.
- Removal of loose objects.
- Jumper preparation. (including harness or binding attachment; and Instructions to the Jumper)

- Jump Procedures
 - i) Prepare bungee and adjust connections.
 - ii) Connect the Jumper and check connections to the rigging.
 - iii) Final inspection by another person (Jump Operator or Jump Master).
Notes : Include the Methods to ascertain conscious check procedures where repetitive checking is involved.
 - iv) Final instructions to the Jumper.
 - v) Count-down to jump.
 - vi) Observation of jump.
- Landing/recovery procedures (Lowering and Landing).
- Return of Jumper to the public area.
- Retrieval of the bungee to the platform.

(d) Close Down

The operation manual shall include the following close down procedures:

- Equipment - Cleaning, inspection, testing and checking.
- Completion of records, both site and personal.
- The necessary daily maintenance of equipment, structures and facilities.
- The storage of equipment.
- The cleaning up and disposal of rubbish.
- Security checks and lock up.
- De-briefing of staff on
 - i) critical incidents/events occurring during the day;
 - ii) change of equipment, rigging and bungee that are required before the start of any operation in the following day; and
 - iii) maintenance work not completed but required before the start of any operation in the following day.

9 Maintenance Arrangement

9.1 Maintenance Schedule

The Competent Person shall keep and maintain a written schedule of the systematic maintenance of every element of the entire set up, which schedule shall include intervals between the inspection, replacement, adjustment, lubrication, servicing, modification, measurement for excessive wear/deterioration or any other works as recommended or requested by the equipment manufacturer, Surveyor or the Director. The Competent Person shall also permit the Director to inspect and copy the maintenance schedule in his possession. The Director may require the Competent Person to amend the maintenance schedule as circumstance required.

9.2 *Implementation of Maintenance Schedule*

All the maintenance works in connection with the equipment, including bungee cords, bindings, end attachments, safety harnesses, ankle strapping, ropes, life lines, hardware, webbing, rigging & retrieval system as mentioned in section 6 of this Code, shall be carried by and/or under the direct supervision of the Competent Person as required by the Amusement Rides (Safety) Ordinance. The Competent Person shall ensure that the entire set up and every component of the bungee jumping is maintained regularly in accordance with the maintenance schedule.

9.3 *Maintenance Records*

The Competent Person shall keep and maintain an daily operational log book in prescribed form, which shall contain the following information.

- (a) The date, names and duties of the operatives;
- (b) the confirmation of compliance with this Code, the operation manual and the recommendation of the manufacturer in respect of :
 - daily inspections;
 - the pre-operational examination; and
 - Close down procedures.
- (c) the numbers, duties and working hours of the operatives shall be such as have been stated in this Code and the approved operation manual;
- (d) execution of any adjustment or maintenance works which do not fall within the normal daily routine works or procedures;
- (e) stating the components serviced, the condition of such components and the replacement of such components;
- (f) details of any accident, malfunction or abnormal occurrence;
- (g) details of any emergency or rescue operation or practice of a rescue operation; and
- (h) any other information or occurrences that may be required by the Director.

9.4 *Periodic Examination by an Independent Surveyor*

(a) The Owner shall ensure that the entire set up of his jump site is examined by a Surveyor not less than once every 12 months. The extent of the periodic examination shall cover every component of the set up, the operation system, and the structure of the jump platform, ..etc. that may be necessary to ascertain the integrity and safe operation of the bungee jump. Before carrying out the examination, the Surveyor shall seek the Director's consent on the scope of examination.

(b) Notwithstanding the inspection period of 12 months just mentioned, the Director may require such an examination to be carried out at any time if, in his opinion, the condition of any part of the set up is such as to require examination.

(c) The Owner shall ensure that a report of every periodic examination, prepared by the Surveyor conducting the examination, is sent to the Director not later than 14 days after the examination.

10 Rescue Operations and Equipment

10.1 Emergency Manual

(a) Before the operation of any bungee jumping, the Owner shall submit an emergency manual, for the approval of the Director, describing the responsibilities of and the detailed emergency actions to be taken by the Owner, the Competent Person and other operatives. The manual shall also cover emergency means of communication, equipment and instructions for safe rescue and evacuation and the protection of property against damage.

(b) The following gives a outline of the emergency manual for reference:

- A list of undesirable events that might occur at the jump site.
- The emergency provisions and procedures for each critical events.
- The local emergency and support organizations with whom arrangements have been made.
- The communication system and names of key people to be contacted in emergency situations.
- The practice timetable for emergency events and testing of communications systems.
- Standards for call out time and practice events shall be established and recorded.
- A log or record containing:
 - (i) emergency practices held and standards achieved;
 - (ii) qualifications of the current staff who would be involved in emergency procedures and first aid, with renewal dates stated; and
 - (iii) the emergency supplies and appliances to be available on site for injury treatment and the use of the public and the staff during emergency situations.
- The rescue procedures in case of failure in primary retrieval system.
- Details of the retrieval system that is of fail safe design and could retrieve the Jumper within 2 minutes.

10.2 Rescue and First Aid Equipment

(a) The Owner shall at all times ensure that at least one first-aider serves on the jump site and

- all first-aiders are fully trained, and regularly retrained, if required, by a recognized first aid training organization;
- all first aid boxes and equipment are maintained in a serviceable and sanitary condition;
- all materials in a first aid box are those designated in, and are of a grade not lower than the standards specified by, the British Pharmaceutical Code or by any supplement to it;
- nothing except appliances and requisites for first aid are kept in a first aid box;
- basic life support updates shall be completed every 6 months;
- where the site includes moving water or swift water, the operation manual shall specify the rescue training and/or qualifications required for at least 2 operatives on the jump site; and
- a moveable light shall be available on the platform to spotlight the Jumper while in the process of jumping or landing/recovery.

- (b) The Owner shall ensure that the equipment provided for the rescue of Jumpers is regularly examined and kept in a safe state of repair. Rescue equipment shall be placed at prominent locations with broad description of the their functions being displayed.
- (c) The Owner shall ensure that, at any time the jump site is in operation, there is on duty a sufficient number of persons trained in the rescue of Jumpers or handling of emergency situations.
- (d) The Competent Person shall carry out practice for rescue operation on the bungee jumping at such intervals as may be required by the Director.
- (e) The following rescue equipment must be present on the jump deck while jumping is taking place.
- Sharp knife with at least a 10 cm blade.
 - A rope of at least 3 m longer than the distance from the jump deck to the water or a solid surface at landing/recovery area, when anchored at the top , which is suitable for repelling.
 - The rappel line must be available for quick deployment in an emergency situation.
 - A decender with karabeaner ready for use.

Appendix A

Procedures and Submission

A.1 Application Sequence

The following is a typical application sequence for conducting a bungee jumping in Hong Kong which is regulated by the Ordinance.

- (a) Submit details of the design, specification, method and programme of proposed bungee jumping for assessment when applying for design approval.
- (b) When design approval is obtained, applicant may set up the jump site according to the approved design, method and programme of installation.
- (c) Submit operation manual, maintenance manual and emergency manual of jump site for assessment.
- (d) Select an employee to apply as Competent Person.
- (e) Appoint a Surveyor approved under section 5(1) of the Amusement Rides (Safety) (Operation and Maintenance) Regulation to thoroughly inspect, examine, test and certify the integrity of the amusement ride.
- (f) Apply for approval to commence operation of the jump site supplying information to demonstrate compliance with the Ordinance and its subsidiary regulations.
- (g) Approval to commencement of operation of the amusement ride under the Amusement Rides (Safety) Ordinance will be granted by the Director if he is satisfied with the Owner in the aspects of (c) to (f) mentioned above.

In particular, the details in respect of the application for design approval and the Permit for Commencement and Operation of the bungee jumping are further elaborated in section A.2 and A.3 below.

A.2 Design Approval

Pursuant to the Amusement Rides (Safety) Ordinance, prior consent of the Director shall be obtained before any construction works or setting up of a bungee jumping operation in Hong Kong could be commenced. The following is the basic information that shall be contained in the submission for assessment.

- a) Description of
 - entire set up of the jump site and how it operates;
 - all the equipment and apparatus to be used;
 - all the operators required;
 - effects of bungee jumping on participants;
 - restrictions on Jumper especially health-related issues;

- safety features;
 - protection for Jumpers, staff, spectators during normal operation;
 - recovery of Jumper after jump;
 - protection against adverse weather;
 - daily operating hours and measures to be taken for operation outside normal operating hours;
 - history of operation elsewhere, job reference and incident record;
 - whether disabled person and related facilities are accommodated;
 - quality control and type test certificate of the equipment used; and
 - details of principal operator/Competent Person who have a good track record and a proven ability to carry out the procedures in a consistent and thorough manner in operating a similar jump site.
- b) Structural Analysis, engineering design and the general arrangement drawings of the whole set up.
- c) A design report, prepared by a qualified professional engineer, certifying that the design and construction of the structure, equipment, access and operating area meet the requirement of this Code, and the full set up as a whole are considered suitable for bungee jumping.
- d) Calculation on the safety space and safety zone.
- e) Report on mechanical failure redundancy analysis as well as the redundancy on the operating procedures.
- f) Specification and type test certificate of the bungee cord to be used. The specification shall include the jump height and the intended rate of deceleration of the Jumper. A research report will be required to substantiate the correct selection of the rate of deceleration i.e. it shall be within the physical limit of an average person.
- g) Specifications of bungee cord end attachment, Jumper's harness, hardware & webbing, and the free fall rope (if used).
- h) Specification and drawing of the rigging system and retrieval system.
- i) Site location map showing vehicular access to the jump site and related structures for emergency services.
- j) Site layout plans and elevations showing principal dimensions and boundaries of
- tower structure and the retractable or fixed jump platform;
 - ladders/lift to jump platform;
 - Jumper body condition check-up area;
 - length and width of the jump zone and jump space;
 - safety clearances all round the jump zone;
 - landing area;
 - water pool or padding under launch point;
 - fencing of tower structure if any;
 - site fencing;
 - spectator area; and
 - specification with model numbers, weights, design life, operational constraints, and drawings/ sketches/ photographs for all equipment and structure.

- k) Proof of compliance with applicable Design Codes adopted with calculations and acceptance criteria, e.g. stress analysis of structure and resulting safety margins, forces exerted on the Jumpers.
- l) Installation method and programme.
- m) Qualification and training of the operating staff.
- n) A detail account on the operation system illustrated with a process diagram as necessary.
- o) Details of the affiliate facilities in connection with the bungee jumping operation.
- p) A written policy statement and purchasing procedures to ascertain the compliance with the standards for equipment, rigging, bungee cord and other related materials.
- q) Insurance policy and the extent of coverage provided to the Jumpers.

Apart from the support of authoritative design report, a good track record and a proven ability to carry out the procedures in a consistent and thorough manner in operating the similar jump sites would be an important consideration in the assessing the application put forwarded by a particular Owner.

A.3 Permit for Commencement of Operation

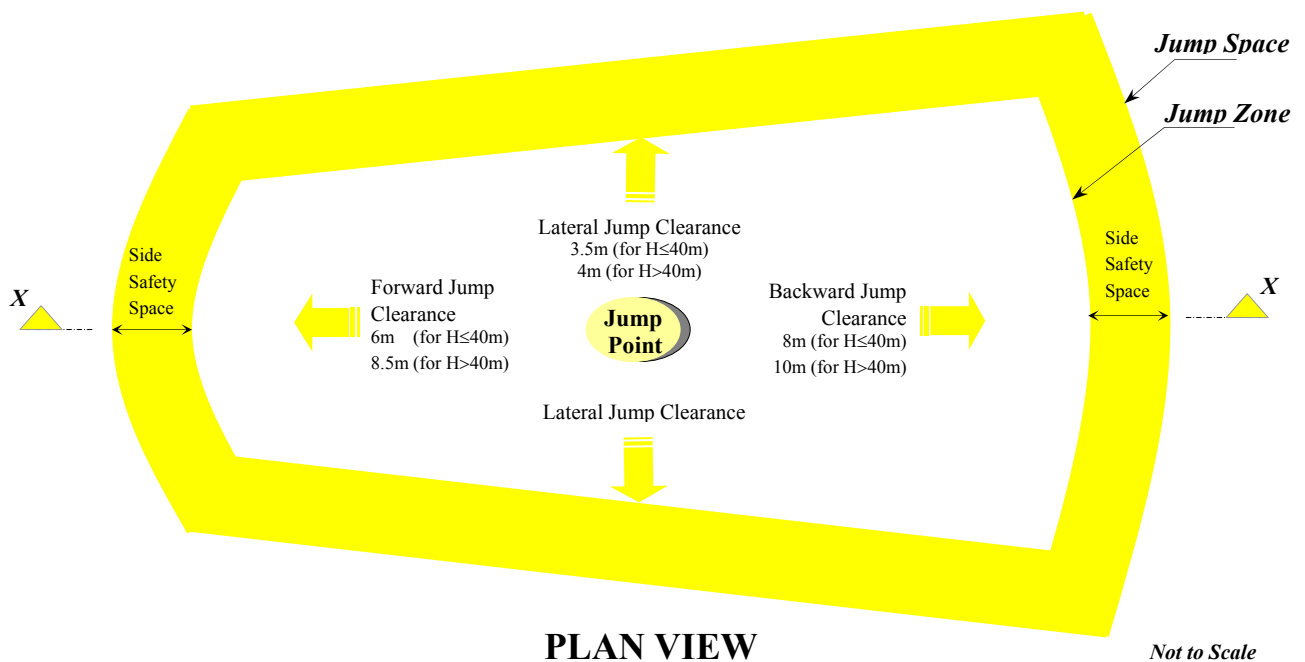
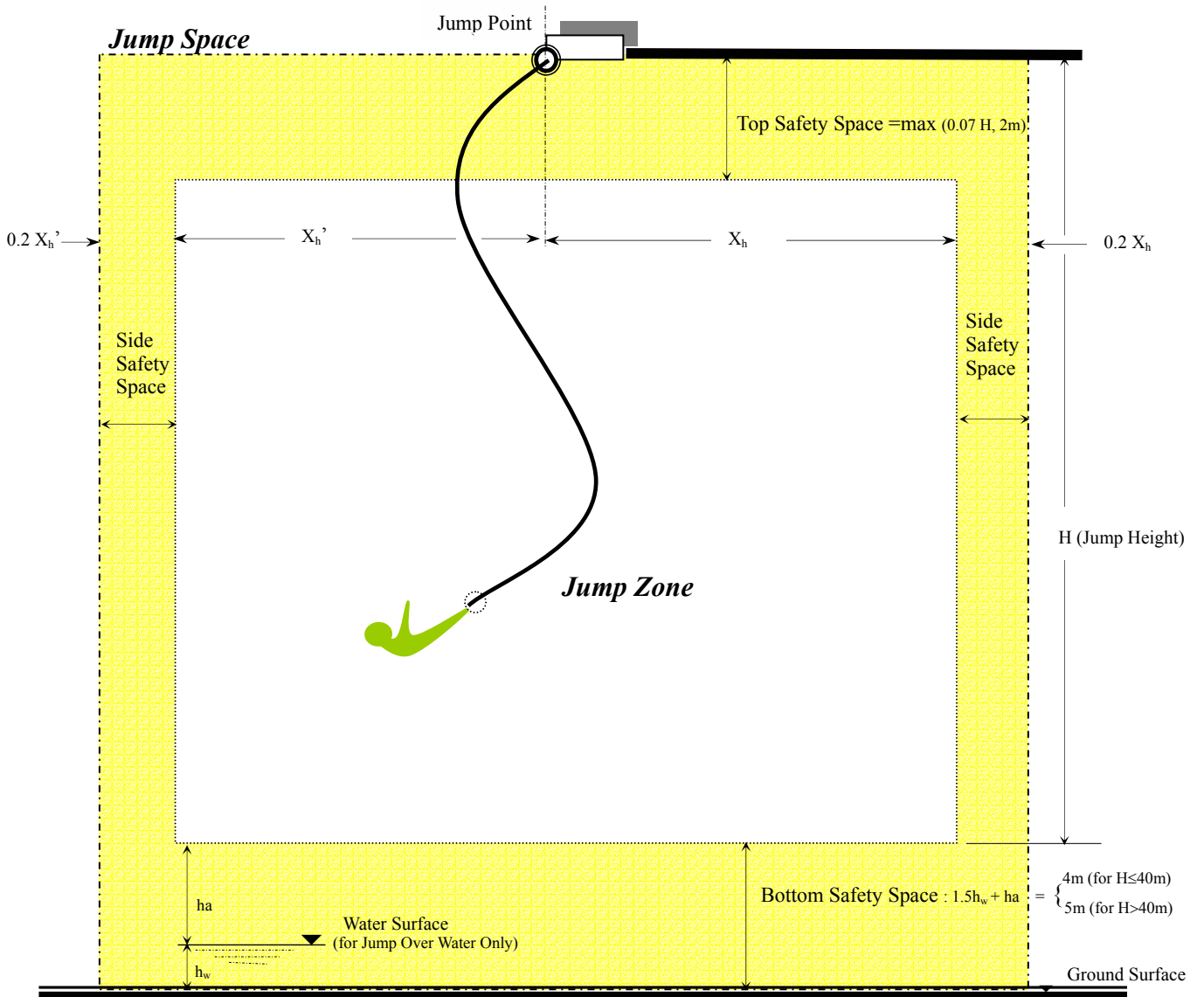
With the consent to the design submission, the construction/installation works may be proceeded accordingly. A permit to use and operate the bungee jumping in the specified location would then be issued to Owner upon submission and clearance of the following:-

- a) Satisfactory testing and certification of the entire set up by an approved Surveyor.
- b) Operation/maintenance/emergency manuals having been submitted and accepted by the Director.
- c) The Competent Person, Jump Master and other operatives, as approved by the Director, having been employed by Owner.

In addition to the considerations specified in the Ordinance, the Director may revoke the registration of a particular bungee jumping operation or individual operative in case of the following:-

- a) The Owner does not actively involve in the bungee jumping operation at a particular registered site for more than six months within a period of one year.
- b) The operative has not been actively involved in a particular registered site for more than 6 months continuously.
- c) Failure in timely submission of the annual Surveyor Report.
- d) Upon receipt of a written notification for cancellation from the Owner or operative.
- e) Failure to comply with the operation system or not carrying out the maintenance works in accordance with the operation manual and the maintenance manual.
- f) Any repeated practices or acts in the course of jumping that are contrary to this Code and may, in the opinion of Director, have put the public safety at risk.

Appendix B Definition of Jump Zone and Safety Spaces



Reference

1. Amusement Ride (Safety) Ordinance (CAP. 449)
2. Amusement Ride (Safety) (Operation and Maintenance) Regulation

Enquiry

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