

# **CANADIAN BUNGEE**

Code of Safe Practice

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## PART 1

### 1.0 EXECUTIVE SUMMARY

The Canadian Bungee Code of Safe Practice has been constructed to be used by the Ontario Government (Ministry of Consumer and Commercial Relations) to help regulate commercial Bungee Jumping as a sport and entertainment in Ontario, through its adoption to legislation. It has also been published to guide and assist other provincial or municipal jurisdictions in Canada who wish to regulate or assist in regulating the Bungee Jumping industry.

The Code of Safe Practice outlines the requirements and guidelines for the safe conduct of Bungee Jumping. This Code of Safe Practice provides the standards on which to base the management of the inherent risks. The code itself will not control the risks involved: this depends on the compliance with the code by each and every operator and practitioner of the sport. Preparation, testing and checking of equipment precedes any operation. Similarly, proper staff selection and training are essential for the effective execution of safety procedures. Since different sites plans and jump structures will require different safety procedures and equipment, every site will require and operate according to its own Operations Manual, the required contents of which are specified in this document.

## PART 2

### 2.0 DEFINITIONS

DEFINITIONS for this code are as follows:

#### ACCIDENT

An occurrence that results in injury or causes property damage.

#### AVERAGE CORD LENGTH

The average of: (a) bungee cord system length, and (b) the maximum system length.

#### BINDING OF CORD

Material used to hold the bungee cord threads in place.

#### BOTTOM JUMP SPACE

The bottom jump space is a box-shaped volume situated directly below the top jump space and directly above the bottom safety space. It comprises the bottom part of the jump space.

#### BOTTOM SAFETY SPACE

The Bottom Safety Space can be defined as the additional space required outside the Jump Space to create an additional margin of safety. The bottom safety space is directly below the bottom jump space.

#### BUNGEE CORD

The elastic rope to which the jumper is attached. It lengthens and shortens and thus produces the bouncing action.

#### BUNGEE CORD SYSTEM LENGTH

The total length of the unstretched bungee cord, karabiners, static line and any other components, when measured from the anchor point, up to and including the jumper.

#### BUNGEE JUMPING

When a person free falls from a height and the descent is limited by attachment to the bungee cord.

#### BUNGEE RIDE OR BUNGEE TYPE DEVICE

An amusement device which uses elastic rope or metal rope and springs or any other means used to create a bouncing action for the purpose of dropping a person from a height, propelling a person in a horizontal or vertical direction or any combination thereof.

**CATAPULTING, LAUNCHING, NEGATIVE OR REVERSE JUMPING**

The practice of loading the bungee cord while attached to an anchored jumper. The jumper's anchor is released to propel the jumper upward.

**CORD** See Bungee Cord

**DYNAMIC LOAD**

The load placed on the bungee cord, rigging harness, etc. by the weight of the jumper while in motion.

**DYNAMIC ROPE**

Climbing rope, of Kernmantel construction, designed with limited stretch to absorb shock loads. Normally used as safety line in sport climbing.

**ENGINEER**

A professional engineer acceptable to the enforcing authority having jurisdiction.

**FACTOR OF SAFETY**

Factor of safety is the ration of the ultimate stress to the maximum stress imposed on a component.

**FAIL SAFE**

A system or design function that causes the primary system to shut down to a safe state when a fault occurs.

**G FORCE**

The unit of force equal to the gravity exerted on a body at rest.

**HARNESS**

An assembly to be worn by a jumper and to be attached to a bungee cord. It is designed to prevent the wearer from becoming detached from the bungee system.

**HARNESS SYSTEM**

The combination of harnesses which provides redundancy of the attachment of the bungee cord to the jumper.

**INCIDENT**

An occurrence with potential for injury or property damage.

**JUMP ASSISTANT**

A person who assists the Jump Master.

**JUMP DECK**

The controlled area from which a Bungee Jump is made, under the supervision of a Jump Master.

#### JUMP HEIGHTS

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

#### JUMP MASTER

A person responsible for the safety and well-being of all jumpers from the time beginning at the point when the jumper enters the jump deck until the jumper is detached from the bungee cord system.

#### JUMP POINT

The designated location from which a jumper leaves the jump deck.

#### JUMP SITE

The area approved and designated to conduct the activity of bungee jumping.

#### JUMP SPACE

The space bounded by the maximum range of movements of the jumper or any part of the jumper. It's dimensions are designed to provide enough area for a jump taking any direction plus an additional 20% safety area on the sides and top.

#### JUMPER

The person who falls or jumps from a height attached to a bungee cord or is propelled or moved on a bungee ride or bungee type device.

#### JUMPER WEIGHT

The weight of the jumper only, as determined by the measurement taken on a scale, calibrated to a National Standard.

#### LANDING AREA

The separated area where the jumper is retrieved at the end of the jump.

#### LOG BOOK

A collection of bound pages numbered in sequential order, used to record all required data.

#### MAXIMUM BUNGEE CORD SYSTEM LENGTH

The measurement of the theoretical designed maximum stretched length of a bungee cord system length, when used in the weight envelope for which it was designed.

#### MIL-SPEC BUNGEE CORD

Manufactured according to U.S.A. military specifications, rubber is loaded before being sheathed in a cotton and nylon combination. A mil-spec bungee cord is comprised of several of these smaller cords bound together.

**PERSONAL LOG BOOK**

A written log held by Jump Masters, Jump Assistants, and Retrieval Operators, recording all jumps performed or dispatched.

**PERSONNEL**

Any worker involved in a bungee jumping operation.

**PREPARATION AREA**

The area separated from the jump point where the jumper is prepared, harnessed and briefed for jumping.

**RIGGING EQUIPMENT**

The bungee cord plus any webbing or rope, karabiners, shackles and pulleys connected in line to the bungee cord which is anchored to the jump structure and attached to the jumper.

**RIGGING SYSTEM**

The manner in which the assembly of rigging equipment is used for bungee jumping.

**SAFE WORKING LOAD (SWL)**

The maximum rated load as determined by the designer and verified by a professional engineer which can be safely handled under specified conditions. SWL shall also incorporate dynamic and ambient loads on to the jump deck and its' support system.

**SAFETY HARNESS**

An assembly worn by all jump site personnel working at height. It is designed to be attached to a safety line to prevent the wearer from falling.

**SAFETY LINE**

A line used to connect a safety harness or belt to an anchor point.

**SAFETY SPACE**

An additional space extending beyond the bottom of the jump space.

**SANDBAGGING**

The practice of loading excess weight to a jumper with the intent of releasing the excess weight during the course of the jump, thus gaining extra momentum on the rebound.

**SET UP**

The assembling of the material and equipment to create a jump site.



**SITE MANAGER**

The person designated as having administrative control over the jump site.

**SLING**

Single or double looped construction of tubular webbing or tape, designed for attachments.

**STATIC LINE**

A length of Static Rope that may be incorporated in series with the Bungee Cord in the rigging system.

**STATIC ROPE**

Non-dynamic climbing rope of Kernmantel construction.

**TANDEM, MULTIPLE, OR DOUBLE JUMPING**

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

**TOP JUMP SPACE**

The top jump space is a pyramid-shaped volume situated directly above the bottom jump space.

**3.0 FUNDAMENTAL PRINCIPLES**

**3.1 Introduction**

This code applies to any amusement device which uses elastic rope or metal rope and springs or any other means used to create a bouncing action for the purpose of dropping a person from a height, propelling a person in a horizontal or vertical direction or any combination thereof.

**3.2 Competence**

In the context of this document, the principle of competence can be defined as the use or employment of a piece of equipment or a person that is capable of performing the desired task in a safe manner.

With respect to equipment, competence is satisfied when the minimum standards which ensure its capability for both normal use and for all anticipated extreme conditions of use, with an appropriate factor of safety, is met.

With respect to performing tasks and procedures, competence is satisfied when they are assigned only to personnel with the necessary knowledge

and ability to perform them. Competence is acquired when a person performs the procedure a certain number of times and demonstrate that they understand the importance and reasoning behind the procedure being carried out. The logic used here is that once an reasonable person has performed the duty or procedure a certain number of times, they become competent in performing that duty.

### **3.3 Redundancy**

The principle of redundancy applies to equipment and procedures. With respect to equipment, redundancy is applied where the failure of a component in a system could cause an accident or incident, by backing-up that component with a second similar component in parallel with the first. If the primary component fails, the second component takes over to prevent the accident or incident.

With respect to procedures, redundancy takes the form of checks and double checks. There is potential for mistakes on all procedures, therefore all procedures shall be rechecked by a different person. For example, when a jumper is attached to a bungee cord, the linkage to the jumper is performed by a competent worker and then rechecked by a second competent worker.

### **3.4 Design Requirements**

All bungee rides or bungee type devices shall be constructed so that they are not portable. These devices shall be permanently anchored and affixed to the location of operation by means acceptable to the Director.

## **4.0 Equipment**

### **4.1 Jump Deck**

- 1) The jump deck design shall be certified by a professional engineer to be capable of carrying SWL with a minimum factor of safety of five (5).
- 2) The jump deck must be used in a manner approved by a professional engineer.
- 3) The jump deck shall have a slip resistant floor surface.
- 4) The jump deck must be designed to ensure that the Jump Master can have an unobstructed view of the jumper at all times during the jump until recovery.

- 5) The jump deck shall have anchor points, cables or rails for safety lines, designed and placed to facilitate the unrestricted movement of personnel while performing procedures. The number of anchor points, cables or rails shall be the same as the maximum number of people permitted on the jump deck.
- 6) The jump deck shall have sufficient space to perform all procedures for the number of persons permitted on the deck. This space shall at least accommodate the Jump Master, the Jump Assistant and the jumper.
- 7) There shall be a self closing gate with an automatic positive lock system separating the jump point from the jump deck to prevent an inadvertent jump or fall. There shall be a gate/barrier separating the jump deck from the structure to prevent inadvertent entry onto the jump deck.
- 8) Access and platform walkways, entranceways, stairways, ladders, handrails, etc. shall meet minimum local building codes for public access.
- 9) Railings shall be present on both sides of the jump point to allow for the jumper to hold on to during the final stages preceding the jump.
- 10) A toe board of at least 10 cm in height shall surround the flooring where it meets the edge of the jump deck, except in the vicinity of the jump point.
- 11) The jump deck must be equipped with a wind speed and direction indicator.
- 12) The jump deck shall have a conspicuously posted sign or marking indicating Safe Working Loads in kgs.

## **4.2 Rigging System**

- 1) All rigging equipment and all aspects of a rigging system shall conform to the fundamental principals explained in section 3.0.
- 2) There shall be an alternative procedure of jumper retrieval should the primary system fail. This procedure shall be outlined in the operations manual and contain the same redundant requirements as the primary system.
- 3) The rigging system must be primarily designed to lower a jumper. Where emergency rescue procedures require the jumper to be pulled back up to the jump deck, then two separate locking mechanisms (for example, an ascender) shall be used to stop and hold the jumper in one place once the applied force on the retrieval rope is removed.

- 4) The rigging system shall be designed to prevent or stop the uncontrolled movement of the system should a situation arise where a person who is aiding in the operating of the system becomes unconscious or unable to perform the required duties safely.
- 5) All anchoring systems shall meet or exceed the following:
  - a) Two anchors shall be used to attach the bungee cord to the jump deck, with a minimum factor of safety of 10 for the primary anchor. Both anchors must be attached throughout the entire jump and retrieval process. Each anchor must be attached to a different load bearing point on the structure.
  - b) Where an anchor is made of wire rope, it shall have swaged ends with thimble eyes.
  - c) Where ropes are used for anchors they must be of static kernmantle construction.
  - d) Knots used on anchor ropes shall be either a double-loop figure eight or are recognized modified version thereof, followed by an overhand or fisherman's keeper knot.
- 6) All shackles shall be safety wired or cotter pinned and all screw gate karabiners shall be turned to point downwards.
- 7) The rigging system shall pass through or around the jump deck and be equipped in such a way as to eliminate damage to the rigging system and be accessible for a "hands-on" inspection by the Jump Master and/or Jump Assistant before each jump.
- 8) Pulleys must only be used to alter the direction of ropes and must not be used in the rigging system between the bungee cord and the anchor point.
- 9) All pulleys and shackles in the rigging system shall be used in parallel with a karabiner that acts as a no-load bearing backup.

#### **4.2.1 Additional Requirements for Elevating Jump Decks**

- 1) The jump deck shall have overhead protection that shall not obstruct the overhead view of the personnel on the jump deck.
- 2) The jump deck in addition to a main support system shall have a secondary means of support that will be activated in the case of failure of the main support system.

- 3) Means shall be provided to prevent the jump deck from rotating and to limit oscillations.

### **4.3 Bungee Cords**

- 1) All bungee cords must be constructed with an non-load bearing, built-in, backup fall arrest system that ensures that the cord cannot be stretched beyond its designed limit. The minimum breaking strength of the backup fall arrest system shall be 1800 kgs.
- 2) Where 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. The sheath or binding shall not affect the cord's designed performance.
- 3) Where a single cord system is used, the bindings shall hold the cord threads in their designed positions. The binding shall have the characteristics of the cord itself and not affect the cords designed performance.
- 4) A copy of the bungee cord's design, manufacturing and testing data shall, upon request, be submitted to the regulating authority and shall include the following:
  - a) Conclusive Ultimate Tensile Strength testing on a representative sample to assure that the minimum factor of safety of bungee cord at any point of it's rated lifespan, considering the criteria in (c) through (f), shall not be less than five (5).
  - b) A Load Versus Elongation Curve, resulting from the aforementioned test.
  - c) Calculations of the maximum G force exerted by the cord on a jumper within the proper weight range.
  - d) Maximum allowable usage of bungee cords expressed in number of jumps.
  - e) Maximum allowable deterioration or damage to cords before they must be destroyed, including but not limited to hours of ultraviolet light exposure and percentage of broken threads.
  - f) Bungee cord use expiry date.
- 5) Any material such as "webbing" used in either of the two end attachment points of a bungee cord regardless of whether it is designed as a single or

multiple cord system shall have a strength of at least two (2) times the Ultimate Tensile Strength of the bungee cord. All webbing ends in the ends of the bungee cord shall be sewn together.

- 6) Where there are multiple end attachment points these must be bound with a strong and resilient sheath to create a single attachment point, thus minimizing the risk of improper attachment of the bungee cord to the jumper's harness or anchors.
- 7) All end attachment points shall be designed so as to minimize the wearing down and/or severing the rubber from friction and all end attachment points subject to wear are to be retired and destroyed when the cord is retired and destroyed.
- 8) The unloaded length of the bungee cord system to the anchor point shall be less than on half (1/2) the bungee cord-system length at full extension, when loaded to it's maximum designed load.
- 9) Where there exists the possibility of injury to a jumper from hard end attachments in the bungee cord system, the end attachment points must be covered by a secure but detachable pad.
- 10) Bungee cord shall be identified at both ends, using a designated colour scheme that identifies the allowable weight ranges for which the cord was manufactured, with the scheme being indicated in the operations manual

#### **4.4 Harnessing Procedures and Specifications**

- 1) Harnesses shall be specifically designed and manufactured for mountaineering or Bungee Jumping and shall meet or exceed the standards set by Union International Alpinism Association (UIAA). Underwriter's Laboratories Incorporated or be certified by a professional engineer.
- 2) The jumper shall be secured to the bungee cord at two separate points on the jumper's body. Therefore, a jumper harness system consists of one of the following:
  - a) A full body harness with two different and separate attachment points.
  - b) A waist harness used with a shoulder harness.
  - c) An ankle harness system with a safety line to a waist harness or a full body harness.
- 3) Ankle harnesses must not allow the jumpers ankles to collide or cause bruising.

- 4) The minimum breaking strength of a harness shall be the 1800 kgs.
- 5) The minimum factor of safety of a harness system shall be ten (10).
- 6) The G-force imposed on a jumper where the force of the jump is taken on the torso shall not exceed 4.5 G's. The G-force imposed on a jumper where the force of the jump is taken on the ankles shall not exceed 3.5 G's.
- 7) Harnesses shall be available to fit the range of patron sizes as specified by the manufacturer of the harness.
- 8) Safety lines shall limit a fall to 1.5 m.

## **4.5 Rigging Equipment and Hardware**

### **4.5.1 Karabiners**

- 1) Karabiners used to attach the jumper to the bungee cord or used in the rigging system shall be of the screw gate type.
- 2) Karabiners shall have a minimum breaking strength of 3000 kgs
- 3) Karabiners shall have a minimum factor of safety of ten (10).
- 4) Karabiners shall be of a size suitable for the equipment used.
- 5) All screw gate karabiners shall be installed so as to be in opposite and opposed positions.

### **4.5.2 Slings/Webbing**

- 1) All load supporting slings or webbing shall be flat tubular dynamic webbing or the equivalent.
- 2) Slings or webbing shall have a minimum breaking strength of 1800 kgs.
- 3) Slings or webbing shall have a minimum factor of safety of ten (10).
- 4) Ends of webbing used for slings shall be sewn together.

### **4.5.3 Ropes**

- 1) Ropes used in anchoring and/or lowering the jumper shall:
  - a) be of static kernmantle construction

- b) have a minimum breaking strength of 2700 kgs
  - c) have a minimum factor of safety of ten (10)
- 2) Ropes used for safety lines and on rigging systems without a bungee cord where a person may be subjected to shock loading shall:
- a) be of dynamic kernmantel construction
  - b) have a minimum breaking strength of 1800 kgs
  - c) have a minimum factor of safety of ten (10)

#### **4.5.4 Pulleys/Shackles**

- 1) Pulleys and shackles shall have a minimum breaking strength of not less than 1800 kgs.
- 2) Pulleys and shackles shall have a minimum factor of safety of not less than ten (10).
- 3) Pulleys and shackles shall be suitable as specified by their manufacturer for the size of ropes or cables being used.
- 4) Pulleys shall have a minimum diameter of not less than 10 cm.

#### **4.5.5 Ascenders, Descenders, and Other Hardware**

- 1) Any piece of hardware used in the rigging system shall have a minimum breaking strength of 900 kgs.
- 2) Hardware used in the rigging system shall have a minimum factor of safety of five (5).
- 3) Where hardware in the rigging system is used to take dynamic load, it shall have a minimum breaking strength of 1800 kgs.
- 4) All “Jumars” shall be backed by 1" tubular nylon webbing which takes the load in the case of “Jumar” failure.

#### **4.6 Scales**

- 1) All scales shall:
  - a) be approved by the CSA.
  - b) maintain a 5% accuracy.

#### **4.7 Retrieval Vessel**



- 1) The retrieval vessel shall be such that and used in such a manner so that the person being retrieved is not exposed to hard or sharp surfaces.
- 2) The retrieval vessel shall be free from water leaks.
- 3) Where a motor is used with the retrieval vessel, it shall:
  - a) be within the power range suitable for the vessel as recommended by the manufacturer
  - b) be equipped with a propeller guard
- 4) The retrieval vessel shall be equipped with the following equipment:
  - a) a spare lifejacket
  - b) a rescue pole of at least 3 m or a floating lifesaving device with a rope, to assist anyone who might be in the water.
  - c) a personal first aid kit
  - d) a replacement oar/paddle in the case of a motor failure or the loss of one of the primary oars.

#### **4.8 Equipment Inspection, Testing, Maintenance and Replacement**

- 1) The jump deck, anchor points, and all equipment and operating systems shall be regularly inspected for damage and wear. The inspections shall:
  - a) be performed as specified by the equipment manufacturers and according to the frequency and methods stated in the operations manual.
  - b) as a minimum be performed prior to opening the site each day.
  - c) be recorded in a log book and kept readily available to the regulating authority.
- 2) Jumping shall cease until the damaged or worn item is repaired or replaced.
- 3) Each item shall have its own permanent individual identification or serial number. The identification shall:
  - a) not harm the material of the item.
  - b) be clearly visible to personnel during daily operations.
  - c) be recorded in the equipment log book.
- 4) All equipment shall be replaced according to the manufacturer's recommendations.
- 5) All inspections shall be undertaken by two (2) people.

##### **4.8.1 Bungee Cords**

- 1) All bungee cords shall be inspected by a Jump Master or Jump assistant.

All inspections shall:

- a) be performed as specified by the equipment manufacturers and according to the frequency and methods stated in the operations manual.
  - b) as a minimum be performed prior to opening the site each day.
  - c) be performed after 25 jumps.
  - d) be recorded in a log book and kept readily available to the regulating authority.
- 2) The following data with regards to bungee cords shall be recorded in a log book and kept readily available to the regulating authority.
- a) cord manufacturer.
  - b) cord lot.
  - c) cord serial number.
  - d) total allowable jumps and Ultra Violet exposure time for unsheathed cords.
- 3) Repairs to any bungee cord shall only be made according to the manufacturer's approval and recommendations.
- 4) A bungee cord shall be removed from use and destroyed (cut into lengths less than 2 m) when:
- a) more than five (5)% of the load bearing threads are broken or damaged or they exhibit signs of deterioration.
  - b) it does not behave according to manufacturer's specifications.
  - c) it has reached the maximum usage expressed in number of jumps as specified by the manufacturer.
  - d) it exhibits any abnormalities as specified by the manufacturer.
  - e) it has been exposed to damaging or unknown chemicals or solvents.
  - f) it has been subjected to loads greater than 20% of their designated working dynamic load.
  - g) it has exceeded manufacturer's recommended total allowable Ultra Violet exposure time, expressed in number of hours.
  - h) it has exceed the bungee cord expiry date as specified by the manufacturer.

#### **4.8.2 Harnesses**

- 1) All harnesses shall be inspected for damage or wear before being fitted on each jumper.
- 2) Any harness showing signs of being partially severed, serious fraying, loose stitching, less than perfect buckles, or anything which makes them unsafe for use, shall be removed from the jump site.

#### **4.8.3 Hardware**

- 1) Hardware shall be inspected daily. Hardware subject to abnormal loadings, being impacted against hard surfaces, or having surface damage, shall be replaced.
- 2) Karabiners shall be removed from service when the locking mechanisms fail to lock properly, the springs are worn or the locking gates deform to the point where its safe use become questionable.

#### **4.8.4 Ropes, Cables and Webbing/Slings**

- 1) Ropes, cables or webbing/slings subject to an abnormal dynamic load shall be replaced.
- 2) Ropes, cables or webbing/slings shall be destroyed and replaced when they exhibit signs of excess fraying.

#### **4.9 Equipment Storage and Security**

- 1) All equipment shall be stored at the end of each day according to the manufacturer's recommendations.
- 2) All equipment shall be stored in a secure structure, under lock and key, with access to keys being limited to the Jump Master(s) and site manager(s).
- 3) All equipment shall be stored in an orderly and efficient manner.
- 4) All unserviceable equipment shall be removed from the jump site.
- 5) All persons other than jump site personnel shall be prohibited in fenced areas during the set up or break down of equipment.

### **5.0 SITE CONDITIONS and REQUIREMENTS**

All jump sites shall be permanently located as required by Clause 3.4 and are required to provide the following:

#### **5.1 First Aid Equipment**

The first aid kit on the site shall contain:

- 1) A recognized manual for the administration of first aid.
- 2) The following instruments:
  - a) one (1) pair of scissors

- b) one (1) tweezers
  - c) twelve (12) safety pins
  - d) one (1) neck collar or brace suitable for immobilization
  - e) one (1) spinal board of a recognized design
  - f) one (1) speed splint for upper and lower extremities
- 3) The following dressings:
- a) twenty-five (25) adhesive bandages in sterile envelopes
  - b) twenty-five (25) gauze compresses in sterile envelopes
  - c) four (4) rolls of sterilized gauze bandages
  - d) eight (8) triangular bandages
  - e) two (2) rolls of elastic bandages
  - f) four (4) pressure bandages
  - g) one (1) large trauma pressure bandage (4 inch)
  - h) ten (10) large gauze compress pads
  - i) one (1) bottle of antiseptic
- 4) In the case of a raised tower jump platform with no vehicular access, a sling suitable for lowering an unconscious patient off the platform.
- 5) A First Aid kit and Emergency equipment shall be kept in a place no more than 50 m from the jump space and must be easily accessible to any and all personnel.

## **5.2 Public Provisions**

- 1) The following must be available during hours of operation:
- a) access to public roads.
  - b) internal access routes for emergency service vehicles.
  - c) washroom facilities.
  - d) a public address system.
  - e) telephone or radio communication to emergency services.

## **5.3 Lighting**

- 1) Where bungee jumping is to be conducted after sunset, adequate lighting of at least 500 lux shall be provided at both the jump deck, retrieval and recovery areas and along access ways from the ground level to the jump deck.
- 2) If no artificial lighting is available on the jump platform then jumping must cease ½ hour before sunset and not commence until ½ hour after sunrise.

## **5.4 Fencing**

- 1) Fencing at least 1.1m high shall be provided to limit access to the following areas, where the areas are not naturally sectioned off to deter public access:
  - a) the area directly below the jump space.
  - b) the jump recovery area.
  - c) the jump preparation area.
- 2) Where the jump space is over open water, harbors, or public waterways where there is access by other watercraft, the area directly below jump space shall be defined by the deployment of buoys.
- 3) To deter public access while the site is not operational fencing at least 2.4m high with a locking gate must surround the jump tower or any other area where height could be achieved by access from the ground level. This fenced area must also be accompanied by no-trespassing signs every 6m along the fence.

### **5.5 Posted Signs**

- 1) All signage shall:
  - a) be prominently displayed.
  - b) have letters not less than 2.5 cm high.
  - c) be of durable construction.
- 2) The following signage shall be posted:
  - a) a listing of the medical, weight and age restrictions for jumpers.
  - b) a warning forbidding access at the entrance to the base of the jump structure when the operation is closed.
  - c) where a jump is conducted over public waterways or where watercraft access, other than the retrieval vessel, is not restricted, a warning to other watercraft that the bungee jumping activities are in progress, shall be posted on floats at least 20m ahead of the jump space on every side of potential access.

### **5.6 Storage Facilities**

- 1) All jump sites must have proper storage facilities that provide for equipment to be stored according to the manufacturer's recommendations under lock and key.
- 2) The storage unit must be of suitable size for the amount and type of equipment being stored.

### **5.7 Rescue Equipment**

- 1) The following rescue equipment must be present on the jump deck while jumping is taking place:
  - a) a sharp knife with at least a 10 cm blade.
  - b) two (2) ropes at least 3 m longer than the distance from the jump deck to the water when anchored at the top, that is suitable for raveling. The rapel line must be anchored at all times and be available for quick deployment in an emergency situation.
  - c) two (2) descending devices, one to be carried on the Jump Masters harness, at all times and the second to be pre-attached to the rapel line.
  - d) two (2) extra karabiners attached to Jump Masters harness.
  - e) any other equipment that is required for emergency rescue procedures at a jump site as stated in the jump site operating manual.
  
- 2) The following rescue equipment must be present at a location no more than one (1) minute from the boundary of the jump space while jumping is taking place:
  - a) a sharp knife with at least a 10 cm blade.
  - b) one (1) spinal board.
  - c) one (1) neck brace.
  - d) three (3) triangular bandages.
  - e) one (1) personal first aid kit.
  - f) any other equipment that is required for emergency rescue procedures at a jump site as stated in the jump site operating manual.

## **5.8 Jump Spaces and Safety Spaces**

(For clarification of this section refer to Appendix A)

- 1) A jump which leaves the jump space shall be recorded as an incident and jumping stopped until the cause of the incident is determined and corrected.
- 2) The jump space and safety space shall be free of spectators at all times.
- 3) The jump space and safety space shall be free of any equipment or personnel from the point in time when a jumper is being moved from the jump deck to the jump point until the jumper stops rebounding.
- 4) The clearance between a bungee jumping operation and electrical power lines shall be in accordance with the requirements established by the authority having jurisdiction.
- 5) The bottom safety space must be composed of water in accordance with this section.

### **5.8.1 Bottom Safety Space**

- 1) Where water is used as part of the jump space, the following shall apply:
  - a) water must cover the bottom dimensions of the entire jump space.
  - b) an area with dimensions equal to 75% of the length and width of the bottom jump space and centered longitudinally and laterally under the jump space, shall have a water depth of 8% of the jump height with minimum of 4 m.
  - c) the water must be suitable for human immersion as determined by municipal standards on bacteria levels.
  - d) a means shall be provided to prevent debris and solid objects from entering the safety space.
  
- 2) Where the water is **not** used as part of the jump space, the following shall apply:
  - a) the depth of the bottom of the safety space shall be measured from top of the low water mark.
  - b) the depth of the bottom safety space shall be no less than 20% of the jump height and a minimum of 7 m.
  - c) The water shall cover the bottom dimensions of the entire jump space and shall be no less than 6m x7 m and capable of absorbing the impact forces of a fall. The pool shall be centered in the middle of the bottom safety space.
  - d) where a pool is used the water depth shall be no less than 8% of the jump height and minimum of 3 m.

## **5.8.2 Jump Space**

- 1) The dimensions of the jumps space shall be determined by adding the top jump space onto the bottom jump space and centering the entire volume at a arbitrary point halfway between the anchor point of the bungee cord system and the jump point:
  
- 2) The depth of the jump space shall be not less than the maximum bungee cord system length.

### **5.8.2.1 Bottom Jump Space**

- 1) The depth of the bottom jump space shall be equal to the average cord length where depth is measured upwards from the top of the bottom safety space.
  
- 2) The width of the bottom jump space shall be equal to 50% of the maximum bungee cord system length.
  
- 3) The lateral dimension of the bottom jump space shall be equivalent to 200% of the bungee cord system length.

### **5.8.2.2 Top Jump Space**

- 1) The dimensions of the top jump space shall be determined by extending four lines originating at the top four points of the bottom jump space to a point half way between the jump point and the anchor point of the bungee cord.
- 2) The depth of the top jump space shall be determined by subtracting the bottom jump space from the maximum bungee cord system length.

### **5.9 Jumper Landing Area**

When the jumper is retrieved over water a clean, padded or air filled compartment, with a non-abrasive surface, free of debris, shall be provided for the jumper and bungee cord(s). The sides of the compartment must be a least 25 cm higher than the bottom.

## **6.0 MANAGEMENT PROCEDURES**

### **6.1 Prerequisites for Participation**

- 1) A jump site manager shall allow only those who satisfy the following conditions to bungee jump:
  - a) to be at least 18 years old. (Suitable identification shall consist of a date of birth with a picture).
  - b) to be in good health and not be suffering from any of the following:
    - i) Extreme Asthma
    - ii) Pregnancy
    - iii) Epilepsy
    - iv) Cardio/Respiratory Disorders
    - v) Hypertension
    - vi) Skeletal weakness or joint/ligament problems
    - vii) Any other medical condition that would preclude the jumper from participating in active sports.
  - c) to be within the weight limits of the designed use for the bungee cords available at the jump site.
  - d) to not be in an intoxicated state.
- 2) If a jumper has satisfied the above requirements, a jump site personnel must ensure that the jumper complete the following registration procedures before being permitted to jump:
  - a) to complete a recognition of risk and assumption of liability form.
  - b) to measure the weight of the jumper on a scale supplied by the operator.



This measurement shall be taken twice on different scales and be inscribed on the hand or arm of the jumper in indelible ink.

## **6.2 Operating Procedures**

### **6.2.1 Personnel Requirements**

- 1) There shall be a minimum of three (3) personnel operating a jump site, including a Jump Master, a Jump Assistant and a Retrieval Operator.
- 2) All personnel must be at their respective designated positions from the time when the jumper is being moved to the jump deck until the time when the jumper has been unhooked from the rigging system and released from the landing area.
- 3) When a retrieval vessel must be maneuvered or steadied to hold a retrieval position or is operated in moving or water where waves can be created, a vessel operator must be assigned to position the vessel while the Retrieval Operator controls the jumper's landing.
- 4) If any personnel should suffer from deterioration in their physical or mental condition from whatever cause, the Jump Master or jump site manager shall order that jumping cease until they can be replaced.

### **6.2.2 Pre-Jump Procedure Order**

- 1) The jumper's weight shall be verified and recorded at a place separated from the jump deck.
- 2) The jumper shall be instructed and harnessed in a place separated from the jump point.
- 3) The jumper shall be secured to the jump deck by a safety line after being harnessed and remain so until the bungee cord has been attached. The safety line shall be detached from the jumper only after all attachments and connections have been rechecked.
- 4) Both the Jump Master and the Jump assistant shall check and verify the following before the jumper is attached to the rigging system:
  - a) the security and proper fitting of the jumper's harness system.
  - b) The proper adjustments made to the rigging system according to the weight of the jumper.
  - c) The proper selection of the bungee cord.

- d) The proper attachment of the bungee cord to the rigging system.
- 5) Both the Jump Master and the Jump Assistant shall check and verify the proper attachment of the bungee cord to the jumper's harness system.
- 6) The gate, separating the jump point from the jump deck shall be kept closed until all checks and rechecks by the Jump Master and Jump Assistant have been completed and the jumper is ready to proceed to the jump point.
- 7) The gate separating the jump point from the jump deck shall be closed, thus separating the jumper from the Jump Master, before the countdown to jump is initiated.
- 8) Prior to using a new bungee cord a test jump with a dead weight shall be carried out.

### **6.2.3 Jump Information Record**

- 1) The following data for each jump shall be recorded:
  - a) jump date and time.
  - b) approximate extension of bungee cord as determined by the retrieval personnel.
  - c) the amount of static line given on the anchor when the distance of the anchor point and the bungee cord is varied.
  - d) the cord used, according to identification number.
  - e) the name, address and phone number of the jumper.

### **6.2.4 Use of Rigging System and Equipment**

- 1) All bungee cords on the jump deck shall be anchored at all times.
- 2) There shall be only one cord attached to the rigging system at one time to prevent the accidental attachment of a jumper to a cord not designed for their weight.
- 3) The jumper shall be lowered to a landing area and not raised back to the jump deck.
- 4) No equipment shall be used within the rigging system which has been used in conditions where the applied loads are unknown or when the equipment has been used in a manner not recommended by the manufacturer.

- 5) A minimum interval of five (5) minutes shall be required between jumps when using the same bungee cord, to allow the bungee cord to return to its' original designed length.

### **6.2.5 Personnel Clothing**

- 1) All personnel shall wear clothing suitable for the climatic conditions in which they are working.
- 2) All jump site personnel shall be easily identifiable from the public or jumpers by means of uniforms or similar clothing colours, etc.
- 3) All personnel handling ropes or other equipment which requires hand protection shall wear gloves suitable for such purposes.

### **6.2.6 Personnel Communication**

- 1) Jump site personnel located at the jump deck, the retrieval area, the hoisting controls (if applicable) and the registration area, shall have an effective radio communication link to warn each other of potential danger and to ensure the safe and efficient execution of jumping and retrieval procedures.
- 2) A backup plan for a communication link, in the form of hand signals from the jump deck to the Retrieval Operator must be in place. The signals used shall be those currently recognized by portable hoist or lifting devices operators in the operator's respective jurisdiction. A backup communication system may be used only until a replacement radio system is acquired. Maximum use is two (2) hours.

### **6.2.7 Safety Management and Emergencies**

- 1) The following procedures shall be followed in the case of an accident or incident:
  - a) record the event on a form sheet.
  - b) notify the proper regulating authority(ies)
  - c) send a copy of the report to the proper regulating authority(ies).
- 2) In the event of an accident causing serious injury or death, the entire jump site shall be remain undisturbed except as permitted by the regulating authority.

- 3) A comprehensive emergency plan shall be developed for each site and written in the site operation's manual. It shall include at least the following:
  - a) a detailed map showing the determined access routes for emergency vehicles.
  - b) the response time for all emergency services.
  - c) the procedures for all personnel in an emergency evacuation. This procedure shall be practiced at least once each operating season.
  - d) an alternative method of retrieval of a jumper when the primary retrieval system is not functional.
- 4) A copy of the operations manual shall be given to all personnel and a separate copy kept onsite and available to all personnel at any time.

### **6.3 Weather Conditions and Work Periods**

#### **6.3.1 Unsafe Weather Conditions**

- 1) If weather conditions are judged to be unsafe to jump by the Jump Master or portable hoist operator, operations shall cease. Some conditions which could be hazardous to the health or safety of jumpers or operations personnel include:
  - a) high winds
  - b) heavy rains
  - c) electrical storms
  - d) hail or related conditions which could impair or diminish one's vision

#### **6.3.2 Work Periods**

- 1) To ensure that all personnel involved in jumping operations maintain their full ability to concentrate the following policies regarding work periods shall be enforced:
  - a) all personnel will be required to take a 30 minute break after 3 hours of continuous work.
  - b) all personnel will be required to take a 60 minute break after a 5 hour work period.
  - c) no personnel member will be permitted to work more than 8 hours on jumping activities in the course of a working day. A minimum of eight hours break is required after a ten hour work period, before starting the next work period.
  - d) no personnel member can work on jumping activities for more than 48 hours in any 7 day period.

## **7.0 JUMP SITE PERSONNEL**

## **7.1 Jump Site Personnel Qualifications**

### **7.1.1 Jump Master**

- 1) Hold current certificates in First Aid (Standard Level) and CPR (Level A) issued by a recognized approved authority or the equivalent.
- 2) Provide documentation of completion of a course on rescues techniques from vertical environments, held by an organization recognized by the Ontario Rock Climbing Association or the Canadian Mountain Guide Association or the Federacion Quebecois de la Mountagne or a recognized equivalent, as qualified to do so, or provide documentation of certification as a Rock Climbing Instructor, issued by an organization recognized by the Ontario Rock Climbing Association or the Canadian Mountain Guide Association or the Federation Quebecois de la Mountagne or a recognized equivalent, as qualified to do so.
- 3) Provide evidence of dispatching at least 300 logged jumps and with at least 10 logged jumps from the type of structure from which they wish to supervise jumps. The training is to be consistent with Code of Safe Practice and be documented as such.
- 4) To have jumped at least 20 times on 5 different days from the type of structure (fixed or portable) from which they wish to supervise jumps.

### **7.1.2 Jump Assistant**

- 1) Hold current certificates in First Aid (Standard Level) and CPR (Level A) issued by a recognized approved authority or the equivalent.
- 2) Provide documentation of training in treating spinal injuries.
- 3) Provide evidence of assisting in dispatching at least 100 logged jumps and with at least 10 logged jumps from any class of structure from which they wish to assist in dispatching jumps. The training is to be consistent with the Code of Safe Practice and be documented as such.
- 4) To have jumped at least 10 times from the class of structure from which they wish to assist in dispatching jumps.

### **7.1.3 Retrieval Operator**

- 1) Hold current certificates in First Aid (Standard Level) and CPR (Level A) issued by a recognized approved authority or the equivalent.
- 2) Provide documentation of training in treating spinal injuries.

- 3) Hold a certificate in Swift Water Rescue Training or hold a Bronze Medallion issued by the Canadian Red Cross or have documentation showing training in water rescue of spinal injury victims.
- 4) Provide evidence of acting as Retrieval Operator for at least 100 logged jumps and with at least 10 logged jumps from any class of structure from, which they wish to act as Retrieval Operator. The training is to be consistent with the Code of Safe Practice and be documented as such.
- 5) To have jumped at least once from the class of structure from which they wish to act as Retrieval Operator.

#### **7.1.4 Vessel Operator**

- 1) Hold current certificates in First Aid (Standard Level) and CPR (Level A) issued by a recognized approved authority or the equivalent.
- 2) Hold a valid Automobile Driver's Licence recognized by the regulating authority.

### **7.2 Crew Responsibilities**

#### **7.2.1 Jump Master**

- 1) The Jump Master is responsible for the safety of the jumper from the time starting when they enter the jump deck boundaries until they are detached from the bungee cord system.
- 2) The Jump Master shall cease jump operations when:
  - a) the requirements of the jump site operating manual are not met.
  - b) the requirements of the Code of Safe Practice are not met.
- 3) The Jump Master shall:
  - a) direct and organize all staff.
  - b) recheck all work done by the Jump Assistant.
  - c) verify that the jump deck is in the correct position for jumping.
  - d) make the final decision for the selection and setting of rigging system before every jump.
  - e) select the bungee cord.
  - f) check the size and security of all harnesses before the bungee cord is attached to the jumper.
  - g) check all attachment of the rigging system to the bungee cord and the attachment of the bungee cord to the jumper's harness system before permitting the jumper to the jump point.
  - h) initiate the final countdown to signal the jumper to leave the platform.

- i) ensure that all required jump information is recorded on log sheets.
- j) lead personnel in rescue procedures and emergency situations.
- k) ensure that all jumpers know what to do and what not to do during the course of their jump, and answer any questions that they might have.
- l) supervise the lowering of the jumper.
- m) communicate with the Retrieval Operator and portable hoist operator (if applicable) to ensure the safe lowering or raising of jump decks and/or jumper.

### **7.2.2. Jump Assistant**

- 1) The Jump Assistant shall assist the Jump Master as directed to ensure that all redundancy requirements are met.
- 2) The Jump Assistant shall:
  - a) recheck all work done by the Jump Master, including:
    - i) the selection and setting of rigging system before every jump.
    - ii) the selection of the bungee cord.
    - iii) all attachments from the bungee cord system to the jumper's harness system before permitting the jumper to the jump point.
  - b) check the size and security of all harnesses before the bungee cord is attached to the jumper.
  - c) assist in the lowering of the jumper.
  - d) ensure that all required jump information is recorded on log sheets.
  - e) Ensure that all jumpers know what to do and what not to do during the course of their jump, and answer any questions that they might have.

### **7.2.3 Retrieval Operator**

- 1) This person is responsible for the safe retrieval of jumpers being lowered to a predetermined level after their jump and is responsible for a jumper's safety from the time they leave the jump deck until the time they leave the landing and retrieval area.
- 2) The Retrieval Operator shall:
  - a) ensure that retrieval vessel and motor are operational and sea worthy.
  - b) ensure vessel is equipped with all safety and additional equipment ie. life jackets for all persons, plus one extra; oars; padded pole to retrieve jumper; towels.
  - c) operation of the retrieval vessel at jump sites where one retrieval person is required.
  - d) ensure that area directly below the jump space is free of objects or debris.
  - e) give lowering instruction to the Jump Master and Jump Assistant to ensure a safe retrieval.

- f) unhook rigging equipment from the jumpers harness, and indicate to Jump Master to retrieve the rigging system.
- g) talk to and calm the jumper in the boat while maneuvering the boat to the retrieval/recovery area.
- h) assist the jumper from the boat to the retrieval/recovery area.
- i) ensure that the jumper is fully recovered before leaving recovery area to retrieve the next jumper.
- j) ensure that all rescue supplies and equipment are complete and at the retrieval area, including a spinal board and a neck brace.

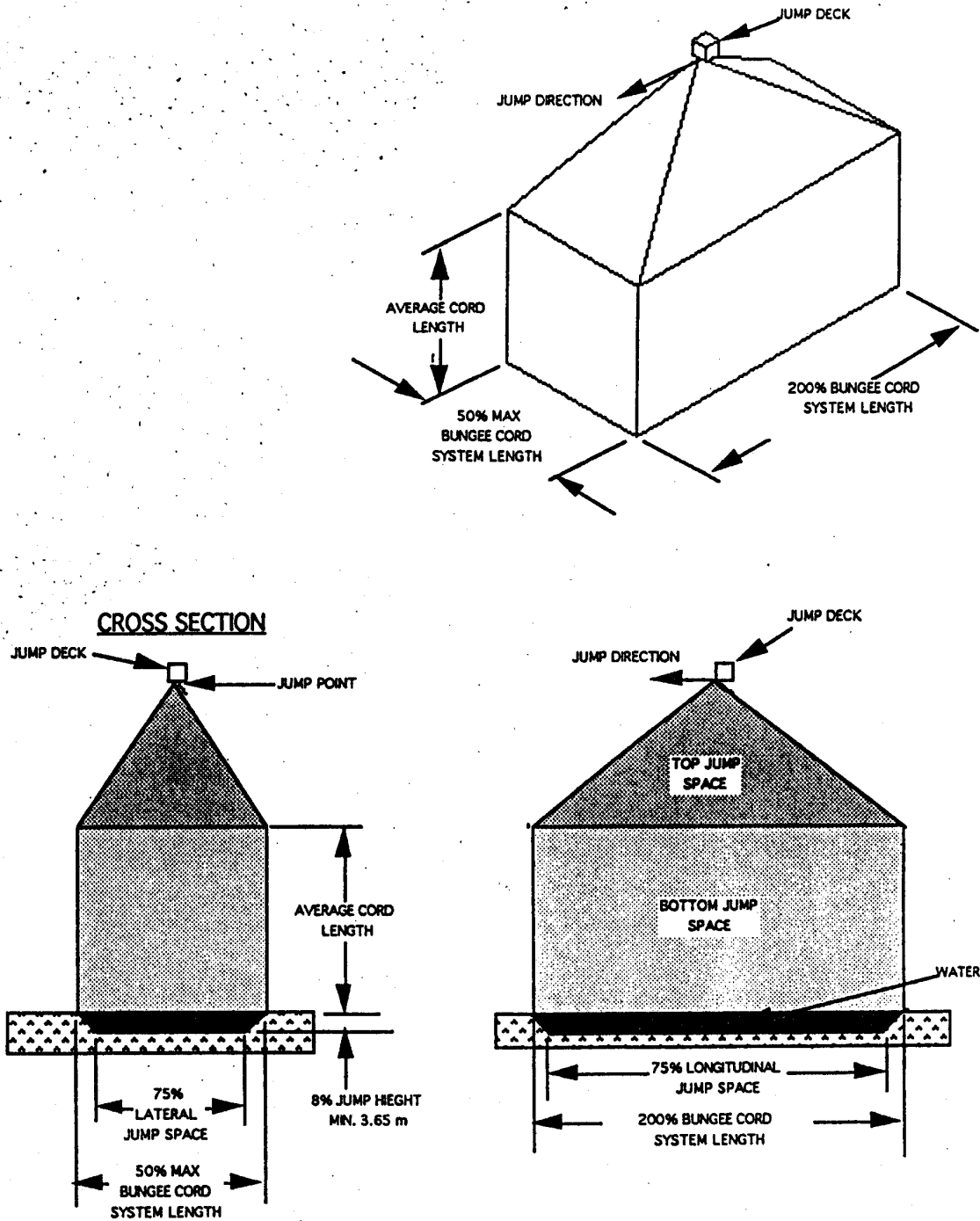
#### **7.2.4 Vessel Operator**

- 1) The vessel operator shall follow the instructions for positioning given by the Retrieval Operator.
- 2) The vessel operator shall steady the vessel in a position of safety to ensure the best possible retrieval.
- 3) The vessel operator shall ensure the safe and efficient transportation of the jumper and Retrieval Operator from the landing area to a predetermined safe location.



### Appendix 'A'

## Jump Space Over Water



## Appendix 'B'

### Summary of Required Documentation

All applicants for operating approval must provide the following documentation prior to obtaining approval:

- 1) A jump site operations manual, which shall contain in no particular order:
  - a) Drawings and measurements of the site plan with include the jump structure, all fencing, jump and safety spaces, access roads, emergency vehicles access routes, registration and retrieval areas and any other structures within the jump site area.
  - b) A detailed description of the use of the rigging system.
  - c) Criteria for regular inspections and maintenance of water levels (if applicable).
  - d) Personnel qualifications; required and actual.
  - e) Personnel training procedures and documentation of experience.
  - f) Job descriptions/position duties and responsibilities.
  - g) Diagrams of all hand signals which will be used on site.
  - h) Emergency plan and contingencies to contain:
    - i) a list of objective risks that could result both from the inherent nature of the activity and through system failure or error.
    - ii) a management plan for each of those risks.
    - iii) connections to the Emergency Management System and a list of the support available.
    - iv) the primary and secondary communication systems.
    - v) the expected response times of emergency services with the names and telephone numbers of each service.
    - vi) a list of emergency facilities and supplies on site and their location.
  - i) Sample forms that will be used for the reporting of injuries, damage and incidents and procedures for how they will be used.
  
- 2) An equipment manual, which shall contain in no particular order:
  - a) Models of the rigging equipment and their breaking strengths for all equipment and their supplier(s).
  - b) An engineering report on the bungee cords used, providing the information required in section 4 of this document and any other required engineering reports on new equipment.
  - c) An engineer approved and certified design on the jump deck and structure/tower if applicable that will be used, which includes all dimensions and capacities.
  - d) Criteria for the maintenance of the retrieval vessel.
  - e) Samples of equipment log forms and the procedures that will be followed for using them.