



Health and Safety Bulletin No. 6

Requirements for flying foxes (zip lines) under the Work Health and Safety (General) Regulations 2022

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Background

It has come to the attention of WorkSafe that there are potentially several hundred flying foxes in operation across Western Australia.

A flying fox is an amusement device consisting of an elevated rope on which a pulley or trolley system is used to transport passenger(s) between two support structures. Flying foxes are also called zip lines.

Regulation 5 of the Work Health and Safety (General) Regulations 2022 (WHS General Regulations) defines an **amusement device** as plant operated for hire or reward that provides entertainment, sightseeing or amusement through movement of the equipment, or part of the equipment, or when passengers or other users travel or move on, around or along the equipment. This means that a flying fox is an amusement device under the WHS General Regulations if a system for payment is in place.

A person conducting a business or undertaking (PCBU) has duties under Work Health and Safety legislation to ensure the health and safety of workers and others in a workplace, so far as is reasonably practicable. In regard to amusement devices such as flying foxes, this duty includes passengers.

Summary of hazard

Factors such as inadequate design, installation, inspection, maintenance and training have contributed to serious injuries and fatalities from flying foxes in the eastern states and overseas.

Passengers are exposed to risks of potential injuries or death if flying foxes do not meet the design requirements of a published technical standard, or their installation, testing, inspection and maintenance do not meet the requirements specified by the designer or manufacturer. For example, the passenger could fall from a height, or hit a structure while moving at speed.

Managing hazards and risks

A risk management approach is the best way to determine the measures that should be implemented to control risks for flying foxes.

Effective risk management starts with a commitment to health and safety from those who operate and manage the business or undertaking. Managing work health and safety risks is an ongoing process. Risk management involves four steps:

- identify hazards – find out what could cause harm
- assess risks – understand the possible harm, how serious it could be, and the likelihood of it happening
- control risks – implement the most effective control measure that is reasonably practicable in the circumstances
- review control measures to ensure they are working as planned

The aim must always be to eliminate a hazard where reasonably practicable. If elimination of a hazard is not reasonably practicable, the risk needs to be minimised by one or a combination of the following:

- **Engineering** – only use the flying fox in accordance with the manufacturer's instructions.
Ensure equipment is in good condition and free from any defects. Any components or equipment associated with the flying fox should be used, inspected and maintained according to the manufacturer's specifications and instructions.
In the absence of any manufacturer's specifications and instructions, follow the instructions of a competent person. This may mean engaging a competent person to develop instructions for the use, inspection and maintenance of the flying fox.
- **Administrative controls** – if risk remains, it must be minimised by implementing administrative controls, so far as is reasonably practicable. For example:
 - ensuring only authorised persons perform specific tasks
 - ensuring worker training, experience and competency are appropriate for the nature and complexity of their duties
 - before commencing any maintenance work on a flying fox, a competent person should inspect components and equipment to identify any wear, movement or alterations to the system that may adversely affect its safe operation.
- **Personal protective equipment** – any remaining risk must be minimised with suitable personal protective equipment. For example, helmets, harnesses or gloves may be required when using some flying foxes.

Actions required

Design of a flying fox

All flying foxes, including the line terminations and anchorage systems, should be designed and design verified by a suitably qualified professional engineer. The engineer should verify all components of the device, including the methods used to install the hardware. The

engineer should provide written instructions on periodic inspection methods for the flying fox, along with any limitations on its use (e.g. loading, wind speed and direction).

All connections should comply with recognised Australian or International Standards for lifting or climbing equipment. Connections should also comply with sound rigging practice. This includes setting up flying foxes using:

- thimbles on all steel wire rope terminations
- load-rated and moused shackles (i.e. to prevent the pin coming loose)
- load-rated chain that has been proof loaded before use
- load-rated turnbuckles and connectors.

Hand-spliced terminations should not be used for flying fox line terminations. Any termination where the manufacturer states that the termination is unsuitable for suspending people should not be used. Comply with any conditions that a termination manufacturer states for the use of a termination.

An assessment of all trees to which flying foxes are attached should be made by a qualified arborist prior to commissioning, and thereafter at intervals not exceeding 12 months.

Load tests

Prior to first use, a proof test load should be applied to the flying fox in the same manner that the flying fox is to be used. A minimum proof test load of twice the rated capacity of a flying fox is recommended. After the proof test and prior to use, the flying fox installation should be inspected for damage and other irregularities, including slippage of rope terminations. Inspections must be carried out by a competent person.

Periodic load testing of every flying fox, with a safety factor of 2, and post-test inspection, should be carried out at intervals as specified by the designer, and at least every 12 months.

Registration of plant design and item of plant

At a workplace, flying foxes classified by Section 2.1 of AS 3533.1:2009 *Amusement rides and devices – Design and construction* must have their design registered with WorkSafe or another regulatory agency, unless they are classified as a Class 1 device according to this standard (r. 243). Devices of this type must also be registered as an item of plant (r. 246).

Operation of a flying fox

The person with management or control of an amusement device at a workplace must ensure that the device is operated only by a person who has been provided with instruction and training in its proper operation.

The person with management or control of an amusement device at a workplace must ensure that:

- there is a daily pre-start check of the amusement device
- the amusement device is operated without passengers before it is operated with passengers on each day on which it is to be operated

- the daily checks and operation of the amusement device without passengers are accurately recorded in a log book for the device (r. 238).

Storage of a flying fox

The person with management or control of an amusement device at a workplace must ensure that the device is stored so as to be without risks to health and safety. The storage task must be conducted by or under the supervision of a competent person (r. 239).

Maintenance, inspection and testing of a flying fox

The person with management or control of an amusement device at a workplace must ensure that the maintenance, inspection and, if necessary, testing of the device is carried out by a competent person, and in accordance with:

- the recommendations of the designer and/or manufacturer; or
- if a maintenance manual for the device has been prepared by a competent person, the requirements of the maintenance manual.

A person is not a competent person to carry out a detailed inspection of an amusement device that includes an electrical installation unless the person is qualified, or is assisted by a person who is qualified, to inspect electrical installations (r. 240).

Annual inspections and weather based inspections of a flying fox

The person with management or control of an amusement device at a workplace must ensure that a detailed inspection of the device is carried out at least once every 12 months by a competent person.

An annual inspection must include:

- check of information about the operational history of the amusement device since the last detailed inspection
- check of the log book
- confirmation that maintenance and inspections have been undertaken (r. 240)
- confirmation that any required tests have been carried out, and that appropriate records have been maintained
- detailed inspection of the amusement device to ensure compliance with WHS laws, including a specific inspection of the critical components.

For the purposes of the annual inspection, a competent person is someone who:

- has acquired, through training, qualifications or experience, the knowledge and skills to inspect the plant; and
 - is eligible for professional engineer membership of Engineers Australia
- or has been determined by the regulator to be a competent person. (r. 241)

Flying foxes should receive a comprehensive inspection after high winds (wind speed specified by the competent person) or other severe weather events. Tree inspections should be carried out by a qualified arborist after severe weather.

Record keeping

Flying foxes that meet the definition of an amusement device and require design registration and item of plant registration must comply with the record-keeping requirements of the WHS General Regulations (r. 237).

The person with management or control of the flying fox at a workplace must keep a record of all tests, inspections, maintenance, commissioning, decommissioning, dismantling and alterations of the plant. The record must be kept for the period that the plant is used or until the person relinquishes control of the plant. The person must keep the record available for inspection under the WHS Act. The person must make the record available to any person to whom the person relinquishes control of the plant (for example, the purchaser if the property or business is sold).

Log book and manuals for a flying fox

The person with management or control of a flying fox at a workplace must keep records of the erection and storage of the device (including dates) in the log book. The log book, operating manual and maintenance manual for the flying fox must be kept with it.

The person with management or control of a flying fox at a workplace must ensure that persons involved in the commissioning, installation, use, storage and testing, and the decommissioning, dismantling and disposal, of the flying fox are given the log book, operating manual and maintenance manual (r. 242).

High risk work license requirements

Workers undertake rigging work involving flying foxes must hold a current high risk work license for advanced rigging.

References and further information

- AS 3533.1 Amusement rides and devices – Part 1: Design and construction
- AS 3533.3 Amusement rides and devices – Part 3: In-service inspection
- AS 2076 Wire rope grips for non-lifting applications
- AS 2759 Steel wire rope: Use, operation and maintenance
- Work Health and Safety Commission, [Code of practice: Safe design of structures](#)
- Work Health and Safety Commission, [Code of practice: Managing risks of plant in the workplace](#)
- WorkSafe WA, [Information sheet: Inflatable amusement devices](#)
- WorkSafe WA, [Information sheet: Amusement devices: a guide for local government](#)
- WorkSafe Queensland, [Safety alert: Zipline terminations](#)