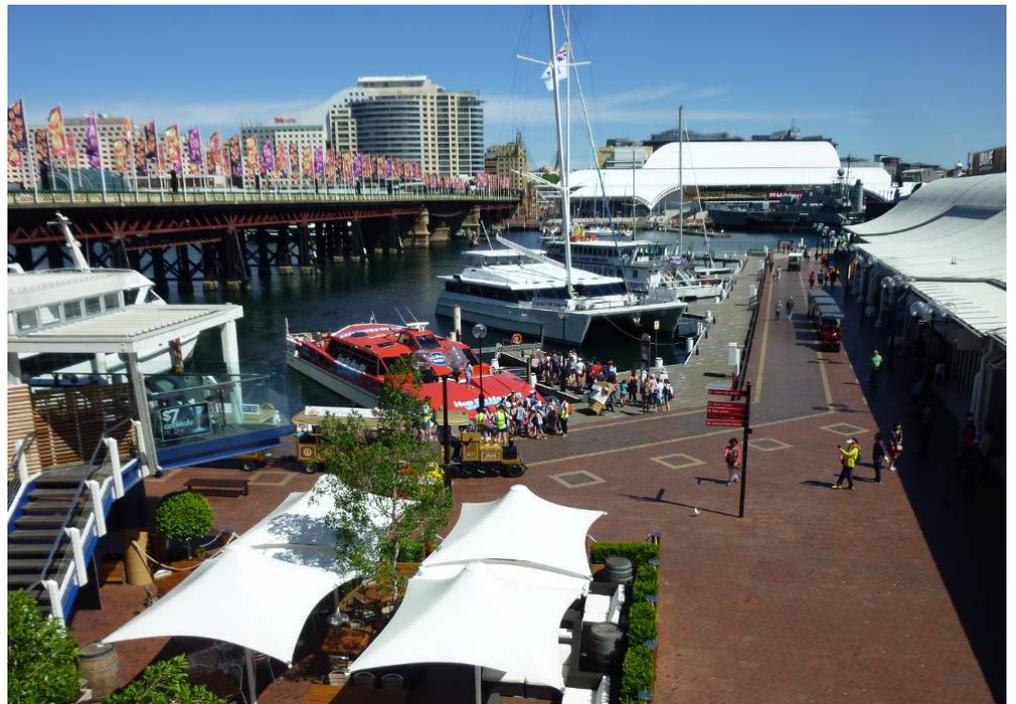


# Guideline for the Assessment of Public Ferry Wharf Safety (2016)



**Issue No. 8**  
**February 2016**

**DISCLAIMER**

*The information in the Guideline is intended only for use in assisting owners or persons responsible for the maintenance of public ferry wharves in safety inspection, maintenance and operation of public ferry wharves in New South Wales.*

*This Guideline is intended for use by persons that have appropriate training and experience in condition and structural assessment of maritime structures and, where necessary, supervision by a competent engineer. Decisions affecting the overall safety of the wharf or critical safety elements should be made by or immediately reviewed by an appropriately qualified structural engineer.*

*This document is to be used alongside any relevant Australian standard. You should always refer to the most current version of the relevant standards and should not rely on this Guideline in place of considering the relevant standards.*

*Roads and Maritime Services developed this Guideline by updating the Procedure for the Assessment of Public Ferry Wharf Safety (2007), in consultation with a number of stakeholder groups. While all reasonable care has been taken to ensure the accuracy of the materials in this document, Roads and Maritime Services makes no representations or warranties of any kind about the accuracy, reliability, completeness or suitability or fitness for purpose in relation to this Guideline . Roads and Maritime Services does not accept and expressly disclaims any liability or responsibility for any loss, damage or costs howsoever incurred by any person as a result of or in connection with reliance upon any part of these Guidelines.*

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**DOCUMENT CONTROL**

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## CONTENTS

1	INTRODUCTION .....	1
1.1	Background .....	1
1.2	Purpose of this Guideline .....	1
2	SAFETY INSPECTION AND ASSESSMENT GUIDELINE .....	2
2.1	Confirmation that a Structure is a Public Ferry Wharf.....	2
2.2	Wharf Information Form.....	2
2.3	Level 1 Inspection Form .....	2
2.4	Level 2 Engineering or Specialist Inspection and Assessment.....	3
2.5	Repair Works.....	3
3	METHODOLOGY FOR WHARF INFORMATION FORM.....	6
3.1	Introduction .....	6
3.2	Methodology for Each Item .....	6
4	METHODOLOGY FOR LEVEL 1 INSPECTION FORM.....	11
4.1	Introduction .....	11
4.2	Fields .....	11
	4.2.1Background Details .....	11
	4.2.2Condition .....	11
	4.2.3Compliance.....	12
	4.2.4Risk and Priority .....	12
	4.2.5Comments and Actions .....	15
	4.2.6Overall Actions .....	15
	4.2.7Comments .....	15
5	LEVEL 2 INSPECTION AND ASSESSMENT .....	16
5.1	Inspections .....	16
5.2	Assessments .....	16
	5.2.1Structural Analysis.....	16
	5.2.2Evaluation of Options .....	17
6	SAFETY ASSESSMENT FLOWCHARTS .....	18
6.1	Barriers and Handrails.....	18
6.2	Gangway or Ramp Connection .....	22
6.3	Pontoon Pile Aperture .....	23
6.4	Lighting .....	24

6.5	Safety and Vessel Access Ladders.....	26
6.6	Markings .....	28
6.7	Anti-Skid Treatment.....	29
6.8	Vehicular Access Provisions .....	30
6.9	Fire Hose Heels, Hydrants and Extinguishers.....	31
6.10	Lifebuoys .....	33
6.11	Exits clear of obstructions .....	34
6.12	Load Limitations .....	35
6.13	Work Health & Safety Provisions .....	38
	6.13.1First Aid Kit .....	38
	6.13.2Emergency Response Plan and Procedure .....	38
	6.13.3Other Considerations .....	39
6.14	Disability Standards.....	40
6.15	Signage – Warnings on Usage.....	46
6.16	Booms for Oil/Petrol of Chemical Spillage .....	47
7	CONDITION ASSESSMENT CHECKLIST AND COMMENTARY .....	48
	7.1 Introduction .....	48
	7.2 Wharf Type .....	48
	7.3 Timber Access Way and Main Wharf Structure .....	50
	7.3.1Timber Deck .....	51
	7.3.2Timber Substructure .....	52
	7.4 Concrete Access Way and Main Wharf Structure.....	53
	7.4.1Concrete Deck.....	54
	7.4.2Concrete Substructure .....	54
	7.4.3Steel Connections .....	55
	7.5 Handrails and Barriers.....	56
	7.6 Piles .....	57
	7.6.1Pile Tops and Caps .....	57
	7.6.2Timber Piling.....	57
	7.6.3Steel Piling.....	59
	7.6.4Previously Repaired Piles .....	60
	7.7 Stairs, Steps, Ramps and Low Level Landings.....	60
	7.8 Boarding and Berthing Area .....	61

7.8.1	Moorings, Berthings and Fendering .....	61
7.9	Gangway .....	63
7.10	Pontoon .....	63
7.11	Services .....	65
7.11.1	Safety Items.....	66
7.11.2	Seating and Shelter Area .....	66
8	GLOSSARY .....	67
9	REFERENCES .....	72

APPENDIX A WHARF INFORMATION FORM

APPENDIX B LEVEL 1 INSPECTION FORMS

## 1 INTRODUCTION

### 1.1 Background

This Guideline has been prepared to assist owners or persons responsible for the maintenance of public ferry wharves in defining key criteria for safety at public ferry wharves including consideration of safety compliance, structural integrity and risk management.

A public ferry wharf is defined as “a wharf or any associated facilities used for the purposes of public passenger services provided by ferries” under the Marine Safety Act 1998. A ferry is defined as any vessel that seats more than 8 adult persons and includes a fare or other consideration. As such, a public ferry wharf includes wharves used by typical commuter scheduled ferries, charter vessels and other hire vessel such as dive vessels that fit the definition of a “ferry” vessel.

### 1.2 Purpose of this Guideline

The aim of this Guideline is to provide a general methodology to assist owners with the assessment of the safety of their public ferry wharf. The Guideline provides checklists that may be used by owners for assessing: safety compliance and the condition of their wharf and whether further works are required, such as engineering inspection and assessment, specialist inspections and preparing a maintenance program. It has been prepared with input from owners and designers of wharf assets and Roads and Maritime Services (RMS) with reference to the relevant building codes, guidelines and standards.

This Guideline is designed to assist in identifying appropriate criteria and standards for public wharf safety, outline appropriate inspections and maintenance requirements and establish an appropriate methodology for ongoing safety compliance of public ferry wharves.

The Guideline also explains the role of RMS. Pursuant to the Marine Safety Act 1998 RMS may inspect public ferry wharves. An authorised RMS officer may:

- (a) issue the owner of a public ferry wharf, or the person responsible for its maintenance, with an Improvement Notice requiring remedial safety work to be undertaken, where the officer is of the opinion that it is necessary to do so to ensure the safety of persons using or operating public passenger services provided by ferries.
- (b) issue to the person who has or may be reasonably presumed to have control over the activity that involves or will involve an immediate risk to the health or safety of persons using, or operating, public passenger services provided by ferries, with a Prohibition Notice prohibiting the carrying on of the activity until the matters that give or will give rise to the risk are remedied. Where an authorised RMS officer deems a public ferry wharf to have minor safety issues, RMS may as a first step issue a Defect Advisory Notice requiring the owner of a public ferry wharf to provide a timetable and strategy for repairs. Should the owner fail to comply with the Defect Advisory Notice, RMS will then issue a formal Improvement Notice or Prohibition Notice.

Penalties can be imposed on an individual or a Corporation for a failure to comply with an Improvement Notice or Prohibition Notice.

The role of RMS under the Marine Safety Act is summarised in **Figure 2.1**.

## 2 SAFETY INSPECTION AND ASSESSMENT GUIDELINE

Recommendations for wharf owners regarding steps that can be taken to inspect and assess a public ferry wharf are summarised in **Figure 2.1**.

Wharf owners (or their representatives) are responsible for the safety of their assets. To help to fulfil this responsibility it is recommended that public ferry wharf owners:

- Complete regular public safety and structural integrity assessments of the structure;
- maintain inspection and maintenance records;
- prepare an inspection and maintenance plan; and
- undertake an inspection and maintenance program in accordance with the inspection and maintenance plan.

Further information on these steps is provided below.

### 2.1 Confirmation that a Structure is a Public Ferry Wharf

Determine whether the structure is a public ferry wharf as defined in the Marine Safety Act 1998, that is “a wharf or any associated facilities used for the purposes of public passenger services provided by ferries”.

A “public passenger service” means the carriage of passengers for a fare or other consideration by vessel within any New South Wales waterway.

A “ferry” is defined as any vessel that seats more than 8 adult persons and includes a fare or other consideration. This includes: typical commuter scheduled ferries, charter vessels and dive vessels.

If the structure does not fall under this definition for a public ferry wharf, then legislative compliance for a public ferry wharf under the Marine Safety Act 1998 does not apply. However, wharf owners may still wish to apply relevant sections of the Guideline in monitoring and maintaining all wharves.

### 2.2 Wharf Information Form

It is recommended that the owner, or the person responsible for the maintenance of a public ferry wharf keeps accurate records about the wharf and its use. One method of achieving this is to complete the Wharf Information Form (Appendix A) or a similar form, to record all relevant information. It is recommended that the owner or operator review and update the Wharf Information Form when there is a significant change to the record, such as damage, maintenance and improvement or change of wharf usage. The methodology for completion of the Wharf Information Form is provided in **Section 3**.

### 2.3 Level 1 Inspection Form

It is recommended that public ferry wharves are inspected regularly. The Level 1 inspection form provided at Appendix B provides a mechanism to record these inspections. The suggested methodology for completion of this forms provided in **Section 4**. The purpose of the Level 1 inspection is to undertake a general visual inspection to detect and record the following:

1. Apparent safety matters (public and occupational health and safety);
2. General structural integrity and condition of each item; and
3. Defects that can affect durability, serviceability and operating performance.

The Level 1 Inspection Form allows the owner or the person responsible for its maintenance to record, for each item or provision, information including condition, compliance against accepted guidelines, codes or

standards, risk and priority. It can be used to identify any actions required to bring the structure up to acceptable public safety standards, assist the owner or the person responsible for its maintenance to make informed decisions on engineering inspection, assessments and requirements for potential specialist inspections.

Two parts to the Level 1 Inspection Form are as follows:

1. Safety Assessment – Safety Assessment flow charts are provided in **Section 6** to assist with the completion of the Safety Assessment section.
2. Condition Assessment – A Condition Assessment checklist and commentary is provided in **Section 7** to assist with the completion of the Condition Assessment section.

To maintain the safety of the wharf, the owner or the person responsible for its maintenance is strongly encouraged to undertake regular inspections of the structure in conjunction with completing the Level 1 Inspection Form (or similar). It is recommended that the wharf structure be inspected for safety compliance by the owner, the persons responsible for its maintenance or their representatives every 6 months for urban and commuter wharves and every 12 months for regional wharves. Where regional wharves are dilapidated or subject to vandalism, the frequency may need to be increased. A non-scheduled Level 1 inspection may be undertaken also following a significant storm, fire, vandalism or other serious event that could, potentially, compromise operational safety or structural integrity. Inspections should be completed in accordance with the NSW Work Health and Safety Act and Regulation 2011 and applicable Codes of Practice.

Under the Marine Safety Act 1998, RMS (or other authorised officers) may conduct inspections of public ferry wharves. The inspection will consider if further inspections of the wharf, improvement works or engineering assessments are required.

## **2.4 Level 2 Engineering or Specialist Inspection and Assessment**

It is recommended that Level 2 Inspections be undertaken at an interval of every 2 years for urban and commuter wharves and every 3 to 5 years for regional wharves. However, this will vary depending on the age, usage and condition of the structure.

The purpose of the Level 2 Inspection is for an appropriately qualified and experienced engineer specialising in maritime structures to undertake a more detailed condition inspection to detect and record safety risks, damage or deterioration of individual items (e.g., each individual pile) and obtain data to assist with determining the wharf's structural capacity. Following the inspection, there may be requirements to undertake structural analyses to assess wharf's structural capacity. An inspection schedule, repair and maintenance works plan may be developed as part of the assessment.

Typically, Level 2 Inspection and Assessments would comprise the following:

- Engineer's visual inspection;
- Engineer's structural analysis;
- Specialist inspections such as divers, pest and services inspections;
- Identification of inspection, repair and maintenance works; and
- Development of maintenance strategy plan with inspection and repair schedule.

**Section 5** provides information relevant to the completion of a Level 2 inspection.

## **2.5 Repair Works**

Where repair works involve the alteration or modification of the design, it is recommended that the original or subsequent designer should be consulted. Any changes to the design of a structure may affect the

health and safety of those who work on or use the structure and must be considered by the person altering or modifying a design. A person conducting a business or undertaking who alters or modifies a design without consulting the original or subsequent designer will assume the duties of a designer including the compilation of a safety report as directed under the Work Health and Safety Regulation 2011 and the Safe Design of Structures Code of Practice 2014.

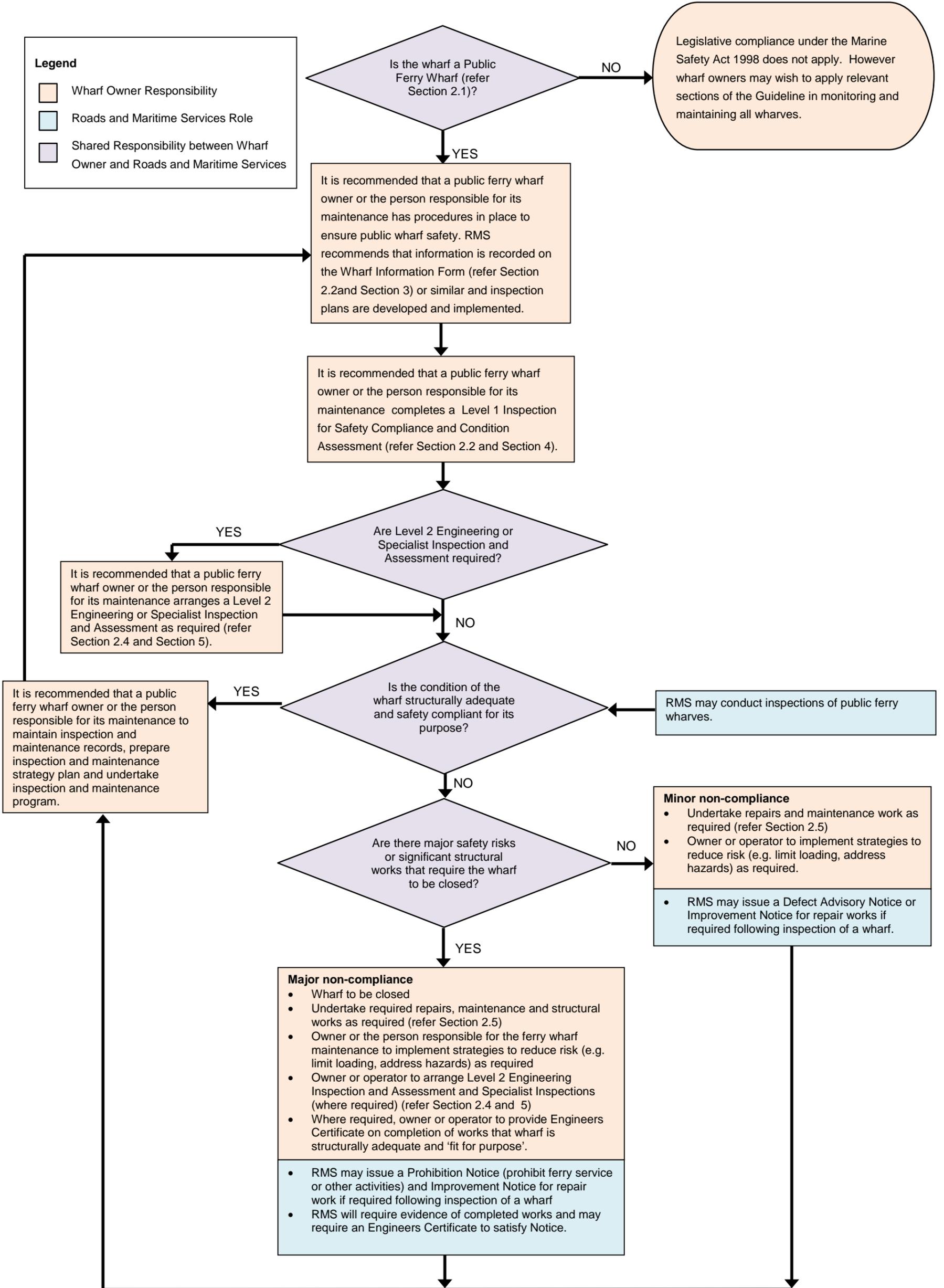


Figure 2.1: The responsibility of the wharf owner and the role of RMS under the Marine Safety Act.

### 3 METHODOLOGY FOR WHARF INFORMATION FORM

#### 3.1 Introduction

This section details the recommended methodology for completion of the Wharf Information Form. The Wharf Information Form is contained in **Appendix A**.

It is recommended that the owner or the person responsible for its maintenance complete the Wharf Information Form (or similar document) to record all relevant information. It is recommended that the owner or the person responsible for its maintenance review and update the Wharf Information Form when there is a significant change to the record such as damage, maintenance and improvement or change of wharf usage.

#### 3.2 Methodology for Each Item

##### Item 1 – Type of Structure

Classify the structure into one of the following categories:

- Fixed wharf:** a structure fixed to and parallel to the foreshore (or jetty) alongside which vessels may lie to load or unload cargo, passengers, etc. (refer **Figure 3.1**). This includes a catwalk, which is a narrow walkway, raised above the ground or water, often built for accessing vessels (refer **Figure 3.2**).
- Floating pontoon:** a stable, floating platform restrained by guide piles or anchors that can be accessed via a gangway (refer **Figure 3.3** and **Figure 3.4**).
- Fixed wharf and floating pontoon:** a combination of the above

If the structure does not fit into the types provided above, provide a general description of the structure.



Figure 3.1: Example of a fixed wharf structure.



Figure 3.2: Example of a Catwalk.



Figure 3.3: Example of a floating pontoon structure.



Figure 3.4: Example of a access ramp or gangway

## Item 2 – Description of Structure

### ITEM 2.1 – DIMENSIONS

Provide general dimensions for the footprint (length and width) and the deck level of the structure in metres relative to Australian Height Datum (AHD).

### ITEM 2.2 – MATERIALS

Describe the material/s used (e.g. wood, concrete, steel, etc.) for each of the main structural elements (deck, piles, headstocks, access way or gangway, pontoon, etc.).

## Item 3 – Historical Information of Structure

### ITEM 3.1 – YEAR OF ORIGINAL CONSTRUCTION

Provide year of original construction (if known), otherwise approximate age.

#### ITEM 3.2 – AVAILABLE DOCUMENTATION

Indicate if the design/construction drawings and associated documentation for the structure are readily available.

#### ITEM 3.3 – RECORDS OF DAMAGE

Provide details of any recorded incidents or damage to the structure since its construction. This should include the date of when the damage occurred (if known), how the damage occurred, the degree of damage and the resulting action taken (i.e., repairs undertaken).

#### ITEM 3.4 – MAINTENANCE

Provide details of all maintenance undertaken on the structure since its construction. This should include the date of each maintenance event (if known) and other relevant details.

#### ITEM 3.5 - IMPROVEMENTS

Provide details of any improvements undertaken of the structure since its construction. This should include the date on which each improvement was undertaken (if known) and the type and scale of the improvement.

### **Item 4 – Site Conditions**

Provide brief details on the site conditions in the vicinity of the structure including the features described below. Any supporting drawings or data that are available can be attached to the report and referred to on the Inspection Report form.

#### ITEM 4.1 – AREA TOPOGRAPHY

Describe the general nature of the existing ground level landwards of the structure (flat, hilly, etc.).

#### ITEM 4.2 - BATHYMETRY

Describe the general nature of the bathymetry surrounding and beyond the structure (depth of water at seaward end of structure, bed gradient, etc.)

#### ITEM 4.3 – WATER LEVEL VARIATION

Provide astronomical tidal planes for the location related to Australian Height Datum (AHD). Also include the predicted water level at the location during a 1 in 50 year storm event, taking into account barometric effects, wind setup and wave setup.

#### ITEM 4.4 – FOUNDATION CONDITIONS

Provide details of the condition of the material upon which the structure is founded. This might include a classification of the overlying soil and the depth to stiff clay or rock.

#### ITEM 4.5 - EXPOSURE TO WIND, WAVES AND CURRENTS

Describe the degree of exposure that the structure normally experiences to wind, waves and currents.

#### ITEM 4.6 – SERVICES

Describe the services present in the vicinity of the structure. Types of services might include water, power, sewerage, fuel and telecommunications.

#### ITEM 4.7 - AREA OF APPROACH FOR VESSELS

Comment on the area available for vessels to berth at the structure including the size and shape of any obstacles around which a vessel may need to manoeuvre.

### **Item 5 – Land and Water Access**

Provide details of all access points from the land (transition to structure) and water (berthing features).

### **Item 6 – Usage Details**

#### ITEM 6.1 VESSELS USING THE WHARF

List the types of vessels and indicate the total number of each vessel type using the structure on a regular basis. Indicate how often the structure usually is utilised by vessels.

#### ITEM 6.2 MAIN USERS

Indicate the main types of users of the structure (e.g., general public, Harbour City Ferries, charter groups).

#### ITEM 6.3 DETAILS OF LARGEST VESSEL

Indicate the details for the largest vessel that uses the structure including type, dimensions (length, width, height and draft) in metres, the weight/displacement in tonnes, and maximum approach velocity to the berth.

The maximum approach velocity to berth can be estimated by referring to **Table 3.1**, taking into account the vessel class, tonnage range and exposure conditions within the berthing zone.

**Table 3.1 Berthing Velocities – Vessels < 1000 tonnes**

Vessel Class	Tonnage Range	Exposure Conditions	V <sub>n</sub> (m / sec)
Private Vessels	Up to 10 tonnes	Mild <sup>1</sup>	0.20
		Moderate <sup>2</sup>	0.25
		Severe <sup>3</sup>	0.30
Private Vessels	Over 10 tonnes	Mild	0.15
		Moderate	0.20
		Severe	0.25
Commercial charter / cruise vessel	Up to 1000 tonnes	Mild	0.20
		Moderate	0.25
		Severe	0.30
Ferries	Up to 100 tonnes	Mild	0.30
		Moderate	0.35
		Severe	0.40
Ferries	Over 100 tonnes	Mild	0.25
		Moderate	0.30
		Severe	0.35

1. 'Mild' exposure has current speeds less than 0.5 knots; fair weather prevailing wind speeds less than 10 knots; and wave height less than 10% of the moulded draft of the design vessel.
2. 'Moderate' exposure has current speeds between 0.5 knots and 1.0 knot; or fair weather wind speeds between 10 knots and 15 knots; or fair weather wave heights between 10% and 20% of moulded depth of vessel.
3. 'Severe' exposure is when the environmental conditions exceed any of the current wind or wave conditions for a moderate exposure.

Source: AS 4997-2005 Table B1. Reproduced with permission from [SAI Global](#) under licence number 1510-c026.

## Item 7 – Usage Limitations

### ITEM 7.1 USAGE LIMITATIONS

If the structure has any formal or informal loading limitations, being point loads and/or distributed loads, indicate these limits for vessels, vehicles or other (specify) in tonnes, kN or kPa.

Formal loading limitations might be in the form of conditions placed on the structure during the approvals phase or as ordered after construction by a regulatory authority. Loading limitations might also have been stipulated within the design drawings or documentation. Informal loading limitations might be in the form of temporary signage advising of recent damage/problems.

### ITEM 7.2 DISABLED ACCESS

Indicate whether or not disabled access to the structure has been provided or not. If formal disabled access is provided, indicate whether this is assisted or unassisted access.

Further information on assisted or unassisted access and disability standards is provided **Section 6.14**.

## 4 METHODOLOGY FOR LEVEL 1 INSPECTION FORM

### 4.1 Introduction

This section details the methodology for completion of the Level 1 Inspection Form. The Level 1 Inspection Form is contained in **Appendix B**. The purpose of the Level 1 inspection is to provide a general visual inspection to detect safety risks or significant damage or deterioration due to overstress, impacts, severe corrosion or biological growth and attack.

To maintain the safety of the wharf, the owner or the person responsible for its maintenance is strongly encouraged to undertake regular inspections of the structure in conjunction with completing the Level 1 Inspection Form (or similar document)

There is a different form for each of the three types of structures:

- fixed wharf (including catwalks)
- floating pontoon
- fixed wharf and floating pontoon.

Within each form, the form is separated into Safety Assessment and Condition Assessment parts.

The purpose of the Safety Assessment part is to assess the condition and compliance of the items or provisions associated with the structure that are related to health and safety minimisation, and to provide an assessment of the adequacy of these provisions in managing risk.

The purpose of the Condition Assessment part is to assess the condition and compliance of each element and associated connections of the structure, and to provide an assessment of the associated risk and priority.

### 4.2 Fields

This section provides information to assist with completion of the corresponding fields for each provision and item.

#### 4.2.1 Background Details

Indicate the wharf name, the owner or operating body responsible for the structure, date of inspection, time and tide of inspection, the name(s) of the person(s) conducting the inspection and corresponding designation(s).

#### 4.2.2 Condition

If the item is provided at the structure, indicate whether it is in a *good*, *fair* or *poor* condition. See below for a guide in classifying the condition of the item:

- |       |   |
|-------|---|
| Good: | No visible damage or wear and tear  |
| Fair: | no or some wear and tear but otherwise in an acceptable condition   |
| Poor: | unacceptable damage or wear and tear. A comment is to be added in the <i>Comments or Actions</i> column if the item requires replacement, repair, modification or maintenance, or if the wharf requires closure due to the poor condition of this item. |

After rating the condition of each of the items listed, indicate whether the overall condition of the wharf is in a *good*, *fair* or *poor* condition at the bottom of the form.

### 4.2.3 Compliance

Indicate whether each provision or item is compliant or not, based on the requirements described in the Safety Assessment Flowcharts for each item (refer **Section 6**) and Condition Assessment checklist and commentary (refer **Section 7**). For each provision or item there can be a number of elements that require compliance. If one (or more) of the elements of the provision or item is not compliant, then the entire item is not compliant.

NOTE: Some of the provisions or items under **Item 5** are not required by any standards or codes. However, the owner or the person responsible for its maintenance should consider implementing these items or provisions with the aim to improve public safety.

Compliance for some of the provisions or items can be difficult to evaluate based on a site visit without detailed engineering or specialist assessment. If this is the case, the *TBC (to be confirmed)* column is to be selected. If engineering or specialist inspection or assessment is required to check for compliance, then this should be added as a comment.

### 4.2.4 Risk and Priority

Indicate the level of risk (low, medium, high, very high) to health and safety associated with the provision of the item and its condition if provided. The priority or level of urgency, for the action to be carried out is related directly to the level of risk.

Risk can be defined as a combination of the probability of a hazard occurring and the magnitude of the consequences of the occurrence. The consequence relates to the adverse impacts or harm resulting from the hazard identified.

The hazard could include a failure of the item (e.g., handrailing collapsing) which has the potential to lead to an adverse health and safety incident (e.g., a person falling off the structure into the water).

The probability ranking ranges from almost certain that an adverse incident will occur to practically impossible that the incident will occur.

The consequences ranking ranges from a small impact (e.g., minor inconvenience) to a very large impact (e.g., fatality).

The Risk Evaluation Matrix in **Table 4.1** can be used to assess the level of risk and priority associated with each item. The description for the likelihood ratings and consequence ratings are provided in **Table 4.2** and **Table 4.3**.

Table 4.1 Risk evaluation matrix

Risk Evaluation Matrix								
Risk Ratings:			Consequence					
VH – Very High H – High			Minor	Moderate	Serious	Major	Severe	Catastrophic
M – Medium L – Low			C6	C5	C4	C3	C2	C1
Likelihood	Frequent	L1	M	H	H	VH	VH	VH
	Likely	L2	M	M	H	H	VH	VH
	Possible	L3	L	M	M	H	H	VH
	Unlikely	L4	L	L	M	M	H	H
	Rare	L5	L	L	L	M	M	H
	Improbable	L6	L	L	L	L	M	M

**Table 4.2 Description of Likelihood Ratings**

Rating	Description
<b>Frequent</b>	<ul style="list-style-type: none"> <li>Expected to occur multiple times (&gt;10) during any given year.</li> <li>Expected to occur at least 1 in every 4 times the event or action occurs. i.e., &gt; 25% chance of occurrence. This risk is known to occur frequently.</li> </ul>
<b>Likely</b>	<ul style="list-style-type: none"> <li>Expected to occur occasionally (&lt;10) during any given year</li> <li>Expected to occur between 1 in 4 and 1 in 10 times the event or action occurs, i.e., 10% to 25% chance of occurrence. This risk occurs often.</li> </ul>
<b>Possible</b>	<ul style="list-style-type: none"> <li>Expected to occur once during any given year</li> <li>Expected to occur between 1 in 10 and 1 in 100 times the event or action occurs, i.e., 1% to 10% chance of occurrence. This risk is known to have occurred on occasions.</li> </ul>
<b>Unlikely</b>	<ul style="list-style-type: none"> <li>Expected to occur once over 10 years</li> <li>Expected to occur between 1 in 100 and 1 in 1,000 times the event or action occurs, i.e., 0.1% to 1% chance of occurrence. This risk could occur but not often.</li> </ul>
<b>Rare</b>	<ul style="list-style-type: none"> <li>Expected to occur once in the next 100 years</li> <li>Expected to occur between 1 in 1,000 and 1 in 10,000 times the event or action occurs, i.e., 0.01% to 0.1% chance of occurrence. It is unusual that this risk occurs but it has happened.</li> </ul>
<b>Improbable</b>	<ul style="list-style-type: none"> <li>Not expected to occur in the next 100 years</li> <li>Expected to occur less than 1 in 10,000 times (if ever) the event or action occurs, i.e., &lt; 0.01% chance of occurrence. Any risk can occur but this risk it is very improbable that it will occur within the large number of events.</li> </ul>

**Table 4.3 Description of Consequence Ratings**

Rating	Description
<b>Minor</b>	Minor injury not requiring medical attention
<b>Moderate</b>	Minor injury requiring medical attention for full recovery
<b>Serious</b>	Minor injuries or illnesses resulting in lost time
<b>Major</b>	1 to 10 serious injuries or illnesses as defined S36 WHS Act
<b>Severe</b>	Single Fatality 10 to 20 serious injuries or illnesses as defined S36 WHS Act
<b>Catastrophic</b>	Multiple Fatalities > 20 serious injuries or illnesses as defined S36 WHS Act

**EXAMPLE:** A review of the Barriers and Handrails flow chart indicates that appropriate handrailing is required on either side of a gangway to a pontoon that requires disabled access. The gangway is located 3-4 m over a shallow mud flat that is often exposed at low tides. The risk here is that a user of the structure might fall off the gangway onto the mud flat below.

**Scenario 1 - No handrailing provided along the gangway.**

It could be considered possible (or even likely) that someone would fall off the gangway in this case. The consequences of falling off the gangway onto the solid mud flat would result in a serious injury or even major injury with potential loss or limitation of current health and mobility.

For this scenario the risk associated with this item would be High (H).

**Scenario 2 - Handrailing provided, however it is lower than the recommended standard.**

Although the handrailing is not to standard, it is at least provided in this case and so it could be considered rare that someone would fall off the gangway. Again, the consequences of falling off would result in a major injury.

For this scenario the risk associated with this item would be Medium (M).

Where an item is not provided for, the level of risk should be assigned as High.

#### **4.2.5 Comments and Actions**

This column provides the opportunity to record comments on condition of the item.

Detail any required action identified after the inspection of the item to bring the level of risk to health and safety to an acceptable level. This might include repairing, replacing or, if the item is not provided, installing the health and safety item. Further, it might mean making alterations to the item to ensure it is compliant with the relevant standards, codes or guidelines.

#### **4.2.6 Overall Actions**

Indicate whether any engineering or specialist assessment is required and whether the wharf needs to be closed.

#### **4.2.7 Comments**

This provides the opportunity to record comments on overall actions and areas that should be the focus of engineering inspection and assessments and whether potential specialist inspections are required.

## 5 LEVEL 2 INSPECTION AND ASSESSMENT

### 5.1 Inspections

A Level 2 Inspection is a more detailed condition inspection, undertaken by an appropriately qualified and experienced engineer specialising in maritime structures, to detect and record safety risks and damage or deterioration of individual items (e.g., individual piles) and obtain data to assist with determining the wharf's structural capacity.

An engineer's visual inspection of a structure normally is undertaken at low tide and from a boat where required. Typically, the engineer would undertake the following:

- provide a photographic record of defects
- record condition of members and defect location and extent on a general arrangement drawing
- report on condition of members
- review available specialist inspection reports
- use non-destructive testing techniques (e.g., hammer tapping, ultrasonic thickness testing) to determine the condition of key structural elements.

It is recommended that the Level 2 engineer's visual inspection be undertaken at an interval of every 2 years for urban and commuter wharves and every 3 to 5 years for regional wharves. However, this will vary depending on the age, usage and condition of the structure.

In some instances the following specialist inspection could be required:

- Diver's inspection, testing and reporting on pile condition below the waterline undertaken by an experienced engineering diver or a diver supervised by qualified and experienced engineer specialising in maritime structures. Marine growth may need to be removed to assist with inspecting the piles. Wave and current conditions can affect visibility. For structures with piles below the waterline, underwater diver inspections of piles should be undertaken at least every 3 years for urban and commuter wharves and at least every 5 years for regional wharves. This frequency should be increased where marine animal infestation is known to be a problem.
- Timber structural grading, sounding and test-drilling
- Pest inspection and treatment (where required)
- Destructive testing (e.g., core sampling of concrete and wood structures or surface hardness testing)
- Services inspection (e.g., lighting, electrical, water services, service supports).

### 5.2 Assessments

#### 5.2.1 Structural Analysis

In the event that the wharf has deteriorated, or if the original design loading conditions are unknown, structural analysis should be undertaken to determine a wharf's structural capacity and to confirm the wharf's load limitations. Generally, the structural analysis undertaken by an engineer would comprise the following:

- structural analysis of the wharf in an as-observed condition
- structural analysis of the wharf in an as-built condition for comparison to an as-observed condition
- determination of vertical live load capacity of the wharf in its existing condition
- determination of lateral load capacity of the wharf
- determination of loading from design vessel type and velocity

- static and dynamic analysis of the structure.

### **5.2.2 Evaluation of Options**

Following a Level 2 inspection and structural analysis, the owner, the person responsible for its maintenance or the engineer should identify and evaluate options for implementing strategies to reduce risk (e.g., limit loading, address hazards) or for maintenance, repair, upgrade or disposal. Generally this would comprise the following:

- design of maintenance and repair works, including scope and quantities
- maintenance strategy plan with inspection and repair schedule
- maintenance and repair budget plan with priorities.

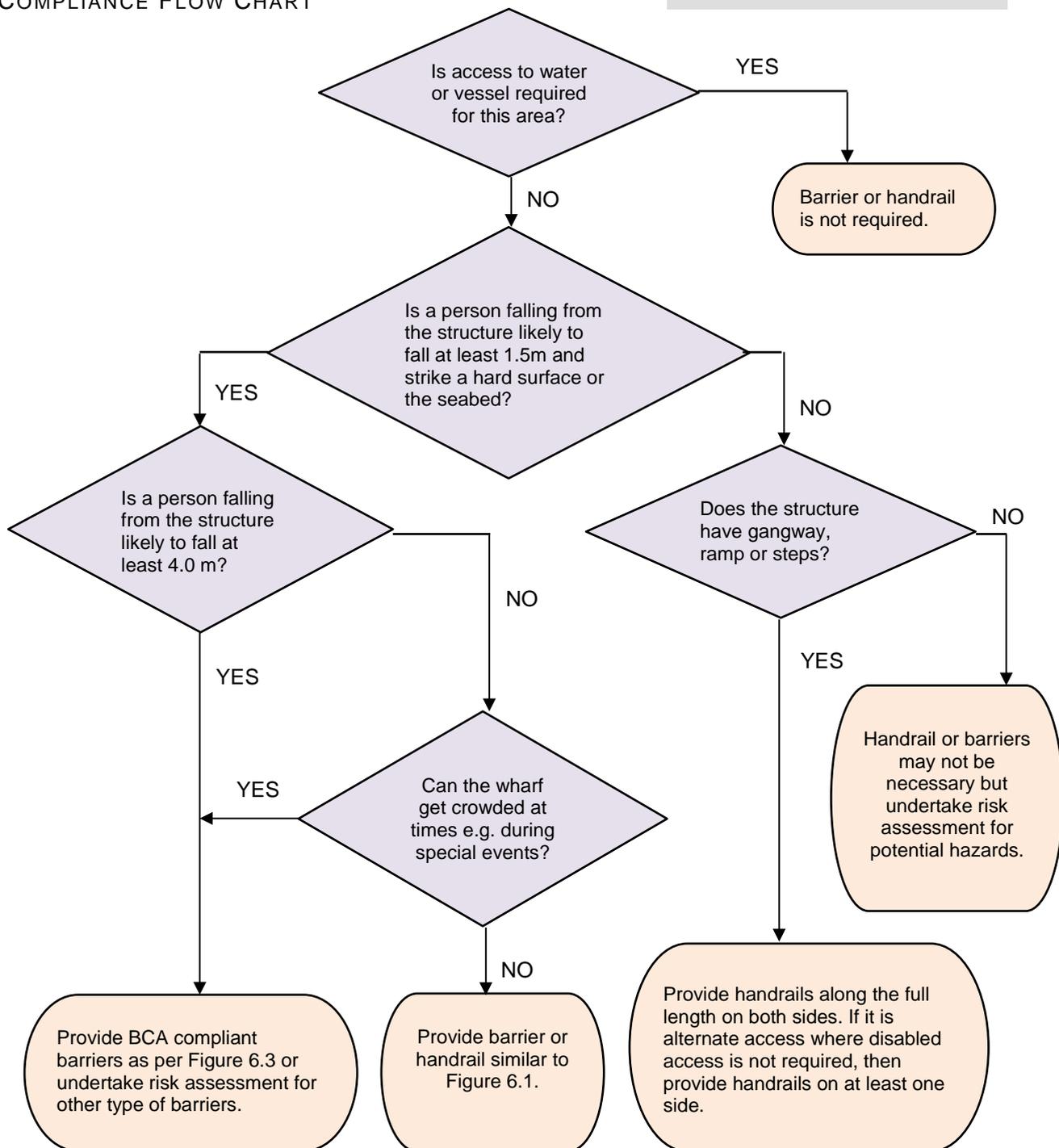
## 6 SAFETY ASSESSMENT FLOWCHARTS

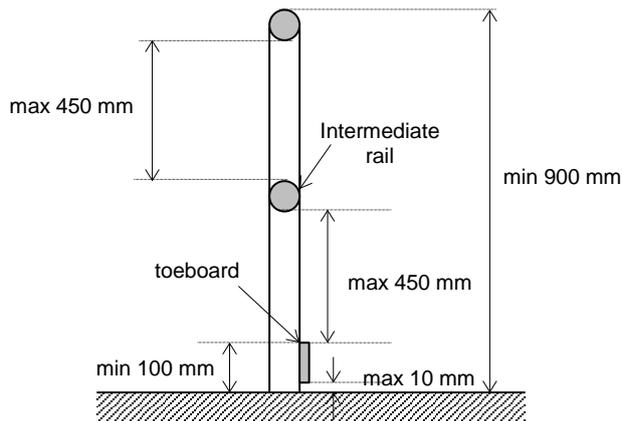
### 6.1 Barriers and Handrails

#### COMPLIANCE FLOW CHART

Relevant References

- AS 1170.1-2002 Clause 3.6
- AS 1428.1-2009 Section 10, 11, 12
- AS 1428.2-1992 Section 10
- AS 1657-2013 Clause 6.2
- AS 3962-2001 Clause 3.6.3
- AS 4997-2005 Clause 3.4.4
- BCA Vol 2-2015 Part 3.9.2

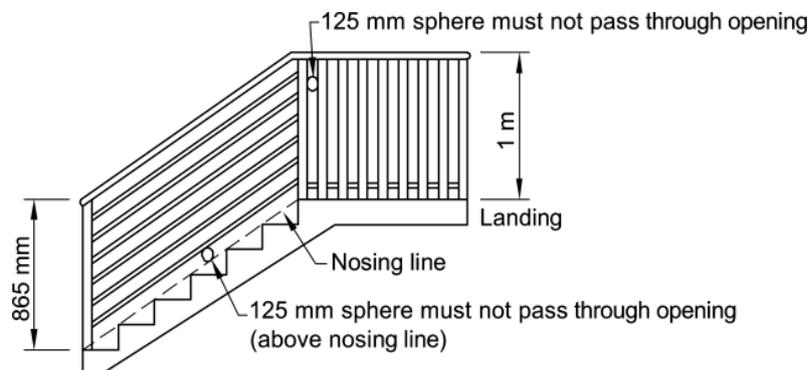




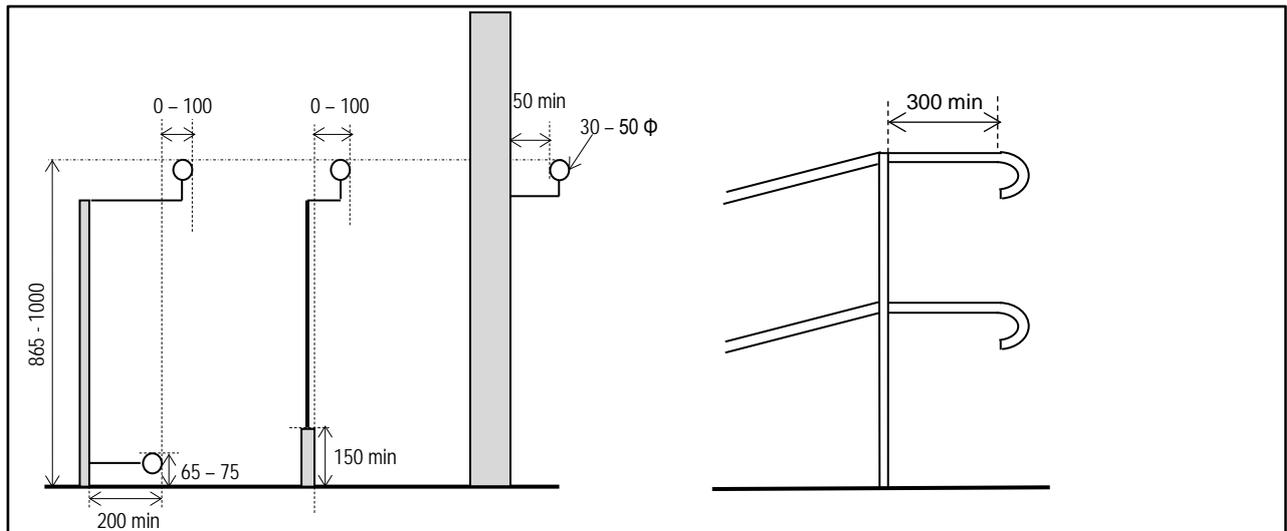
**Figure 6.1 Recommended barrier where the fall is between 1.5 and 4.0 m with no crowd (AS 1657-2013 Figure 6.1. Reproduced with permission from [SAI Global](http://www.sai-global.com) under licence number 1510-c026.)**

**BCA compliant barriers recommended where the fall is at least 4.0 m or where crowding occurs**

- Height not less than 865 mm above nosings of stair treads, or floor of a ramp or gangway
- Height not less than 1000 mm above the floor of the wharf or landing
- Any openings to not permit a 125 mm sphere to pass through it. For stairs, the space is tested above the nosing line
- Take loading forces in accordance with AS/NZS 1170.1
- Example barriers options: vertical railing; glass or perspex panels; and running of stainless steel wire. If a wire barrier is proposed, refer to BCA for details.



**Figure 6.2 BCA compliant barriers to prevent fall. Image sourced from the Australian Building Codes Board (ABCB) [www.abcb.gov.au](http://www.abcb.gov.au), BCA Vol 2 Part 3.9.2 Figure 3.9.2.1.**



**Figure 6.3 Unassisted disability access requirements for handrails for consideration. Dimensions in mm.**

#### BARRIER AND HANDRAIL RISK ASSESSMENT

Assess the level of risk using the Risk Evaluation Matrix provided in **Section 4.2.4**.

Potential hazard to be considered are as follows:

- Strike a hard surface or seabed
- Slips, trips and falls
- Fall into water – distance to safety, wave climate, height above water
- Trapped limbs and pinch spots

If high to very high risk rating are determined for the above listed potential hazards, then a barrier or handrail is required.



**Figure 6.4 Example of handrailing**

**Example 1**

- Handrails on both sides of the ramp.
- Barrier in front of the end of the access ramp would reduce the risk of falling into the water.
- The openings of the barrier are greater than 125 mm. If the wharf is subject to crowding, then replace barrier or undertake risk assessment to demonstrate existing provision is adequate for safety.



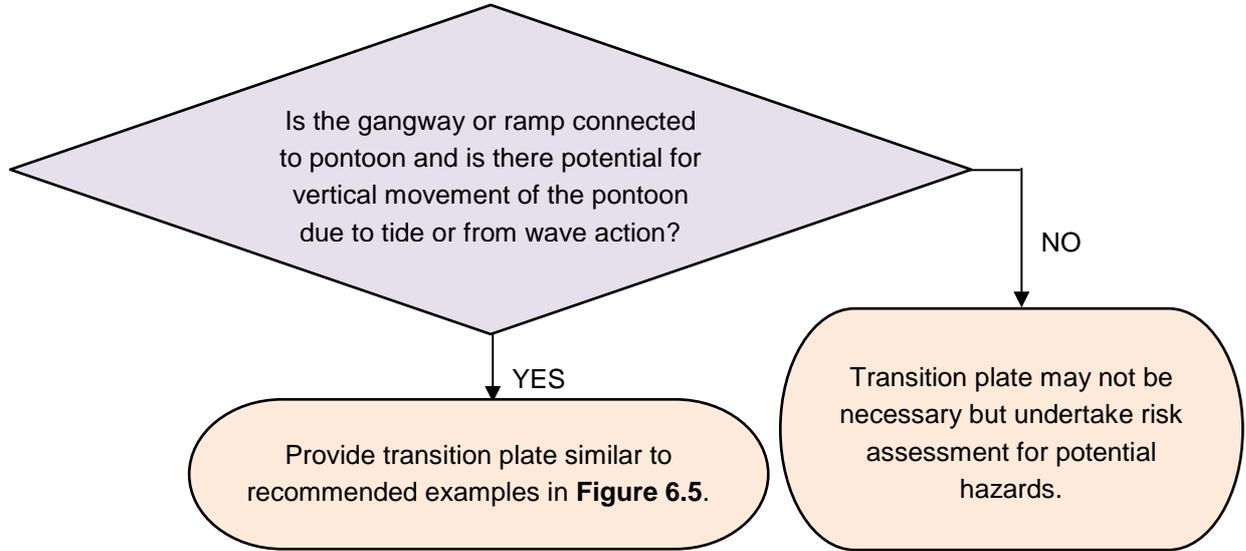
**Example 2**

- Barrier on the water edge.
- Barrier has openings less than 125 mm.
- Barrier should be extended to in front of the pile. Extend barrier or undertake risk assessment to demonstrate existing provision is adequate for safety.



## 6.2 Gangway or Ramp Connection

### COMPLIANCE FLOW CHART



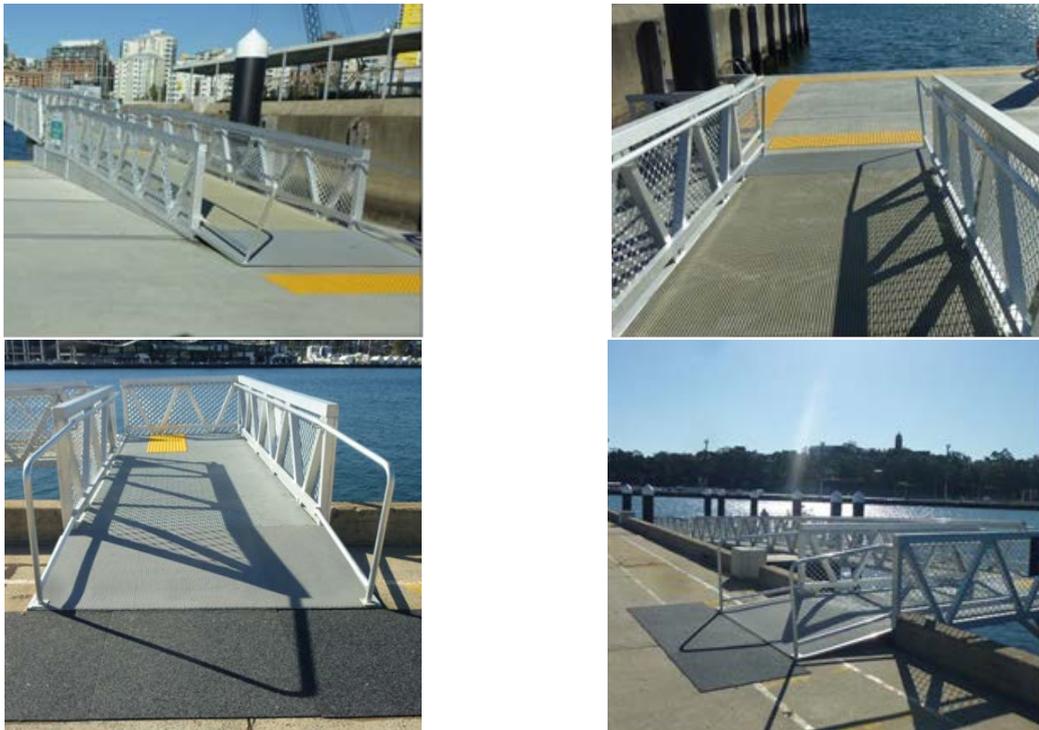
### TRANSITION PLATE RISK ASSESSMENT

Assess the level of risk using the Risk Evaluation Matrix provided in **Section 4.2.4**.

Potential hazard to be considered are as follows:

- Trapped limbs and pinch spots
- Trip hazard – vertical rise or fall between assemblies greater than  $\pm 10$  mm.

If high to very high risk rating are determined for the above listed potential hazards, then a transition plate is required.



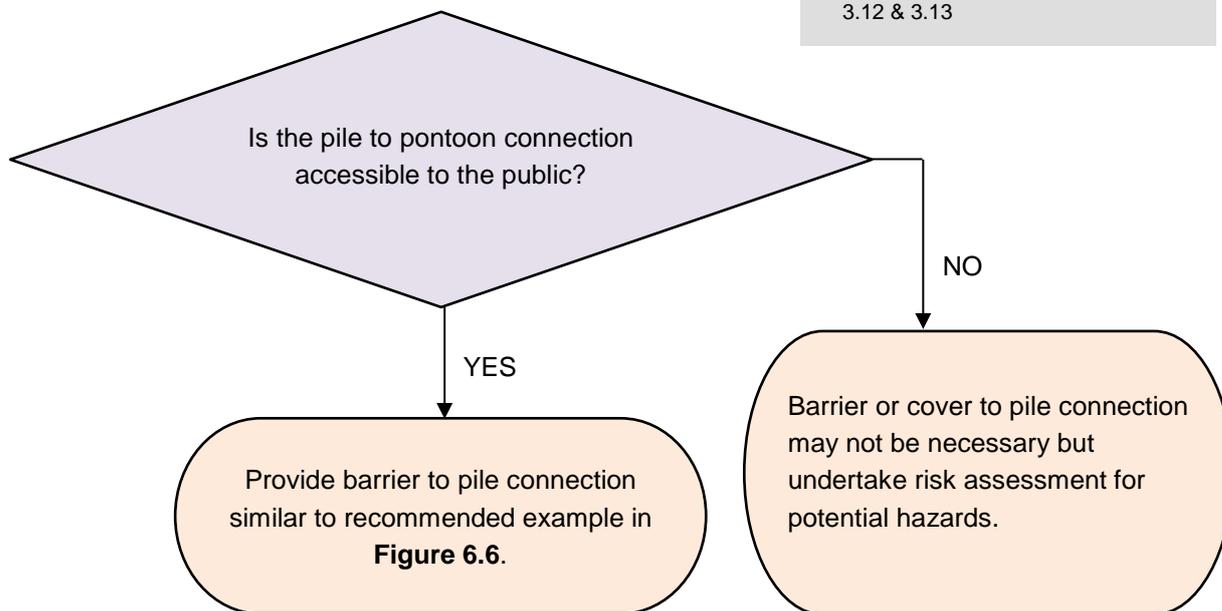
**Figure 6.5** Examples of recommended transition plates

### 6.3 Pontoon Pile Aperture

COMPLIANCE FLOW CHART

Relevant References

- NSW Maritime's Engineering Standings and Guidelines for Maritime Structures 2005 Clause 3.12 & 3.13



**BARRIER FOR PONTOON PILE APERTURE RISK ASSESSMENT**

Assess the level of risk using the Risk Evaluation Matrix provided in **Section 4.2.4**.

Potential hazard to be considered are as follows:

- Trapped limbs and pinch spots
- Safety of public, and operational, inspection and maintenance personnel
- Potential for significant movement of the pontoon or pile during berthing (large vessels) or from wave action
- Risk of public accessing restricted areas.

If high to very high risk rating are determined for the above listed potential hazards, then a barrier or is required for the pontoon pile aperture.

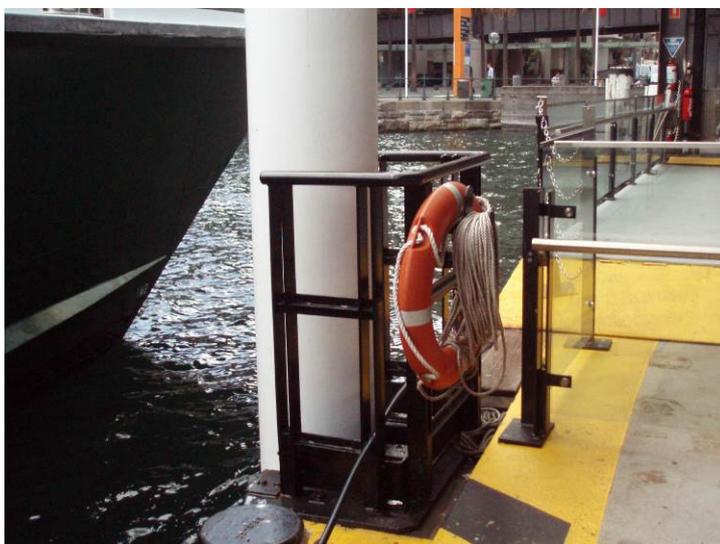
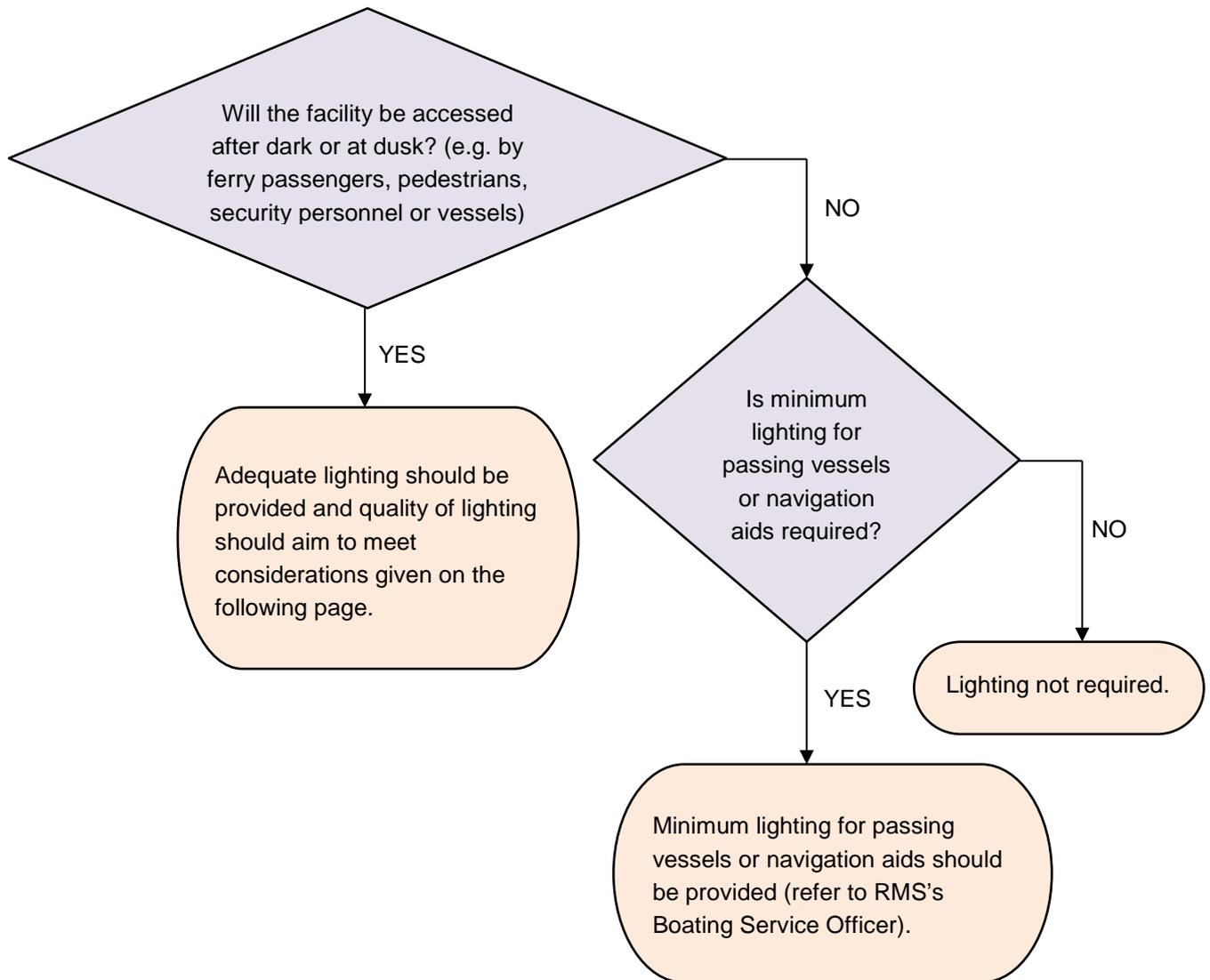


Figure 6.6 Example of recommended barrier for pile roller protection

## 6.4 Lighting

### COMPLIANCE FLOW CHART

- Relevant References
- AS/NZS 1158.3.1-2005
  - AS 3962-2001 Clause 6.5



## CONSIDERATIONS

### TARGETS FOR ILLUMINANCE AT WHARVES

Location	Average Illuminance (Average Horizontal Illuminance)
High Risk of Crime or High Activity	21 lux
Medium Risk of Crime or Medium Activity	14 lux
Low Risk of Crime and Outside of Ferry Operating Times	7 lux

Source: AS/NZS 1158.3.1-2005 Table 2.3 and Table 2.7 [modified]. Reproduced with permission from [SAI Global](#) under licence number 1510-c026.

### CONNECTING ELEMENT

For connecting elements, such as ramps and stairs, the lighting category is the same as the highest lighting category that abuts the connecting element.

### STEPS

For steps, the requirements assume that the noses of the treads are clearly delineated by a contrasting strip or other equally effective means. If such means are not provided, the illuminance should be at least twice the value specified.

### POSITIONING OF LIGHTING

Lighting should be positioned strategically to ensure there is adequate coverage of the facility, particularly at critical areas such as steps/ramps, shadow areas and changes of grade. Lighting should be designed and positioned to minimise glare for vessels navigating in the vicinity and for nearby residents. Sodium vapour luminance should be considered.

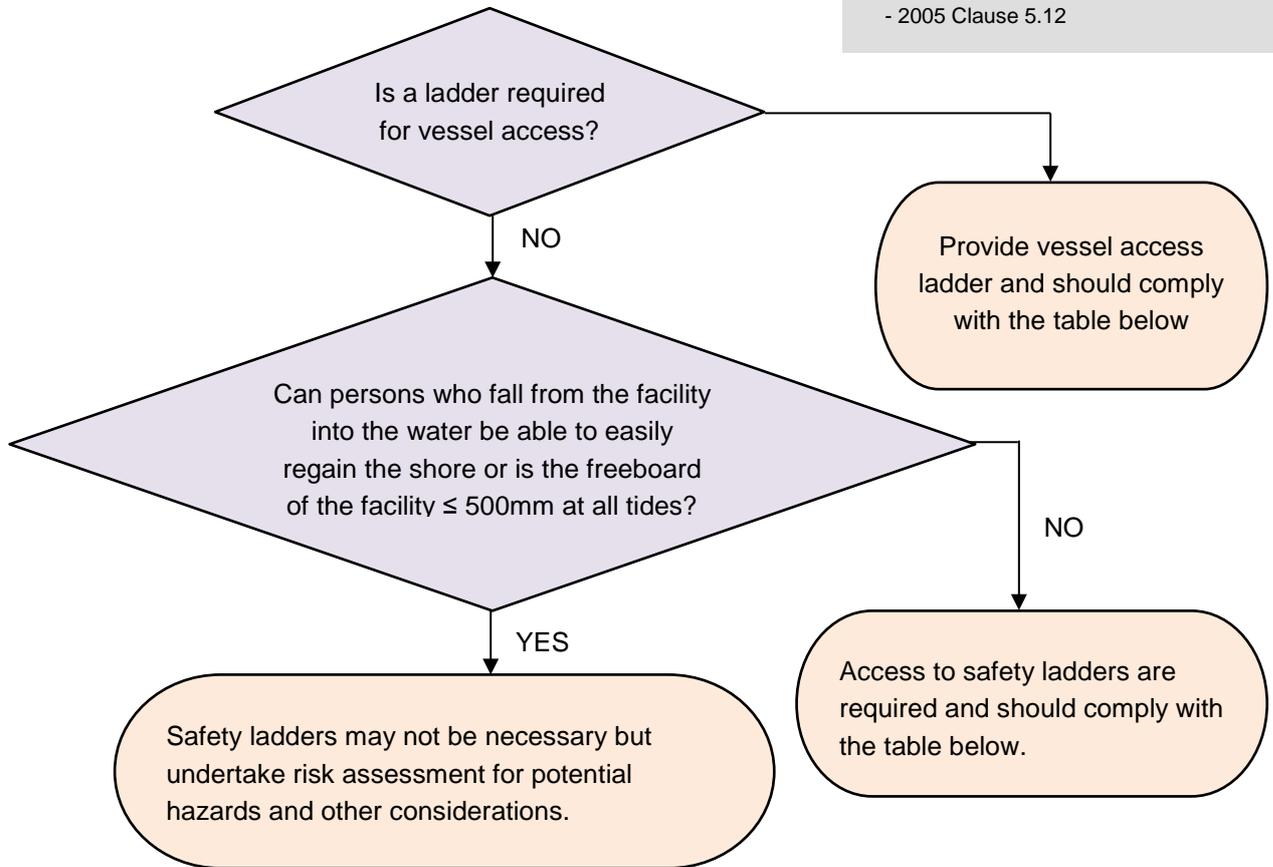
**Where further assessment is required, the owner or operator should seek advice from a lighting consultant.**

## 6.5 Safety and Vessel Access Ladders

### COMPLIANCE FLOW CHART

Relevant References

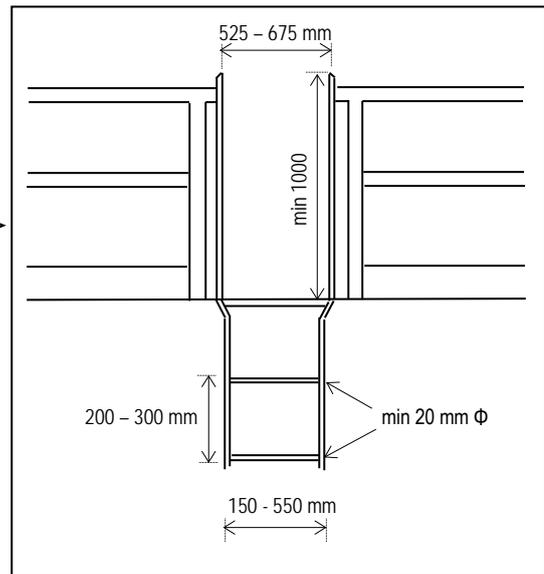
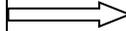
- AS 1657-2013
- AS 3962- 2001 Clause 5.1.2
- AS 4997- 2005 Clause 3.4.5
- NSW Maritime Engineering Standards and Guidelines for Maritime Structures - 2005 Clause 5.12



Requirement	Compliance			
	Yes	No	N/A	Comments
Ladder of durable material (AS 4997-2005 Clause 3.4.5)				
Ladder extends from deck level down to below low water level (bottom rung is at approx. 300mm below LAT) (AS 4997-2005 Clause 3.4.5)				
Ladders are located at maximum 60m intervals (AS 4997-2005 Clause 3.4.5)				
If the ladder are used for vessel access, suitable buffer rails at each side of the ladder or other fendering system should be provided to keep vessel at least 250 mm proud (AS 4997-2005 Clause 3.4.5)				

### Considerations

Rung diameter $\geq 20\text{mm}$ (AS 1657-2013 Clause 7.6.3.3)
Spacing of rungs are between 200 mm and 300 mm (AS 1657-2013 Clause 7.6.3.2)
Clear width of the tread of each rung is between 150mm and 550mm (AS 1657-2013 Clause 7.6.3.3)
Clear openings at top of ladder is between 525mm and 675mm (AS 1657-2013 Clause 7.4.8)
Stiles extend more than 1000 mm (AS 1657-2013 Clause 7.4.8)



AS 1657-2013 Figure 7.9. Reproduced with permission from [SAI Global](http://www.sai-global.com) under licence number 1510-c0206.

## 6.6 Markings

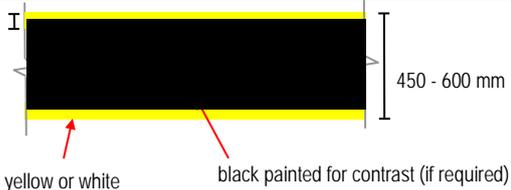
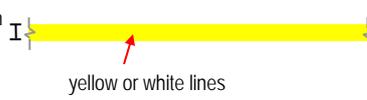
### COMPLIANCE

Adequate painted or coloured tape markings shall be provided along any edges of the structure (water's edge, steps/stairs and other edges) and around no-go zones (e.g., fuel pumps) in the absence of other safety edge indicators for public ferry wharves (both fixed wharf and pontoons).

Generally yellow or white line markings are considered appropriate. Consideration should be given to the type of material upon which the lines will be painted. For example, yellow lines may be more appropriate on a concrete wharf edge as white lines may not stand out.

### CONSIDERATIONS

#### LINE MARKING DIMENSIONS GUIDE

Location	Line Type	Typical Dimensions
<ul style="list-style-type: none"> <li>wharf/pontoon edge</li> <li>transition plate</li> <li>no-go zone</li> </ul>	hatching	75 mm I  450 - 600 mm yellow or white black painted for contrast (if required)
<ul style="list-style-type: none"> <li>wharf/pontoon edge (alternative)</li> <li>step edge</li> </ul>	single line	75 mm min I  yellow or white lines

### CONDITION

Have any markings faded?

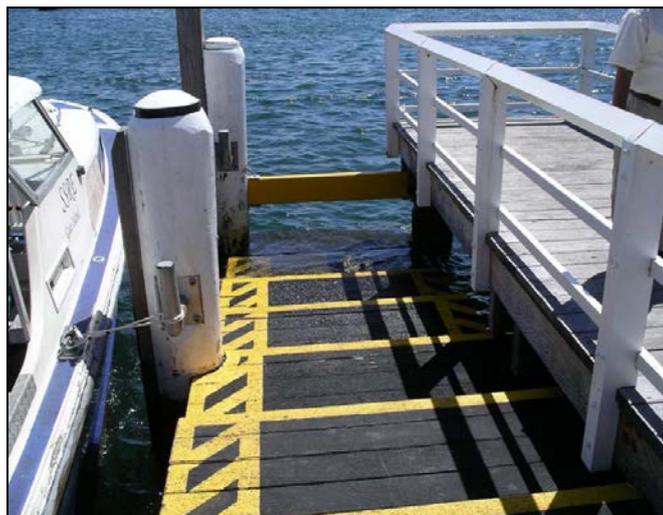


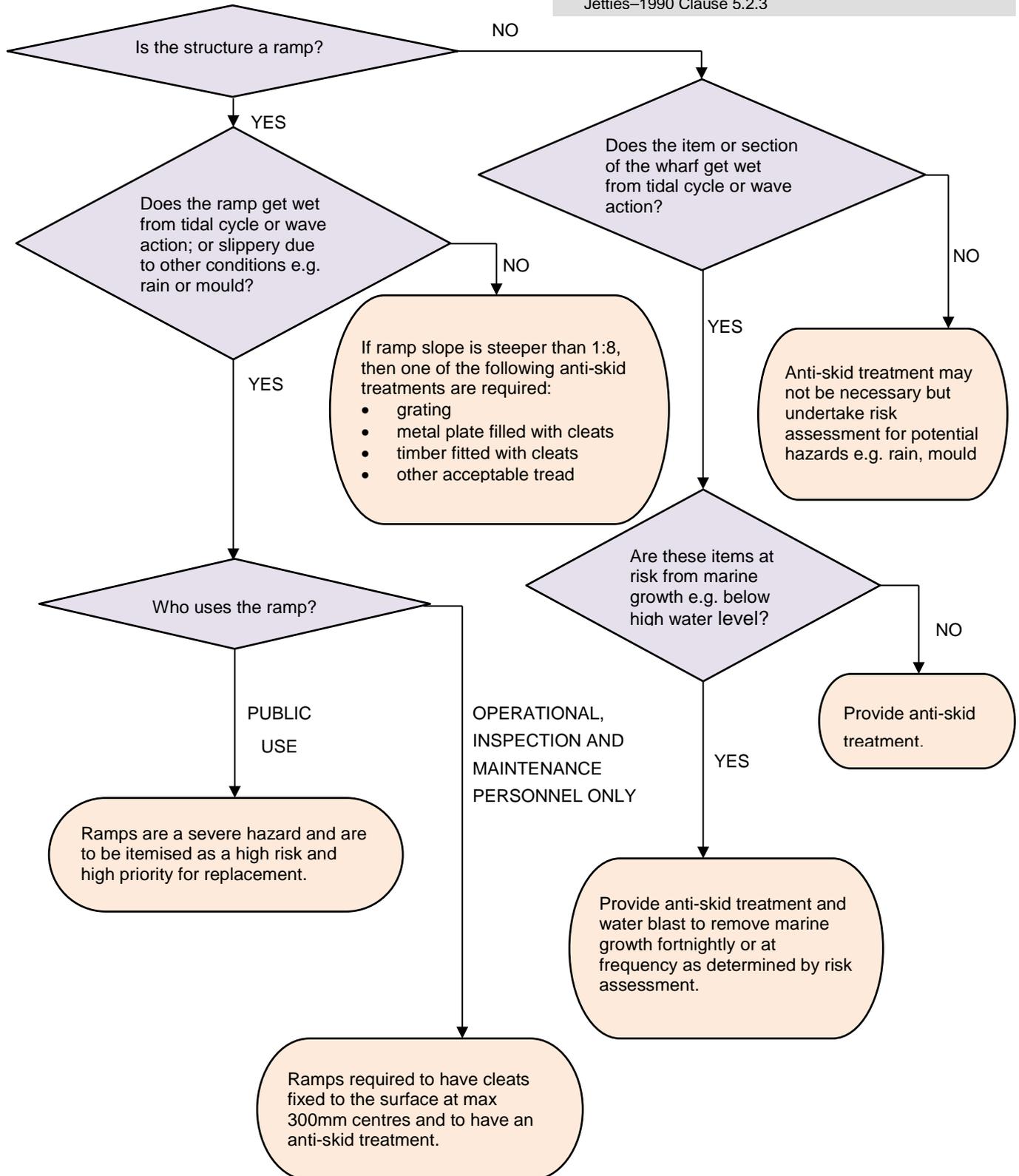
Figure 6.7 Example of paint markings along critical edges (e.g., steps and water edges)

## 6.7 Anti-Skid Treatment

Relevant References

- AS 4997-2005 Clause 3.4.2
- NSW Maritime – Engineering Standards and Guidelines for Maritime Structures – 2005 Clause 5.18
- NSW Public Works – Design Guidelines for Wharves and Jetties–1990 Clause 5.2.3

COMPLIANCE FLOW CHART



CONDITION

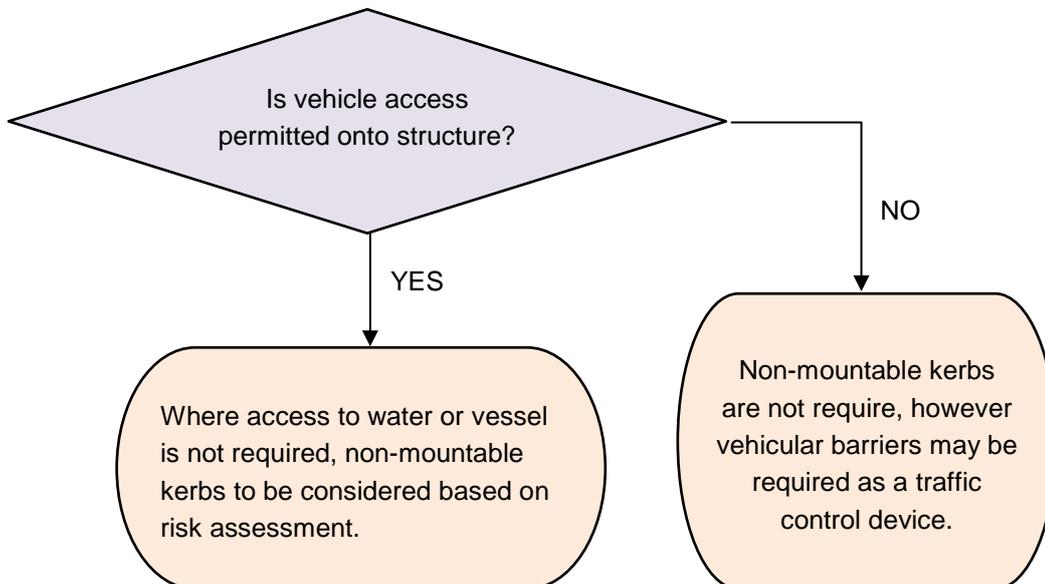
In what condition is the anti-skid treatment?

## 6.8 Vehicular Access Provisions

Relevant References

- AS 4997-2005 Clause 3.4.4

### COMPLIANCE FLOW CHART

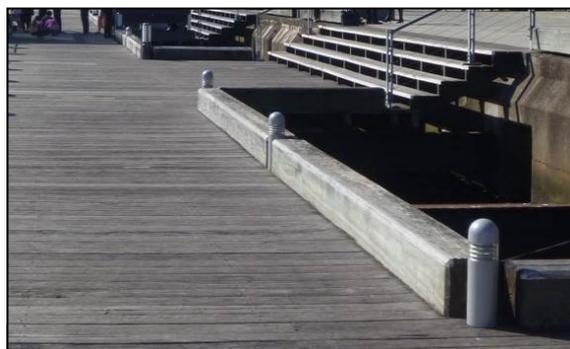


#### Potential Hazards and Considerations

- Pedestrian harm
- Damage to wharf assets
- Speed of vehicles on adjacent roads
- Potential for vehicles to access the wharf inadvertently (e.g., direction and slope of road)
- Potential damage to the vehicles e.g. hard surface, elevated height
- Any physical barrier, signages or visual cues for restricted access. Consider visibility at night.

#### Example 1

- Non-mountable kerbs would safeguard vehicles from the edge of the wharf



#### Example 2

- Bollards provided to restrict vehicle access from the road leading to the wharf
- White bollards assist with visibility of the barrier at night

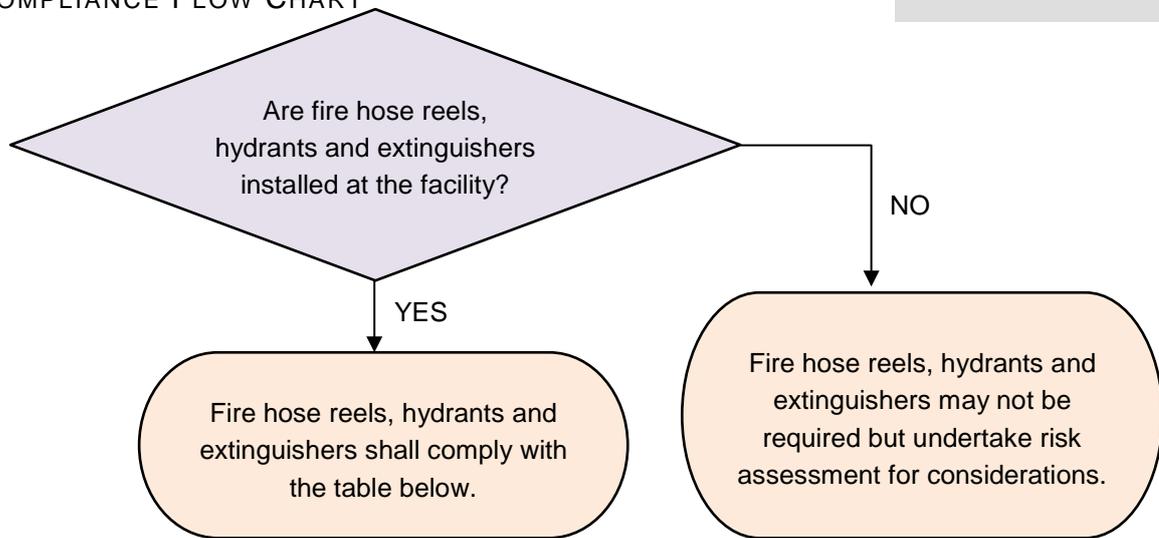


## 6.9 Fire Hose Heels, Hydrants and Extinguishers

Relevant References:

- AS/NZ 1221-1997
- AS 1851-2012
- AS 3962-2001 Clause 6.2

### COMPLIANCE FLOW CHART



Requirement	Compliance		
	Yes	No	Comments
Maximum distance between any two hose reels should be 30 m (AS 3962-2001 Clause 6.2)			
Length of hose should be at least 36 m (AS 3962-2001 Clause 6.2)			
All parts of the facility can be reached by the end of the hose reel (AS 3962-2001 Clause 6.2)			
Fire hydrants are provided adjacent to the head of each gangway (AS 3962-2001 Clause 6.2)			
The maintenance record tag/labels for the fire hose reels, fire hydrants and fire extinguishers are marked with previous inspections (AS 1815-2012)			
The frequency of inspections for the fire hose reels, fire hydrants and fire extinguishers are six-monthly, yearly or 5-yearly as applicable for the test (AS 1815-2012)			

#### CONSIDERATIONS

- Are there activities at the wharf that may indicate a need for fire-fighting facilities, such as permanent mooring of vessels, cooking facilities or flammable goods?
- Can the NSW Fire Brigade or NSW Rural Fire Service access the facility?
- Is the closest fire hydrant near enough to provide adequate service to the facility?

Where further assessment is required, the owner should seek advice from the NSW Fire Brigade or a Fire Safety consultant regarding the provision of fire hose reels, hydrants and extinguishers.

#### CONDITION (AS 1851-2012)

##### Hydrant:

- Provide last service date (refer maintenance record tag).
- Has the hydrant been serviced within the last six months? If 'NO' then condition is poor.
- Does the hydrant appear in an adequate condition?

##### Hose Reel:

- Provide last service date (refer maintenance record tag).
- Has the hose been serviced within the last six months? If 'NO' then condition is poor.
- Does the hose reel appear in an adequate condition?

##### Extinguisher:

- Provide last service date (refer maintenance record tag).
- Has the extinguisher been serviced within the last six months? If 'NO' then condition is poor.
- Does the extinguisher appear in an adequate position?



**Figure 6.8 Example of a hose reel**

## 6.10 Lifebuoys

### Relevant References

- NSW Maritime Engineering Standards and Guidelines for Marine Structures–2005 Clause 5.19
- SOLAS, Guideline 160.150 – Specification for Lifebuoys
- International Life- Saving Appliance Code Clause 2.1

### COMPLIANCE

Lifebuoys shall be provided on all commuter wharves and regularly-serviced public facilities unless evidence can be provided that this is not practicable and shall comply with the following:

Requirement	Compliance		
	Yes	No	Comments
Located in order to cover the water distance of a minimum of 10 m in plan around the perimeter of the facility (NSW Maritime Engineering Standards & Guidelines For Marine Structures Clause 5.19)			
Maximum distance between any two life buoys should be 30 m.			
Should be located near a safety ladder.			

### CONSIDERATIONS

Lifebuoys shall comply generally with the Safety of Life at Sea (SOLAS) guidelines, which include:

- having an outer diameter of not more than 800 mm
- having an inner diameter of not less than 400 mm
- being fitted with grablines not less than 9.5 mm diameter, secured at four equidistant points around the circumference of the buoy to form four equal loops
- being fitted with retro-reflective tape not less than 50 mm wide at 4 locations.

Each lifebuoy is to be fitted with a buoyant lifeline that complies with the following:

- being non-kinking
- having a diameter of not less than 8 mm
- having the length of the lifeline not less than 30 m.

### CONDITION

In what condition is the lifebuoy and lifeline (i.e., is it ripped, worn, etc.)?



**Figure 6.9 Example of a lifebuoy**

## 6.11 Exits clear of obstructions

### Relevant References

- NSW Maritime Engineering Standards and Guidelines for Marine Structures–2005 Clause 5.5 & 5.18
- NSW Public Works – Design Guidelines for Wharves and Jetties August 1990 Clause 5.2.2
- AS 1428.1-2009 Section 6
- AS 1428.2-1992 Section 8
- AS 3962-2001 Clause 3.6.1
- Commonwealth Government – Disability Standards for Accessible Public Transport Guidelines 2001 Part 2

### COMPLIANCE

The requirements specified below is for new structures and, where practicable, should be implemented also for existing structures:

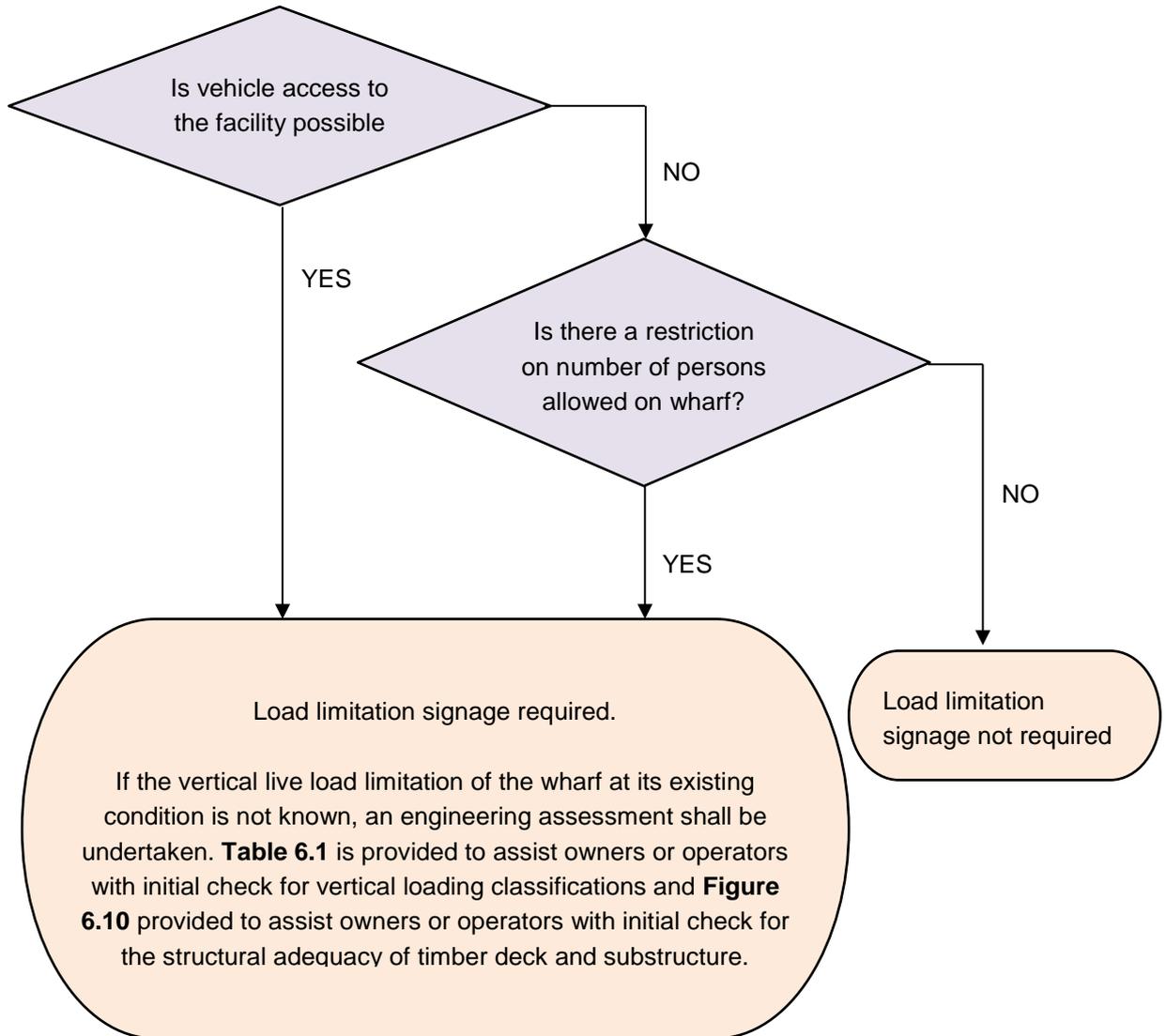
Requirements/Considerations	Compliance			
	Yes	No	N/A	Comments
Steps have a minimum clear width of 1.8 m (NSW Maritime Engineering Standards and Guidelines for Marine Structures–2005 Clause 5.18)				
Stairs (i.e., set of at least two risers) have a minimum clear width of 1.2 m (NSW Maritime Engineering Standards and Guidelines for Marine Structures–2005 Clause 5.18)				
Egress pathway has a minimum unobstructed height of 2.0 m (AS 1428.1-2009 Clause 6.2)				
Gangways or access ramps (excluding boarding ramps) to have a minimum clear width of 1.2 m. (AS 1428.2-1992 Clause 8.1, NSW Maritime - Clause 5.5, Disability Standards for Accessible Public Transport Guidelines 2001 Part 2)				
Jetties, walkways or accessways have a minimum clear width of 2.0 m for light pedestrian traffic and 2.5 m for moderate pedestrian traffic (NSW Public Works-1990 Clause 5.2.2)				
Consideration should be given to removing any obstructions that might present a hazard and obscure line of sight.				

## 6.12 Load Limitations

Relevant References

- AS 4997-2005 Table 5.1

COMPLIANCE



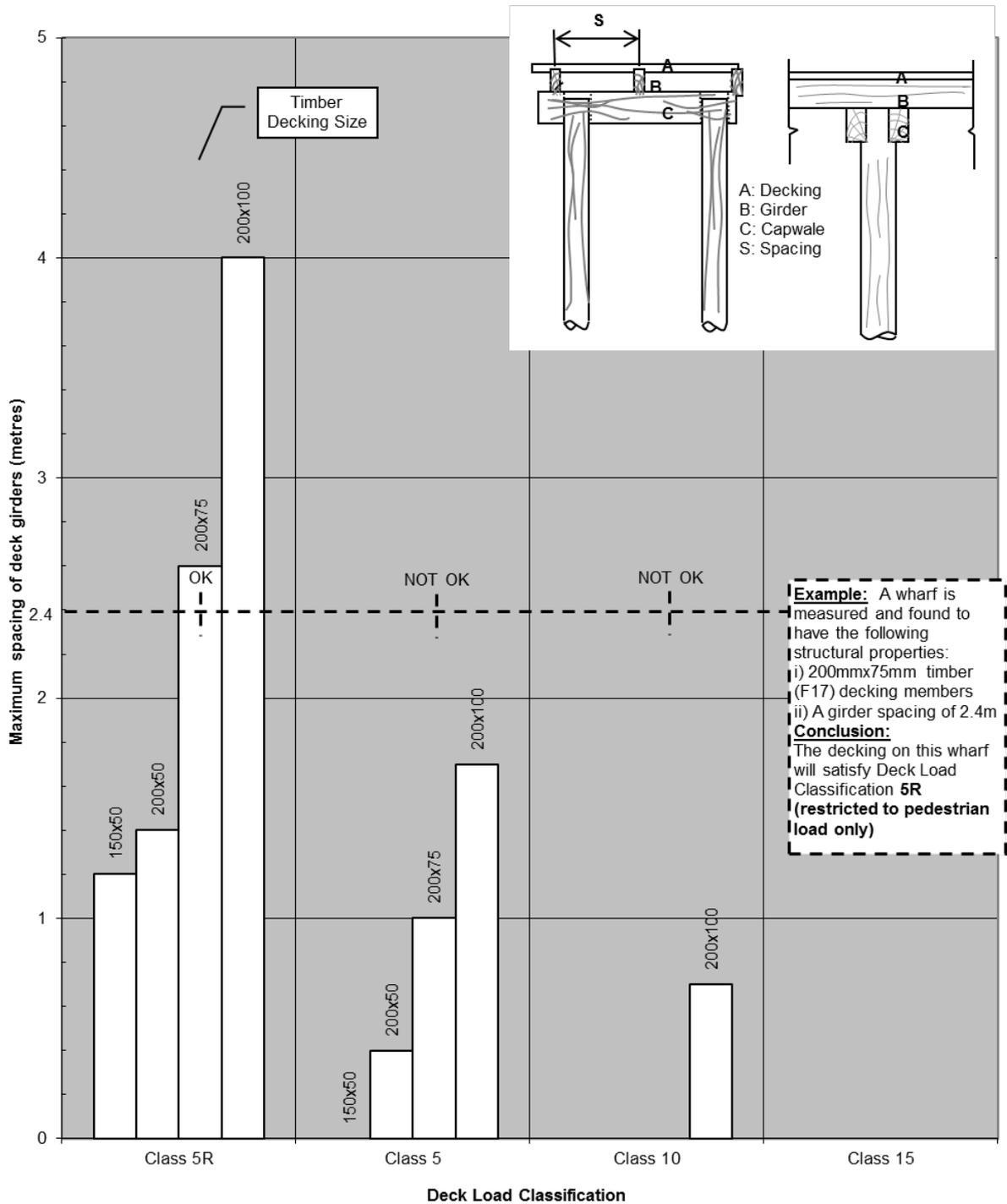
**Table 6.1 Vertical Loading Classifications**

Class	Uniformly Distributed Load (Q)	Concentrated Load (Area mm)	Anticipated Load Conditions	Example Application
5R (restricted)	5.0 kPa	4.5 kN	Pedestrian loading only	Wharf with no vehicle access e.g., prevented by stairs or other obstruction.
5	5.0 kPa	20.0 kN (150x150)  s = 1.8	Pedestrian crowd load and light motor vehicles up to 3 tonne tare	Wharf with light vehicle access e.g., removable bollards for tradesmen's utes, ambulances etc.
10	10.0 kPa	45.0 kN (300x150)  s = 1.8	Small emergency (fire tender) vehicles.	Wharf with access for emergency vehicle and service vehicles.
15	15.0 kPa	200.0 kN (400x700)  s = 4.0	Bridge design code (excl. heavy lift platforms).  Small mobile crane up to 20 tonne SWL.	Light duty wharf and jetty for fishing industry, charter boat industry, light commercial activities.

**Notes:**

1. s = spacing (metres) in any direction between concentrated loads, or between concentrated loads and the edge of uniformly distributed loads. Concentrated loads and uniformly distributed loads should not be superimposed.
2. These loads do not include any component for dynamic effect (rolling 'impact', or heavy landings of cargo loads).

Source: Columns 1 to 4 is sourced from AS 4997-2005 Table 5.1. Reproduced with permission from [SAI Global](#) under licence number 1510-c026.



**Notes:**

- 1) Maximum girder spacing for Class 5R are determined by deflection limits
- 2) Maximum girder spacing for Class 5, 10 and 15 are determined by strength limits
- 3) These guidelines were produced using the following assumptions:
  - a) Deck members are F17 hardwood
  - b) Applied design loads are of 5 minutes duration

**Figure 6.10 Guideline for Structural Adequacy of Timber Decking and Girders (Grade F17)**

## 6.13 Work Health & Safety Provisions

The following Work Health & Safety provisions should be considered for implementation by owners/operators with the aim to improve both worker and public safety. As a Public Ferry Wharf acts as a workplace for ferry and other support workers, it may be considered reasonably practicable for owners/operators to provide first aid facilities/equipment on the Wharf for both workers and users.

### 6.13.1 First Aid Kit

#### CONSIDERATION

Owners shall take a risk management approach to providing first aid facilities/equipment on Public Ferry Wharves. Note that if another Duty Holder under WHS legislation maintains first aid facilities/equipment accessible to workers and users, this may be sufficient without providing more first aid services on the Public Ferry Wharf.

#### CONDITION

Ensure the first aid kit(s) are stocked sufficiently with the necessary items based on risk assessment of the specific hazards and risks at the Ferry Wharf. Basic first aid kits should provide equipment for administering first aid for injuries such as:

- cuts, scratches, punctures, grazes and splinters
- muscular sprains and strains
- minor burns
- amputations and/or major bleeding wounds
- broken bones
- eye injuries
- shock.

Provision of an automatic defibrillator can reduce the risk of a fatality from cardiac arrest and is a useful addition for workplaces where there are large numbers of members of the public.

Displaying well-recognised, standardised first aid signs will assist in locating first aid equipment and facilities easily.

#### Relevant References

- NSW Work Health and Safety Regulation 2011
- First Aid in the Workplace, NSW Code of Practice 2014
- AS 1319-1994 Safety Signs for the Occupational Environment

### 6.13.2 Emergency Response Plan and Procedure

#### CONSIDERATION

As the wharf may be considered a workplace for ferry and support workers, wharf owners shall ensure that an effective emergency plan is prepared including emergency response for the specific hazards at the wharf (e.g., may include fire, chemical spill, violence, medical emergency, etc.), testing of the emergency procedures and information, training and instruction for workers involved in emergency planning and response. Where a workplace is shared by a number of businesses, the person who manages or controls a workplace shall prepare an emergency response plan in conjunction with all businesses at the workplace.

#### Relevant References

- NSW Work Health and Safety Regulation 2011

Relevant References

- NSW Work Health and Safety Regulation 2011
- NSW Workcover Codes of Practices

### 6.13.3 Other Considerations

Consideration should be given to the following potential hazards that may occur during operation of the wharf or during inspection, maintenance and repair works. This list is a guide only and is not exhaustive. It is the responsibility of the owner, operator and their representatives to identify potential hazards at the wharf and meet the relevant Work Health and Safety requirements.

Potential Hazards	Considerations
Isolated work	Aim for workers to not work alone, emergency provisions, etc.
Airborne contaminants	Is there anything likely to exceed exposure standard?
Hazardous atmospheres	Is there anything used that displaces oxygen, increases fire risk or exceed 5% of LEL for gas/vapour/mist/fume?
Storage of flammable or combustible substances	Is there any fuel storage? The owners/operator should ensure storage of such substances be kept at lowest practicable quantity.
Falling objects	Is there anything likely to fall on a wharf worker or user?
Noise	If noise exceeds exposure standard, 8 hour average 85 dB(A) or peak of 140 dB(C), then control measures is required.
Hazardous manual tasks	Any manual task required by workers at the wharf, lifting gates, barriers, etc., which has the potential to cause injury?
Confined spaces	Are there any places at the wharves considered "confined spaces" under the legislation?
Electrical equipment/installations	If there are electrical equipment/installations on wharves, then any risks to health and safety must be managed.
Diving work	Considered high risk, may be undertaken for inspections, etc.
High risk construction work	As defined under WHS legislation, may apply for repairs. etc.

## Relevant References

- AS 1428.1-2009
- AS/NZS 1428.4.1-2009
- AS/NZS 3856.1-1998
- AS 3962-2001
- Disability Standards for Accessible Public Transport 2002

## 6.14 Disability Standards

### CONSIDERATION

The *Disability Standards for Accessible Public Transport 2002* set out the minimum accessibility requirements.

Since October 2002, all new public ferry wharves and associated structures, buildings or attached facilities that a provider or operator provides as part of the public transport service must comply with the *Disability Standards for Accessible Public Transport 2002*. Facilities already in operation at October 2002 have between 5 and 30 years to have adjustments made to the facility in accordance with *Schedule 1 Target Dates for Compliance* of the *Disability Standards for Accessible Public Transport 2002*.

“Public transport service” is defined as an enterprise that conveys members of the public by land, water or air. It includes community transport conveyances that are funded or subsidised by charity or public money and that offer services to the public.

Compliance with the requirements in the standards provides providers or operators with protection from a complaint of unlawful discrimination.

Compliance with the *Disability Standards for Accessible Public Transport 2002* may also be achieved by:

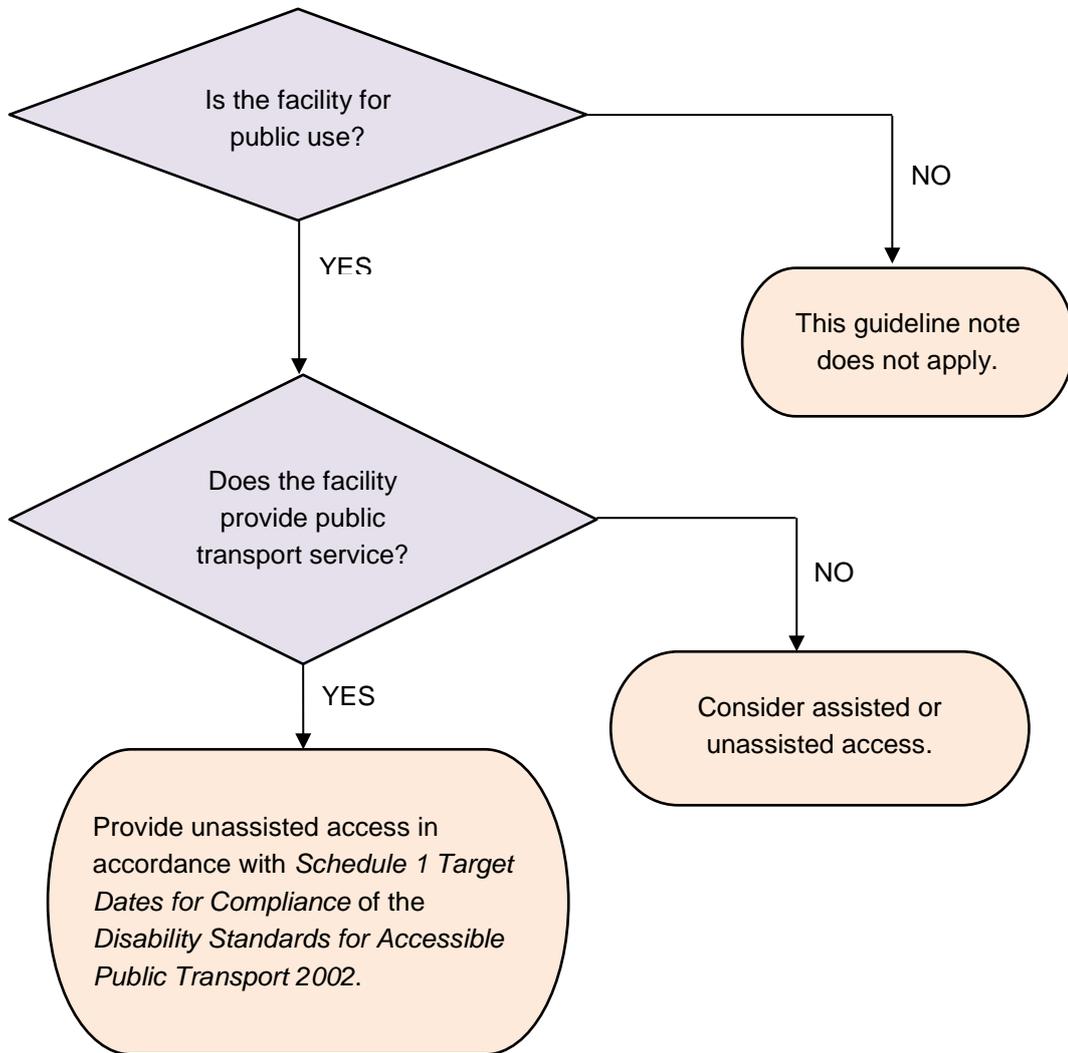
- “using methods, equipment and facilities that provide alternative means of access to the public transport service concerned (but not using separate or parallel services) with equivalence of amenity, availability, comfort, convenience, dignity, price and safety” (Clause 33.3)
- providing “direct assistance to passengers if:
  - it is necessary to provide equivalent access to a service
  - direct access can be provided reasonably without unjustifiable hardship” (Clause 33.6).

Under the *Disability Standards for Accessible Public Transport 2002*, a provider or operator can use unjustifiable hardship as a defence against a claim that they have discriminated against someone unlawfully.

The Attorney-General’s Department notes that a court considers the following factors in assessing a claim of unjustifiable hardship:

- costs
- exceptional operational, technical or geographic factors
- resources reasonably available
- likely benefits or detriment of compliance
- action plans developed
- consultations involving people with disability
- good faith efforts to comply.

ACCESS



HINGED RAMPS AND GANGWAYS TO PONTOON

Item	Considerations
Continuous Path	Continuous path of travel to/from the ferry wharf that has no steps, lips at joints > 5 mm or hazards with less than 2 m height clearance.
Width	Minimum clear width of 1.2 m.
Assisted disabled access	All hinged ramps and gangways to have slopes flatter than 1:8 at water level at lowest astronomical tide. (AS 3962-2001 Clause 3.6.2)
Unassisted disabled access	All hinged ramps and gangways exceeding 1900 mm in length to have slopes flatter than 1:14 for at least 80% of the time (tide). All hinged ramps and gangways less than 1900 mm in length to have a gradient flatter than 1:10.  (AS 1428.1-2009 Clause 10.3 and 10.6; Disability Standards for Accessible Public Transport 2002 Part 6 )

FIXED RAMPS

	Considerations
Assisted disabled access for boarding ramps	All boarding ramps to have slopes flatter than 1:4, but a slope of flatter than 1:6 is preferable.  (AS/NZS 3856.1-1998 Clause 2.1.8)
Assisted disabled access for ramps, excluding boarding ramps	All ramps to have slopes flatter than 1:8.
Unassisted disabled access	All ramps exceeding 1900 mm in length to have a gradient flatter than 1:14. All ramps less than 1900 mm in length to have a gradient flatter than 1:10.  For ramp gradients of 1:14, landings (min 1.2 m in length) to be at intervals not greater than 9 m. For ramp gradients steeper than 1:20, landings to be at intervals not greater than 15 m. For ramp gradients between 1:14 and 1:20, landings to be at intervals to be obtained by linear interpolation.  (AS 1428.1-2009 Clause 10.3 and 10.6)

## WALKWAYS

Any accessible path with a gradient flatter than 1:20.

	<b>Considerations</b>
Unassisted disabled access	<p>All walkways to have a gradient flatter than 1:20</p> <p>For walkway gradients of 1:20, landings (min 1.2 m long) to be at intervals not greater than 15 m intervals (max). For walkway gradients of 1:33, landings to be at intervals not greater than 25 m intervals. For a ramp gradients between 1:20 and 1:33, landings to be at intervals to be obtained by linear interpolation.</p> <p>The above intervals may be increased by 30% where at least one side of a walkway is bounded by the following:</p> <ul style="list-style-type: none"> <li>• kerb or kerb rail as specified in AS 1428.1-2009 Clause 10.3) and a handrail as specified in AS 1428.1-2009 Clause 12; or</li> <li>• a wall and a handrail as specified in AS 1428.1-2009 Clause 12. (AS 1428.1-2009 Clause 10.2 [modified]. Reproduced with permission from <a href="#">SAI Global</a> under licence number 1510-c026.)</li> </ul>

## TACTILE INDICATORS

Requirement	Compliance			
	Yes	No	N/A	Comments
Where hazards exist (e.g., change of surface gradient with no continuous handrail; or edge of wharf with no handrail; or low clearance < 2 m), tactile indicators are required (e.g., warning tactile ground surface indicators (TGSIs), and handrail domed indicator buttons).				
Where directional assistance is required to determine the path of travel or to designate a route to avoid a hazard and no other sufficient tactile directional cues are provided.				
Warning TGSIs are set back 600 mm to 900 mm from edge of wharf and 300 mm from other hazards such as change of surface gradient for the full length of directional TGSIs are provided. (AS/NZS 1428.4.1-2009 Clause 2.3.3 and 3.5)				
Warning TGSIs are placed across the direction of travel and are 600 mm to 800 mm wide (in direction of travel). (AS/NZS 1428.4.1-2009 Clause 2.4)				
Directional TGSIs are placed along the direction of travel and are 300 mm to 400 mm in width (perpendicular to direction of travel). (AS/NZS 1428.4.1-2009 Clause 3.2.3)				
TGSI are of adequate luminance contrast with the ground surface.				



Figure 6.11 Example of tactile markers near the waters edge

## CONDITION

Have tactile indicators been lost, cracked or loosened?

Is adequate luminance contrast with the ground surface maintained?

## OTHER CONSIDERATIONS

Consideration should be given to the other minimum accessibility requirements in the *Disability Standards for Accessible Public Transport 2002*. This list is a guide only and is not exhaustive.

- manoeuvring and passing areas
- waiting areas
- handrails and barriers (refer **section 6.1**)
- doorways
- lifts
- stairs
- toilets
- symbol and signs
- tactile ground surface indicators (refer previous page)
- furniture
- the payment of fares
- access to information about transport services.

## 6.15 Signage – Warnings on Usage

Relevant References

- No AS exist for this item

### CONSIDERATION

Are any of the following warnings regarding usage of the facility required?

Warnings	Yes	No	Comments
No Diving			
No Swimming			
Beware of Berthing Vessels			
Electrical/Fuel Indicators			
No Fishing from Wharf			
Submarine Cables in Vicinity			
Slippery Surface			
Owners Name and Contact Nos			
Emergency Response Signage			

**It is recommended that No Diving, No Swimming and Beware of Berthing Vessels should be displayed on all wharves including owners name and contact details. No Fishing from Wharf or any other message as deemed appropriate should be displayed by the owner.**

## 6.16 Booms for Oil/Petrol or Chemical Spillage

- Relevant References**
- AS 3962- 2001 Clause 6.9
  - Relevant Standards and Best Practice Guidelines

### CONSIDERATION

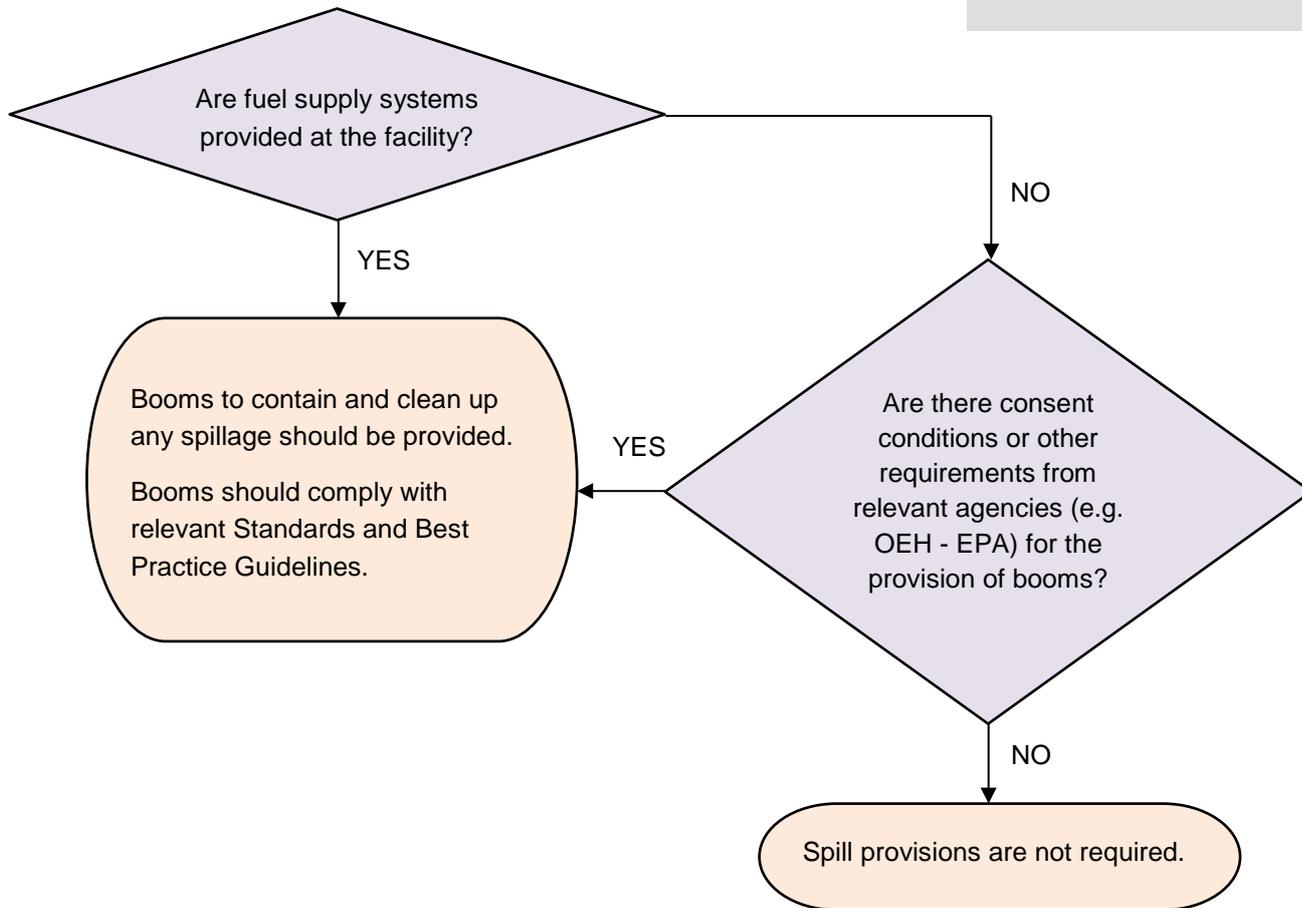


Figure 6.12 Example of spill provisions

## 7 CONDITION ASSESSMENT CHECKLIST AND COMMENTARY

### 7.1 Introduction

The commentary and checklist below is a guide only and is not exhaustive. Every wharf, pontoon or structure is different. However, the common points to look for have been listed below.

Signs and rules of thumb triggers provided in this section are to be used as a guide for Level 1 inspections only. Where there are signs and triggers evident, the owners are to seek a Level 2 engineering inspection assessment or specialist inspections (where appropriate). In relation to hazards that affect safety, reference should be made to the safety compliance criteria flowcharts in **Section 6** and risk assessment undertaken for potential hazards where appropriate to consider other factors such as usage, location and vessel type.

The conduct of inspections of harbours and waterways is naturally hazardous and there are risks associated with boat operations, working over water, deteriorated structures and confined space entry. While part of the substructure may be visible from land or from a boat under normal operating conditions at the wharf, it is recommended that any detailed inspection of the substructure be undertaken by suitably experienced personnel with appropriate safe work procedures for conducting the inspection documented in Safe Work Method Statements.

### 7.2 Wharf Type

As noted in Section 4, there is a different Level 1 Inspection Form for each of the three types of structures:

- fixed wharf (including catwalks)
- floating pontoon
- fixed wharf and floating pontoon.

Generally a fixed wharf would comprise the following areas (refer **Figure 7.1** for example):

- access way in the form of a ramp or stairs extending from land access to the wharf
- main wharf
- boarding area with low level steps or landings, or ramps
- berthing area with berthing piles and mooring cleats or bollards
- seating or shelter area.

Generally a pontoon wharf would comprise the following areas (refer **Figure 7.2** for example):

- fixed access way in the form of a ramp or stairs extending from land access to the gangway
- gangway
- pontoon
- berthing area with berthing piles and mooring cleats or bollards
- seating or shelter area.

The following sections set out the signs and rules of thumb triggers for each of these areas.

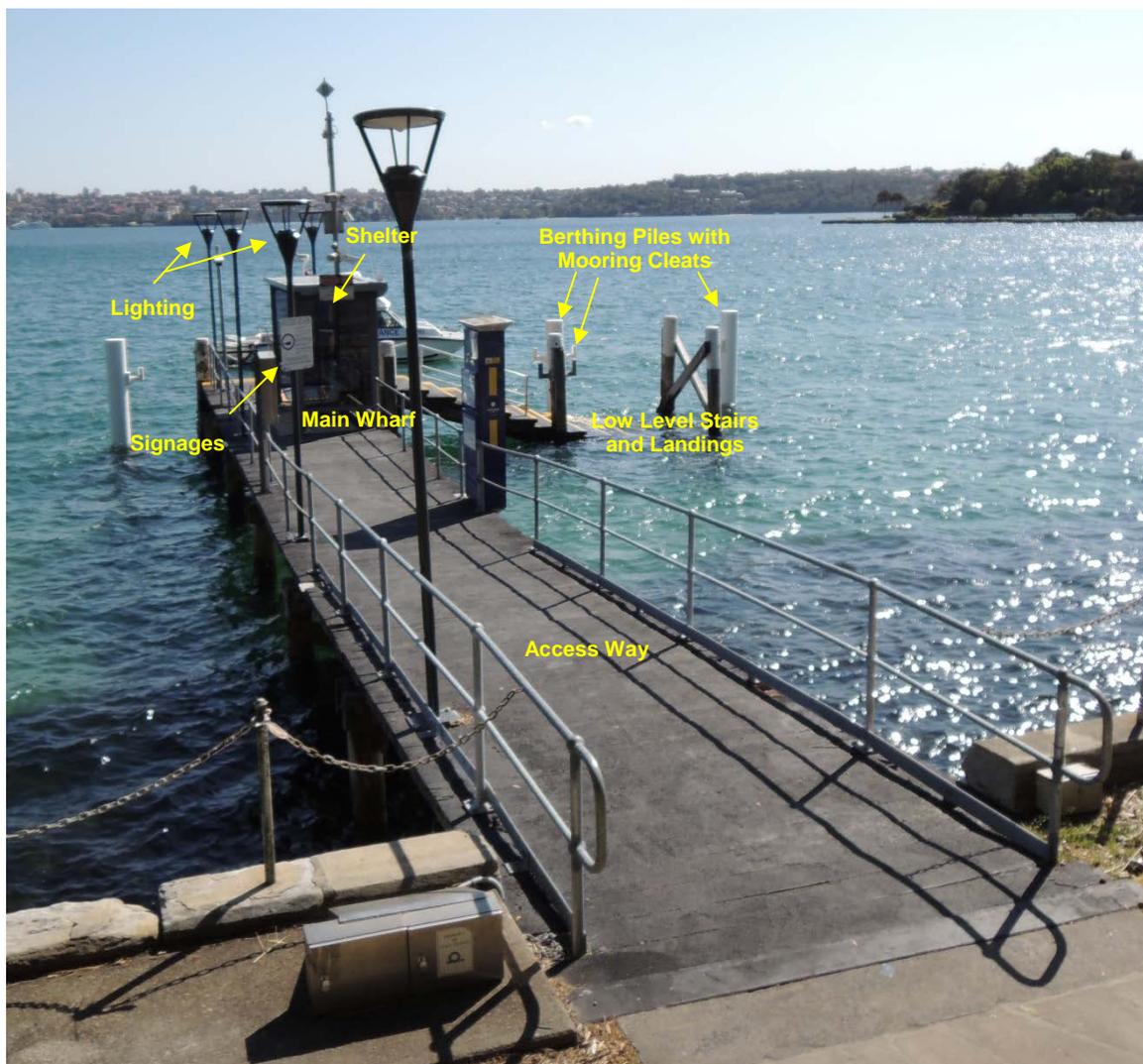


Figure 7.1 Example of a fixed wharf



Figure 7.2 Example of a pontoon wharf

### 7.3 Timber Access Way and Main Wharf Structure

Typical items of a timber access way and main wharf structure include the following:

- deck
- toe rail or kick board
- girders
- headstocks or capwales
- bracing and waling
- piles and pile caps
- fender

The typical locations of these items are shown in **Figure 7.3**.

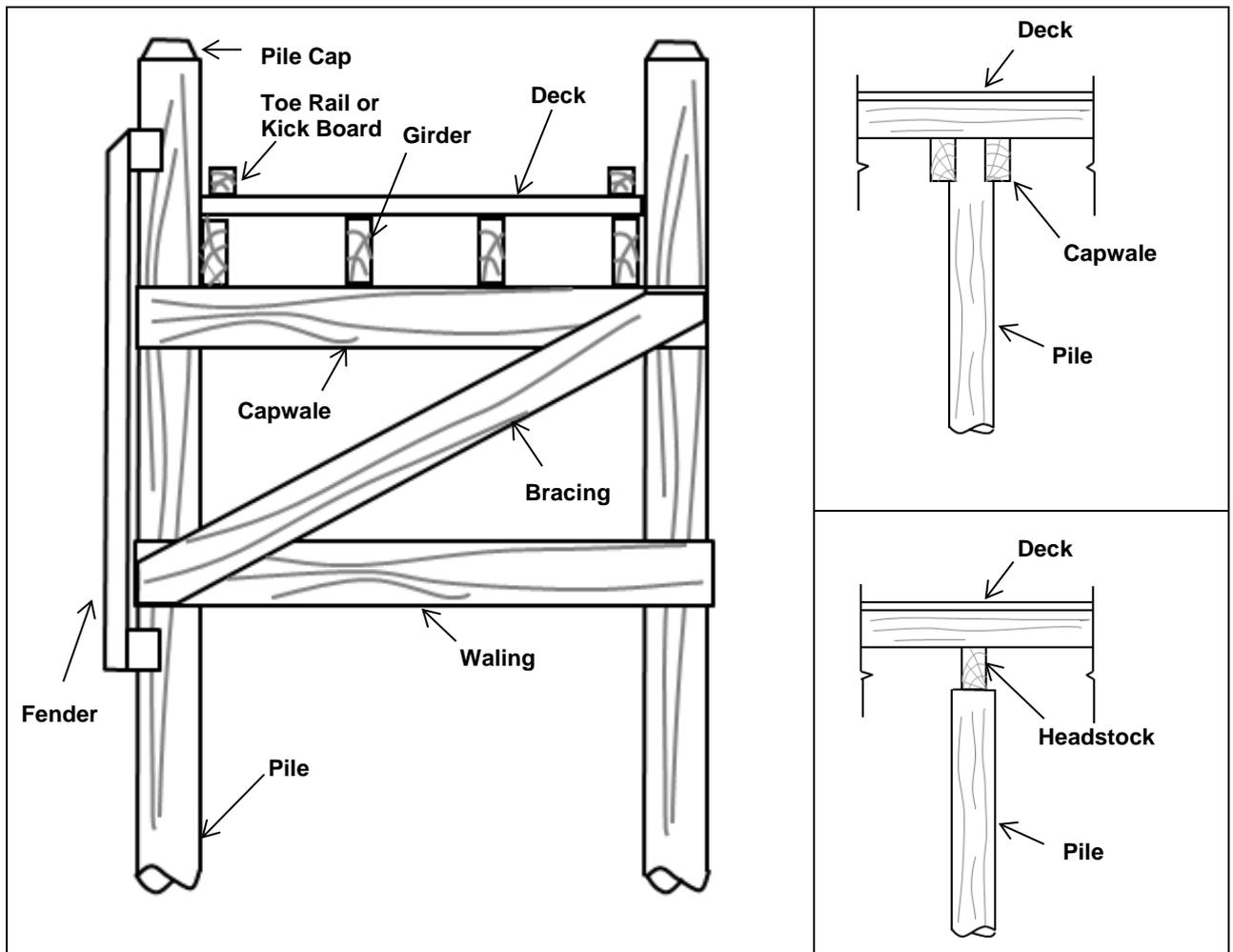


Figure 7.3 Typical locations of the various items for a timber structures

### 7.3.1 Timber Deck

- inspect deck planks for splits, rotting, soft spots and holes
- identify areas where timber work is inundated with fresh water, which increases risk of rotting
- check that deck planks do not sag excessively due to excessive spacing between the girders or poor condition of the deck planks
- identify potential trip hazards by checking gaps (refer **Figure 7.4**) and vertical height differences between deck planks for all sections of the wharf including access way, main wharf, gangway and pontoon:
  - **All Wharves:** check no deck spikes protrude above deck level.
  - **Commuter and Urban Ferry Wharves:** gaps between deck planks to be not greater than 10 mm; and vertical rise and fall between planks to be not greater than 10 mm
  - **Regional Ferry Wharves:** gaps between deck planks to be no greater than 20 mm; and vertical rise and fall between planks to be no greater than 15 mm;
  - If the above requirements are not met, risk assessment shall be undertaken to determine whether repairs or maintenance is required.



**Figure 7.4** Gaps may create a trip hazard

### 7.3.2 Timber Substructure

#### GIRDERS, HEADSTOCKS AND CAPWALES

- check members have even bearing. Uneven bearing can cause extra stresses in members and reduce design life (refer **Figure 7.5** and **Figure 7.6**)
- inspect for splitting, rotting and holes
- check that timber members are not hollow by hitting the member with a hammer and listening for a hollow sound
- check alignment, deformation, sagging and cracking of members
- inspect for termite infestation with signs of wood damage and mud leads (mud-like tubes that usually run horizontally). Refer **Figure 7.7**. Where termites are suspected, termite presence should be confirmed by a pest inspector
- inspect termite monitoring devices for signs of activity (if fitted) (refer **Figure 7.8**).

#### BRACING AND WALING

- check timber cross-bracing for splitting, rotting and holes
- inspect connections for corrosion, damage and whether any are missing.



**Figure 7.5** Girder bearing unevenly on headstock.



**Figure 7.6** Headstock bearing unevenly on pile.



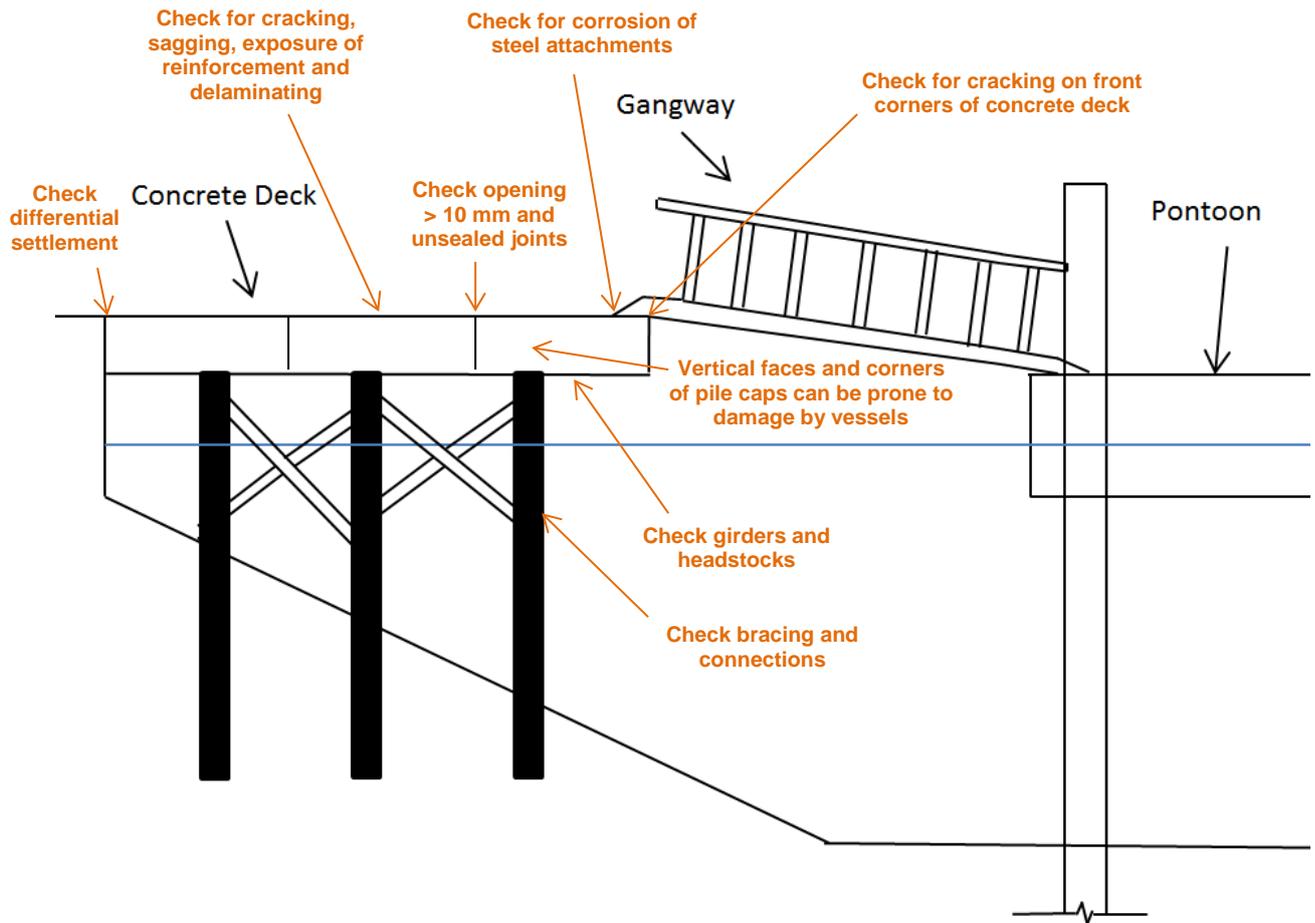
**Figure 7.7** Horizontal mud leads evident of termite presence.



**Figure 7.8** Termite monitoring device. Tasmanian Oak timber dowels are used to monitor pest activity.

#### 7.4 Concrete Access Way and Main Wharf Structure

Typical locations of deterioration prone areas for the concrete structures are provided in **Figure 7.9**. The following sections provide additional details on signs and rule of thumb triggers of deterioration for concrete structures.



**Figure 7.9 Deterioration Prone Areas for Concrete Structures**

### 7.4.1 Concrete Deck

- inspect concrete deck for cracking and sagging of the deck and exposure of steel reinforcement
- check for concrete delaminating and creating a trip hazard
- check for differential settlement of abutting edges is not greater than 10 mm
- check for opening of joints that creates unsealed gaps of greater than 10 mm
- check for unsealed joints in the concrete deck that may allow wetting of the supporting timber below.

### 7.4.2 Concrete Substructure

#### GIRDERS AND HEADSTOCKS

- check for rust stains providing evidence of reinforcement corrosion
- inspect for cracking, spalling and flaking of concrete surfaces
- check for areas of exposed reinforcement
- inspect for the alignment, straightness and deformation of girders and headstocks
- inspect construction and expansion/contraction joints for separation, accumulation of rubbish/debris and breakdown of expansion/contraction material
- check concrete for pockets of delamination by light tapping using a hammer. Delaminated concrete will sound hollow under hammer tapping whereas sound concrete will “ping” when lightly tapped. Full PPE including hardhat and eye protection shall be used by all personnel during this activity.

### 7.4.3 Steel Connections

- inspect holding down rods and U connectors for corrosion, damage and whether any are missing
- check tie rods between piles
- check bolt connections to see if they have become loose or are missing a nut
- check the extent of corrosion. Bolts should be replaced where they are delaminating significantly (steel/rust peeling from the bolt). As a rule of thumb, bolts should be replaced before one third of the original cross-section of the bolt is lost.



Figure 7.10 Loss of cross-section evident from this corroded pile/headstock connection



Figure 7.11 Corroded fasteners, washers and backing plates

## 7.5 Handrails and Barriers

- inspect connections at base and secure joints
- inspect corrosion of metal rails particularly rails installed on low level platforms subject to splash and immersion. Rails should be replaced or repaired where there are holes in the rails and / or stanchions
- inspect the sturdiness of the rails – displacement should be minimal
- inspect the condition of the timber rails for deterioration / split/ rots including its connections.



Figure 7.12 Corroded connections at the base of the handrail



Figure 7.13 Deteriorated timber handrail.

## 7.6 Piles

### 7.6.1 Pile Tops and Caps

- inspect for decay, rot, splits and termite or pest infestations
- check pile cap and connections for corrosion
- inspect paint on top section of timber piles.



**Figure 7.14** Splits in the top of a pile allow water to infiltrate to facilitate deterioration. Cigarette butts get inserted into the splits which create a fire hazard.

### 7.6.2 Timber Piling

Typical damage to timber piles is provided in **Figure 7.15**.

Visual inspection of piles to be undertaken from the deck and below the deck during low tide and from a boat (if required) for the following signs and rule of thumb triggers.

- inspect piles at low tide for signs of necking (hour-glass shape of pile with the diameter reduced in the intertidal zone) (refer **Figure 7.16**). If diameter of the timber piles have reduced to the following dimensions, then an appropriately qualified and experienced engineer specialising in maritime structures should be engaged to advise on the structural adequacy of the deteriorated pile:
  - less than 200 mm for axially loaded piles;
  - less than 250 mm for fender and cantilevered piles.
- check piles for holes, splits and rotting
- check piles for excessive abrasion and erosion
- inspect headstock connections
- check displacement of pile by visual observation or with a Abeny level or inclinometer
- check for breakdown/deterioration of pile sleeves/splice
- check for signs of fungi damage - discoloration and softening of the wood with a fluffy or cotton appearance or appearance of fruiting bodies (e.g. mushrooms), particular in areas of stringers, pile caps and top of piles
- check for signs of marine borers – burrows or hollows, surface trenches in the outer layers of the pile and loss of pile diameter.

Underwater diver inspections of piles should be undertaken at least every 3 years for urban and commuter wharves and at least every 5 years for regional wharves by an experienced diver supervised

be a qualified and experienced engineer specialising in maritime structures. This frequency should be increased where marine animal infestation is known to be a problem.

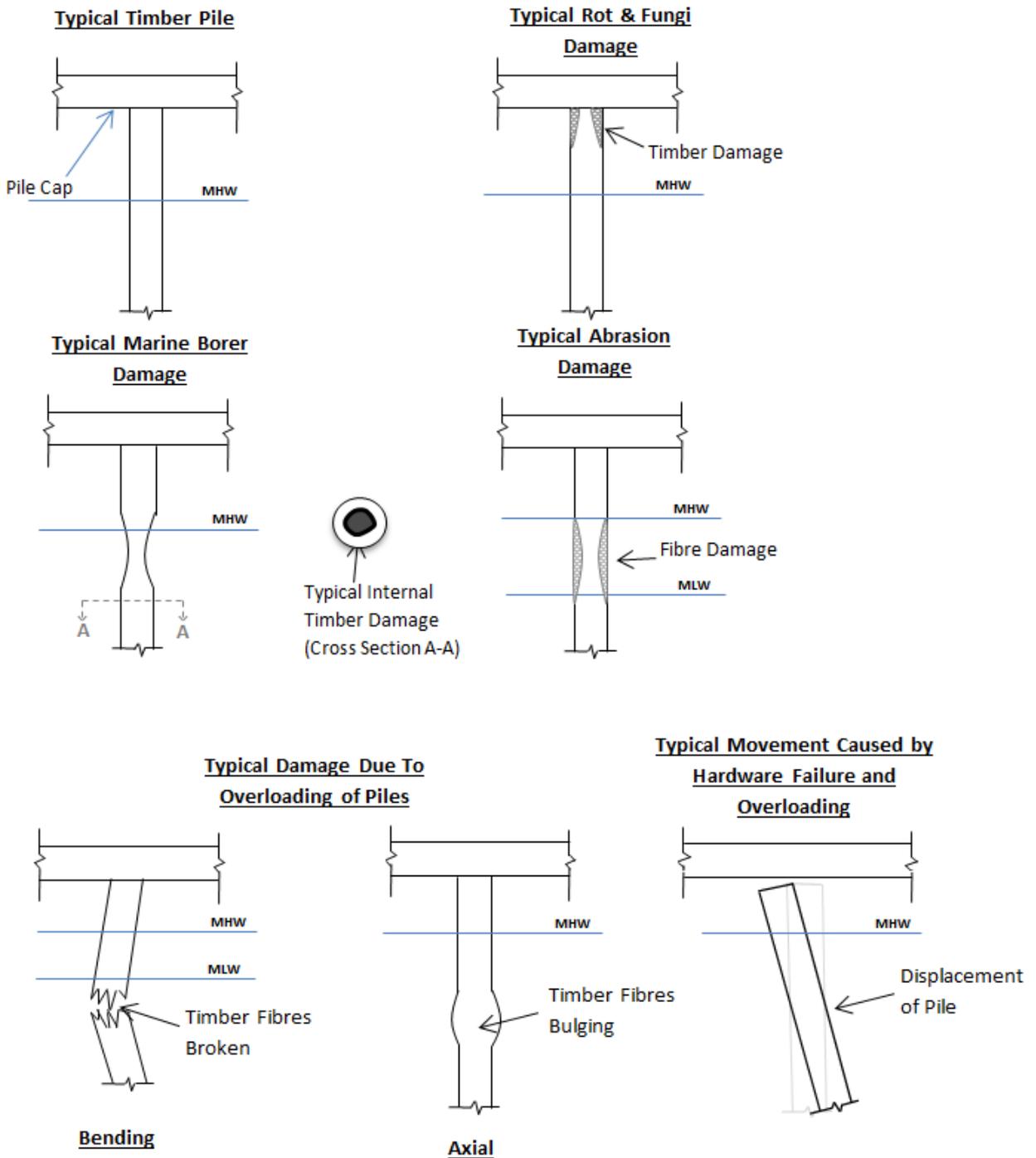


Figure 7.15 Typical Damage to Timber Piles (based on Figure 5.7, U.S Army Corps of Engineers' Unified Facilities Criteria (UFC) Maintenance and Operation: Maintenance of Waterfront Facilities)



**Figure 7.16 Examples of piles and necking (hour-glass shape)**

### 7.6.3 Steel Piling

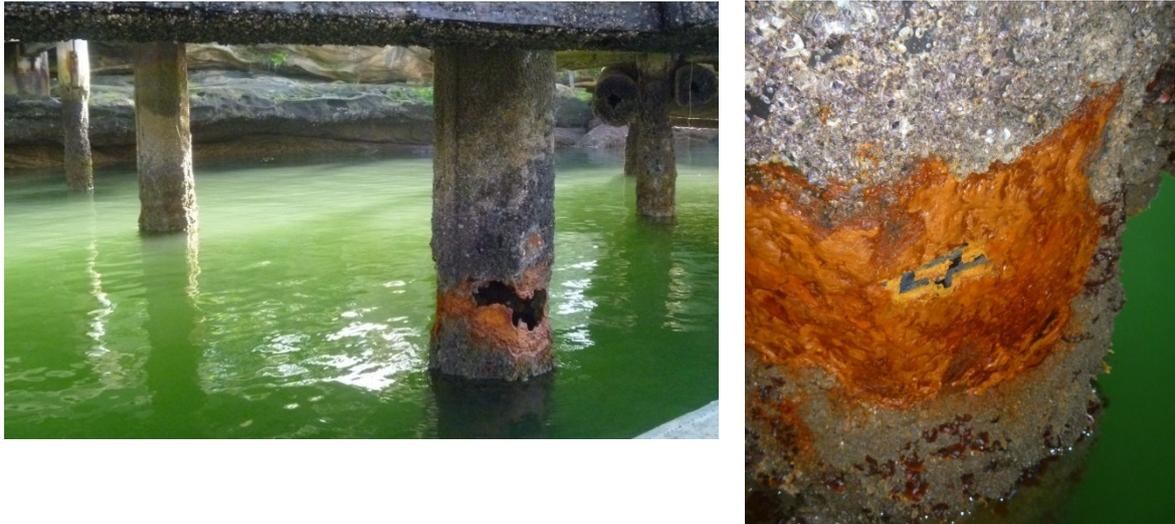
- inspect for deterioration of pile
- check condition of protective coating (refer **Figure 7.18**)
- check gusset plates and stiffeners for signs of buckling, cracking, separation or corrosion
- check welds for cracking or other signs of distress
- inspect the surface of metal for corrosion (refer **Figure 7.17**). Where corrosion appears significant, ultrasonic thickness testing may be required to determine the amount of steel remaining. Painting / protection may be required or piles replacement
- check for signs of microbial induced corrosion (MIC) or Accelerated Low Water Corrosion (ALWC) (rapid pitting form of MIC). ALWC occurs in the low water zone and presents as bright orange sludge fil overlaying shiny steel or grey pitted steel (refer **Figure 7.19**). This is an aggressive form of corrosion that reduces the service life of the pile significantly.



**Figure 7.17 Steel pile with some corrosion**



**Figure 7.18 Pile paint worn from contact with fenders, and rubbing blocks**



**Figure 7.19 Localised degradation of steel pile due to Accelerated Low Water Corrosion**

#### **7.6.4 Previously Repaired Piles**

- inspect piles that have been wrapped with an impermeable membrane for slippage of jacket, seal placement and performance, conditions of straps holding the membrane in place, jacket overlap, marine growth, new borer/worm activity
- inspect epoxy encapsulated piles for headstock connection, steel sleeve condition, pile position, epoxy performance on top surface of sleeve, pile condition, worm activity
- check concrete encapsulated piles for concrete erosion and condition, headstock condition, pile condition above encasement
- check steel jack-up piles protective coating, weld at inner and outer steel tube connection, steel stub condition and position, and epoxy performance at bearing to existing pile stump, corrosion and ALWC.

#### **7.7 Stairs, Steps, Ramps and Low Level Landings**

- check chocks (packer blocks under step planks) are not rotting
- check conditions of cleats for ramps
- check for loose planks or timber members
- check adequate painted or coloured tape markings are provided along the edges of the stairs or steps and if they have faded
- check anti-skid treatment covers all landings or steps that are in the intertidal and splash zone
- check for marine growth.



Figure 7.20 Stairs with patchy antiskid treatment and some marine growth.

## 7.8 Boarding and Berthing Area

### 7.8.1 Moorings, Berthings and Fendering

#### BERTHING PILES

- check that berthing piles impact on rubber strips and fenders (if installed)
- check piles are not loose.

#### RUBBING STRIPS

If rubbing strips have been installed on fender pile face:

- check length of rubbing strips extend from -0.5m CD to +3.5m CD to allow for berthing vessels at extreme tides with waves
- check steel connections do not protrude from rubbing strip – this could damage a vessel
- check timber rubbing strips for wear, splitting or rotting.

#### RUBBER FENDERS

- check that rubber fenders completely bear on the wale / fender pile
- check the rubber for cracking, laminar separation (the rubber splitting into parallel layers), perishing, loss of pliability, heavy discolouration and surface crazing (myriad of small cracks on the surface of the rubber)
- check for corrosion, loss of section and wearing of fender chains and rods.

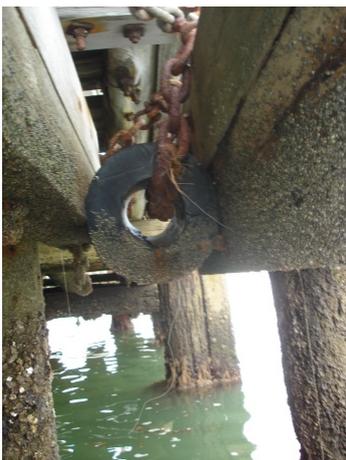


Figure 7.21 Rubber fender not fully bearing on wharf wale and fender chain corroded.

#### MOORING CLEATS AND BOLLARDS

- inspect for corrosion of holding bolts to cleats/bollards (potential to fail under berthing line load, see steel connections). The possibility of the cleat/bollard being thrown onto vessel with damage to vessel and injury to persons should increase the risk/priority rating selected
- inspect wear and corrosion on cleat/bollard, especially where mooring ropes are applied
- check mooring cleat and bollard capacity: The expected maximum horizontal load due to vessel impacts (bollard capacity) can be determined from **Table 7.1** for sheltered conditions. Where vessels may be exposed to conditions other than mild, the bollard capacity should be increased by 25%. Wind, current and wave forces on the vessel should also be considered and if these forces are significant, then advice from an appropriately qualified and experienced engineer specialising in maritime structures should be sought.



Figure 7.22 Corroded mooring cleat and bollard.

Table 7.1 Mooring Forces for Sheltered Conditions

Vessel Displacement (Tonnes)	Bollard Capacity kN
Up to 50	50
50 to 200	100
200 to 1000	200
1000 to 10,000	300

Source: AS 4997-2005 Table C1. Reproduced with permission from [SAI Global](#) under licence number 1510-c026.

## 7.9 Gangway

- inspect the connection of the gangways to the abutment
- inspect safety chains to the gangway
- inspect transition plates from gangway to pontoon and from land to gangway – check no trip hazards are present, and for wear of rubbing strip underneath
- check corrosion particular for bottom section exposed to sea spray, areas likely to collect water in hollow sections and areas where different metals are used
- check all sections for signs of damage, cracks, failure of the welds or brittleness. Note aluminium may become brittle due to prolonged exposure to the sun and salt environment.



Figure 7.23 Corroded sections of bottom steel member of gangway

## 7.10 Pontoon

### FREEBOARD

- check that pontoon freeboard is maintained over time. Reduced pontoon freeboard can indicate that the pontoon is taking on water
- check for water within the pontoon. Do not enter the pontoon without confined space procedures in place
- check for structural corrosion within the pontoon. Do not enter the pontoon without confined space procedures in place.

## WALING

- inspect waling for splitting and rotting
- inspect connections
- inspect there are no trip hazards such as a gap greater than 10 mm between the wale and the pontoon deck.

## APERTURE PLATES

- check for corrosion of aperture plates
- check connections
- check even bearing.

## APERTURE PROTECTION

- check for corrosion and stability of barriers.

## MANHOLE COVERS

- check that covers are bolted or locked shut to prevent public access
- check that the cover and bolts does not create trip hazard
- check for corrosion, damage, stability
- check that the cover does not have holes or ingress points for water.

## HYDRAULIC SUPPORTS

- inspect for corrosion.



**Figure 7.24** Example of an exposed pile to pontoon connection aperture



**Figure 7.25** Example of an aperture plate



**Figure 7.26** Protruding hatch bolts creates a potential trip hazard



**Figure 7.27** Example of hydraulic supports

## 7.11 Services

- inspect for continuity of service conduit / pipe
- check connections for damage, tightness, whether any are missing
- inspect positioning of service is high up within the structure and fixed to element of the structure (not sagging down freely towards the tidal zone).

### FUEL, WATER, SEWERAGE

- check for leaks.

### POWER CABLES

- inspect conduits and connections for damage, corrosion and wear
- check no exposure of live wires.

### TELECOMMUNICATIONS

- inspect corrosion of conduits, connections and exposure of live wires.



**Figure 7.28 Exposed wires are unsafe**

### **7.11.1 Safety Items**

#### SAFETY LADDERS

- check for build-up of marine growth
- check corrosion, connections and any broken, bent or missing rungs.

### **7.11.2 Seating and Shelter Area**

#### ROOFING

- check roof sheeting for corrosion and holes
- inspect connections for corrosion, damage or whether any are loose or missing.

#### SEATING

- check the base connections to the deck.

## 8 GLOSSARY

<b>AHD</b>	Australian Height Datum
<b>ALWC</b>	Accelerated Low Water Corrosion
<b>AMSA</b>	Australian Maritime Safety Authority
<b>Anti-Skid Treatment</b>	Treatment applied on the surface of an access area to prevent people from slipping
<b>ANTT</b>	Australian National Tide Tables
<b>Aperture Plates</b>	A covering used to limit access to the pile to pontoon connection
<b>Aperture Protection</b>	A guardrail used to limit access to the pile to pontoon connection
<b>AS</b>	Australian Standards
<b>Australian Height Datum</b>	The resulting datum from mean sea level measurements around Australia undertaken in 1971
<b>Barrier</b>	A system of rails that provides edge protection at the edge of a floor or platform or walkway
<b>Bathymetry</b>	underwater depth for bodies of water (e.g. rivers, lakes, oceans etc.)
<b>BCA</b>	Building Code of Australia
<b>Boom</b>	Is a temporary floating barrier used to contain a spill. Booms are used to reduce the possibility of polluting shorelines and other resources, and to help make recovery easier
<b>Capwale</b>	A horizontal structural member connecting two or more piles and providing support for superstructure decking, girders and joists. Capwales are connected to the sides of the piles.
<b>Catwalk</b>	A narrow walkway, raised above the ground/water often built for accessing vessels
<b>CD</b>	Chart Datum
<b>Chart Datum</b>	This is the Datum used on Australian hydrographic charts and other hydrographic surveys. Generally this datum corresponds to the level of the Lowest Astronomical Tide (LAT) height, but can vary due to local water levels and fluctuations. Chart Datum is identified for each major Australian harbour in the Australian National Tide Tables (ANTT)
<b>Chocks</b>	A block or wedge used to prevent the movement of a rolling/sliding object, or for filling in an unwanted space.
<b>Concrete Delaminating</b>	Is a horizontal splitting, cracking, or separation within a concrete slab in a plane roughly parallel to, and generally near, the upper surface
<b>Deck</b>	Is a flat surface capable of supporting weight elevated from the ground
<b>Deck Spikes</b>	Used to connect decks to girders

<b>Directional indicator</b>	An indicator used as a guide to a safe route, indicating direction to travel, which is laid in the direction of travel
<b>Edge Marking</b>	Markings made on the edge of the wharf to guide pedestrians and vessels
<b>Egress Pathway</b>	A pathway which leads to the exit
<b>Fender</b>	A buffer, usually made of rubber or timber, to protect vessels and structures against damage during berthing
<b>Fender</b>	A buffer, usually made or rubber or timber, to protect vessels and structures against damage during berthing.
<b>Fender Piles</b>	A pile driven into the sea bed beside a berth to protect the wharf from the impact of vessels
<b>Fixed Wharf</b>	A structure fixed to and parallel to the foreshore (or jetty) alongside which vessels may lie to load or unload cargo, passengers etc.
<b>Floating Pontoon</b>	A floating platform restrained by guide piles or anchors which can be accessed via a gangway
<b>Freeboard</b>	The vertical distance from the waterline to the main deck of a vessel or a facility
<b>Gangway</b>	A structure which provides pedestrian access between a walkway or shore and a floating structure or vessel
<b>Girders</b>	A structural member that supports the deck and transfers the vertical loads down to the headstock
<b>Guardrail</b>	The highest rail in guardrailing fixed parallel to a floor or platform.
<b>Guardrailing</b>	A system of rails or panels, or both, that provides edge protection at the edge of a floor or platform or walkway
<b>Gusset Plates</b>	Gusset plates are metal plates that are used to connect joints i.e. beams and girders to columns or connect truss members
<b>Handrail</b>	A rail that provides a handhold on a platform, walkway, stairway or step-type ladder.
<b>HDPE</b>	High-Density Polyethylene
<b>Headstock</b>	A horizontal structural member connecting two or more piles and providing support for girders or joists. A headstock is generally supported directly on the top of the piles.
<b>Highest Astronomical Tide</b>	Highest level of water which can be predicted to occur under any combination of astronomical conditions and average meteorological conditions.
<b>Hydraulic Supports</b>	Supports which use hydraulic work pieces to provide a self-adjusting rest and compensate for deflections and vibrations under loads
<b>Intertidal zone/area</b>	Corresponds to the area subjected to tidal actions, typically between MLW and MHW
<b>ISLW</b>	Indian Spring Low Water

<b>ITSRR</b>	Independent Transport Safety and Reliability Regulator
<b>Jacket</b>	Are encasings placed around piles to protect them from the harsh marine environment
<b>Jetty</b>	A horizontal decked walkway on piered or piled footings providing pedestrian access from the shore to the waterway
<b>Land Tie</b>	A tie rod or chain used to connect a structure to an anchor plate embedded in the earth behind it
<b>Landing Steps</b>	A set of steps located at the end of a jetty or abutting a seawall or rock face used for providing access from vessels to the shore.
<b>LAT</b>	Lowest Astronomical Tide
<b>Lighting</b>	Equipment used to produce light and illuminate an area
<b>LOA</b>	Length overall of a vessel
<b>Lowest Astronomical Tide</b>	Lowest tide level which can be predicted to occur under any combination of astronomical conditions and average meteorological conditions
<b>Maintenance</b>	Short-term actions on items that do not impact the long-term life of an asset or component in order to retain the asset or component in a state in which it can perform its required functions.
<b>Mean High Water</b>	Average of all high waters observed over a sufficiently long period
<b>Mean High Water Neaps</b>	Average of all high water observations at the time of neap tide over a sufficiently long period
<b>Mean High Water Springs</b>	Average of all high water observations at the time of spring tide over a sufficiently long period
<b>Mean Low Water</b>	Average of all low waters observed over a sufficiently long period
<b>Mean Low Water Neaps</b>	Average of all low water observations at the time of neap tide over a sufficiently long period
<b>Mean Sea Level</b>	Arithmetic mean of hourly heights of the sea at the tidal station observed over a sufficiently long period
<b>MHWN</b>	Mean High Water Neaps
<b>MHWS</b>	Mean High Water Springs
<b>MIC</b>	Microbial Inducted Corrosion
<b>MLWN</b>	Mean Low Water Neaps
<b>MLWS</b>	Mean Low Water Springs
<b>Mooring Bollards</b>	Is a post used as a deck-fitting on ships and wharfs. It is used to secure ropes for towing and mooring
<b>Mooring Cleats</b>	Is a T-shaped object used as a deck-fitting on ships and wharfs. It is used to secure ropes for towing and mooring
<b>MSL</b>	Mean Sea Level

<b>NDT</b>	Non Destructive Testing
<b>Necking</b>	Is a term used to define the deformation of a pile. In a marine environment, this would refer to deformation of a pile in the intertidal range.
<b>Non-mountable Kerb</b>	A kerb which is designed to prevent vehicles from mounting them
<b>Nosing</b>	The leading edge of a stair tread
<b>NZS</b>	New Zealand Standards
<b>OCIMF</b>	Oil Companies International Marine Forum
<b>PIANC</b>	Permanent International Association of Navigation Congresses
<b>Pile Sleeve</b>	Is a sleeve which creates an air tight seal around piles. It is used to protect and prevent them from deteriorating
<b>Piles</b>	A structural element generally driven into the earth and used as the foundation or support for a structure.
<b>Pontoon</b>	A floating platform used for access to the water or a vessel.
<b>PPE</b>	Personal Protective Equipment
<b>RMS</b>	Roads and Maritime Service
<b>Rubbing Strips</b>	Rubbing strips protect piles from damage and wear which can occur when they are used to guide floating pontoons or when vessels are berthing against them
<b>Safety Fencing</b>	Fencing which prevents passage into a dangerous or potentially hazardous area
<b>SOLAS</b>	Safety of Life at Sea
<b>Splash Zone</b>	Corresponds to the area between MHW and 1m above HAT. This zone is regularly splashed but rarely submerged by ocean water.
<b>SWL</b>	Safe Working Load
<b>Tactile Ground Surface Indicators (TGSIs)</b>	Areas of raised ground surface texture treatment, designed to provide blind or vision-impaired pedestrians with warning and/or directional orientation information
<b>Tactile Indicators</b>	Indicators designed to provide blind or vision-impaired pedestrians with orientation information by means of tactile perception
<b>TGSI</b>	Tactile Ground Surface Indicators
<b>Topography</b>	The study and representation of the surface shape and features of a certain area, indicating their relative position and elevations
<b>Transition Plates</b>	Are plates used to allow pedestrians a safe and easy transition from a ramp/gangway to a landing surface
<b>Vessel</b>	Any boat longer than 5.2 m excluding rowing boats, dinghies and other non-motorised craft.

<b>Vessel Displacement</b>	The total mass of a vessel and its contents
<b>Waling</b>	A horizontal structural member connecting two or more piles and providing support for superstructure decking, girders and joists
<b>Wharf</b>	A structure on and parallel to the foreshore alongside which vessels may lie to load or unload cargo, passengers, etc.
<b>WHS</b>	Work Health and Safety
<b>ZFDTG</b>	Zero Fort Denison Tide Gauge

## 9 REFERENCES

*References to codes, standards and guidelines are based on the latest available edition at the time of preparation of these procedures. It is the responsibility of the wharf owner or the person responsible for its maintenance to ensure compliance to the latest edition of the codes, standards and guidelines.*

<b>AMSA Marine Order 25</b>	Australian Maritime Safety Authority Marine Order 25 (Equipment – lifesaving) Issue 7 (Order No. 14 of 2009)
<b>AS/NZS 1158.3.1-2005</b>	Light for Roads and Public Spaces Part 3.1: Pedestrian Area (Category P) Lighting – Performance and Design Requirements
<b>AS 1170.1-2002</b>	Structural Design Actions - Permanent, Imposed and Other Actions
<b>AS/NZS 1221-1997</b>	Fire Hose Reels
<b>AS 1319-1994</b>	Safety Signs for the Occupational Environment
<b>AS 1428.1-2009</b>	Design for Access and Mobility Part 1: General Requirements for Access - New Building Work
<b>AS 1428.2-1992</b>	Design for Access and Mobility Part 2: Enhanced and additional requirements - Buildings and Facilities
<b>AS/NZS 1428.4.1-2009</b>	Design for Access and Mobility Part 4.1: Means to assist the orientation of people with vision impairment – Tactile ground surface indicators
<b>AS 1657-2013</b>	Fixed Platforms, Walkways, Stairways and Ladders - Design, Construction and Installation
<b>AS 1851-2012</b>	Routine service of fire protection systems and equipment
<b>AS/NZS 3856.1-1998</b>	Hoists and Ramps for People with Disabilities – Vehicle- Mounted Part 1: Product Requirements
<b>AS 3962-2001</b>	Guidelines for the Design of Marinas
<b>AS 4997-2005</b>	Guidelines for the Design of Maritime Structures
<b>BCA</b>	Building Code of Australia Volume Two – Class 1 and Class 10 Building Housing Provisions
<b>Commonwealth Government 2002</b>	Disability Standards for Accessible Public Transport
<b>International Maritime Organisation</b>	International Life-Saving Appliance Code

<b>NSW Government</b>	NSW Work Health and Safety Regulation 2011
<b>NSW Public Works</b>	Design Guidelines for Wharves and Jetties August 1990
<b>NSW Maritime Authority 2005</b>	Engineering Standards and Guidelines for Maritime Structures
<b>SOLAS/46CFR160.050</b>	Guideline 160.150 – Specification for Lifebuoys  SOLAS (Safety of Life at Sea)
<b>WorkCover NSW</b>	Work Health and Safety Code of Practices <ul style="list-style-type: none"> <li>• Abrasive blasting</li> <li>• Confined spaces</li> <li>• Construction work</li> <li>• Demolition work</li> <li>• Excavation work</li> <li>• First aid in the workplace</li> <li>• Hazardous manual tasks</li> <li>• How to manage and control asbestos in the workplace</li> <li>• How to manage work health and safety risks</li> <li>• How to safely remove asbestos</li> <li>• Labelling of workplace hazardous chemicals</li> <li>• Managing electrical risks in the workplace</li> <li>• Managing noise and preventing hearing loss at work</li> <li>• Managing risks of hazardous chemicals in the workplace</li> <li>• Managing the risk of falls at workplaces</li> <li>• Managing the risks of plant in the workplace</li> <li>• Managing the work environment and facilities</li> <li>• Preparation of safety data sheets for hazardous chemicals</li> <li>• Preventing falls in housing construction</li> <li>• Safe design of structures</li> <li>• Spray painting and powder coating</li> <li>• Welding processes</li> <li>• Work health and safety consultation, coordination and cooperation.</li> </ul>

## Appendix A Wharf Information Form

## WHARF INFORMATION FORM

<b>Wharf Name:</b>		<b>Owner / Operator:</b>													
<b>1</b>	<b>Type of Structure</b>		<b>4 Site Conditions</b>												
<input type="checkbox"/>	Fixed Wharf		4.1 Area Topography												
<input type="checkbox"/>	Pontoon														
<input type="checkbox"/>	Fixed Wharf and Pontoon		4.2 Bathymetry												
<b>2</b>	<b>Description of Structure</b>		4.3 Water level variation												
2.1	Length														
	Width		4.4 Foundation conditions												
	Deck level (m AHD)														
			4.5 Exposure to Wind, Waves and Currents												
2.2	Materials (provide type for each main elements)														
			4.6 Services												
			4.7 Area of Approach for Vessel												
<b>3</b>	<b>Historical Information of Structure</b>														
3.1	Year of Original Construction (if known or approximate age)		<b>5 Land and Water Access Details</b> (access points from land, vehicular access if provided, berthing features)												
3.2	Available Documentation (provide details, eg. design or construction drawings, specification)														
			<b>6 Usage Details</b>												
			6.1 Vessels using the Wharf												
3.3	Records of Damage (provide date if known, how the damage occurred, the degree of damage and resulting action/repairs)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 70%;">Vessel Type</th> <th style="width: 10%;">No.</th> <th style="width: 20%;">Frequency of Use</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	Vessel Type	No.	Frequency of Use									
Vessel Type	No.	Frequency of Use													
			6.2 Main Users												
3.4	Maintenance (provide date if known and details)														
			6.3 Details of Largest Vessel												
			7 Usage Limitations												
			7.1 Loading Limitations (formal/informal)												
			Vessel												
			Vehicle												
3.5	Improvements (provide date if known and details)														
			7.2 Disabled Access												
			<input type="checkbox"/> Formal Access Provided <input type="checkbox"/> Assisted												
			<input type="checkbox"/> Informal Access Provided <input type="checkbox"/> Unassisted												
			<input type="checkbox"/> No Access Provided												

## Appendix B Level 1 Inspection Forms

**PUBLIC FERRY WHARF LEVEL 1 INSPECTION FORM  
SAFETY COMPLIANCE AND CONDITION ASSESSMENT**

Wharf Name: \_\_\_\_\_  
Owner: \_\_\_\_\_

Wharf Use: \_\_\_\_\_  
Assessor: \_\_\_\_\_

Date: \_\_\_\_\_  
Time: \_\_\_\_\_  
Tide: \_\_\_\_\_

Type: **FIXED WHARF**

Inspection No: \_\_\_\_\_

Pile: \_\_\_\_\_ Sub-structure: \_\_\_\_\_ Deck: \_\_\_\_\_

Item No.	Item or Provision Description	Condition			Compliance (refer Chart)			Risk / Priority			Comments or Actions
		G	F	P	Yes	No	TBC	H	M	L	

**SAFETY ASSESSMENT**

<b>1</b>	<b>SAFETY ITEMS</b>										
1.1	Barriers and Handrails										
1.2	Deck (Trip Hazards)										
1.3	Lighting										
1.4	Safety Ladder(s)										
1.5	Markings										
1.6	Anti-skid Treatment and Slip Hazards										
<b>2</b>	<b>VEHICLE ACCESS BARRIERS</b>										
2.1	Non-Mountable Kerbs										
2.2	Vehicle Barriers										
<b>3</b>	<b>EMERGENCY PROVISIONS</b>										
3.1	Fire Hose, Hydrants and Extinguishers (check service date)										
3.2	Lifebuoys – Spacing & Type										
3.3	Accessways / Exits Clear of Obstructions										
<b>4</b>	<b>SIGNAGE</b>										
4.1	Load Limitations										
<b>5</b>	<b>OTHER CONSIDERATIONS (refer Charts*)</b>										
5.1	Overall Accessibility to Disabled										
5.2	Tactile Indicators										
5.3	Signage - Warnings on Usage – no diving / fishing										
5.4	Signage - Owners name /contact										
5.4	Signage - Emergency Response (plans visible)										

**CONDITION ASSESSMENT**

<b>6</b>	<b>ACCESS WAY</b>										
6.1	Deck										
6.2	Girders										
6.3	Headstocks										
6.4	Other:										
<b>7</b>	<b>MAIN WHARF STRUCTURE</b>										
7.1	Deck										
7.2	Girders										
7.3	Headstocks										
7.4	Piles										
7.5	Berthing Piles										
7.6	Rubbing Strips and Fenders										
7.7	Mooring Cleats and Bollards										
7.8	Connections and Tie Rods										
7.9	Stairs, Steps and Low Level Landings										
<b>8</b>	<b>SERVICES</b>										
8.1	Water, Sewage and Fuel										
8.2	Electric cables and connections										
8.3	Other:										
<b>9</b>	<b>SEATING / SHELTER AREA</b>										
9.1	Seating / Walls										
9.2	Roofing										
<b>10</b>	<b>OTHER</b>										

G F P

OVERALL CONDITION: \_\_\_\_\_ Comments: \_\_\_\_\_

**OVERALL ACTIONS**

Is Engineering or Specialist Inspection or Assessment Required? Yes  No

Does the Wharf need to be closed? Yes  No

**COMMENTS**

\*Refer to Appendix C for Flow Charts  
G = Good    F = Fair    P = Poor    TBC = to be confirmed  
H = High    M = Medium    L = Low

**PUBLIC FERRY WHARF LEVEL 1 INSPECTION FORM  
SAFETY AND CONDITION ASSESSMENT**

<b>Wharf Name:</b> _____	<b>Wharf Use:</b> _____	<b>Date:</b> _____
<b>Owner:</b> _____	<b>Assessor:</b> _____	<b>Time:</b> _____
<b>Type:</b> PONTON	<b>Inspection No:</b> _____	<b>Tide:</b> _____
<b>Pile:</b> _____	<b>Sub-structure:</b> _____	<b>Deck:</b> _____

Ref No.	Item or Provision Description	Condition			Compliance (refer Chart)			Risk and Priority			Comments or Actions
		G	F	P	Yes	No	TBC	H	M	L	
<b>SAFETY ASSESSMENT</b>											
<b>1</b>	<b>SAFETY ITEMS</b>										
1.1	Barriers and Handrails										
1.2	Deck (Trip Hazards)										
1.3	Gangway or Ramp Connection (Transition Plates)										
1.4	Pontoon Pile Connection (Guardrail)										
1.5	Lighting										
1.6	Safety Ladder(s)										
1.7	Markings										
1.8	Anti-skid Treatment and Slip Hazards										
<b>2</b>	<b>VEHICLE ACCESS BARRIERS</b>										
2.1	Non-Mountable Kerbs										
2.2	Vehicle Barriers										
<b>3</b>	<b>EMERGENCY PROVISIONS</b>										
3.1	Fire Hose, Hydrants and Extinguishers (check service date)										
3.2	Lifebuoys – Spacing & Type										
3.3	Accessways / Exits Clear of Obstructions										
<b>4</b>	<b>SIGNAGE</b>										
4.1	Load Limitations										
<b>5</b>	<b>OTHER CONSIDERATIONS (refer Charts*)</b>										
5.1	Overall Accessibility to Disabled										
5.2	Tactile Indicators										
5.3	Signage - Warnings on Usage – no diving / fishing										
5.4	Signage -Owners name /contact										
5.4	Signage - Emergency Response (plans visible)										
<b>CONDITION ASSESSMENT</b>											
<b>6</b>	<b>GANGWAY AND FIXED STRUCTURE</b>										
6.1	Deck										
6.2	Girders										
6.3	Headstocks										
6.4	Piles										
6.5	Other:										
<b>7</b>	<b>PONTOON</b>										
7.1	Waling										
7.2	Rubber Fenders										
7.3	Berthing Piles / Strips										
7.4	Aperture plates										
7.5	Aperture Protection										
7.6	Gangway connections, sliding plates, hangers										
7.8	Gangway safety chains										
7.9	Mooring cleats / Bollards										
7.10	Hatch covers										
7.11	Other -										
<b>8</b>	<b>SERVICES</b>										
8.1	Water, Sewage and Fuel										
8.2	Electric cables and connections										
8.3	Other:										
<b>9</b>	<b>SEATING / SHELTER AREA</b>										
9.1	Seating / Walls										
9.2	Roofing										
<b>10</b>	<b>OTHER</b>										

<b>OVERALL CONDITION</b>	G	F	P	<b>Comments:</b> _____
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<b>OVERALL ACTIONS</b>			
<b>Is Engineering or Specialist Inspection or Assessment Required?</b>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
<b>Does the Wharf need to be closed?</b>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	

**COMMENTS**

\*Refer to Appendix C for Flow Charts  
G = Good    F = Fair    P = Poor    TBC = to be confirmed  
H = High    M = Medium    L = Low

**PUBLIC FERRY WHARF LEVEL 1 INSPECTION FORM  
SAFETY COMPLIANCE AND CONDITION ASSESSMENT**

<b>Wharf Name:</b> _____	<b>Wharf Use:</b> _____	<b>Date:</b> _____
<b>Owner:</b> _____	<b>Assessor:</b> _____	<b>Time:</b> _____

<b>Type:</b> <b>FIXED WHARF AND PONTOON</b>	<b>Inspection No.:</b> _____	<b>Tide:</b> _____
<b>File:</b> _____	<b>Sub-structure:</b> _____	<b>Deck:</b> _____

Item No.	Item or Provision Description	Condition			Compliance (refer Chart)				Risk / Priority			Comments or Actions
		G	F	P	Yes	No	TBC	NA	H	M	L	
<b>SAFETY ASSESSMENT</b>												
<b>1</b>	<b>SAFETY ITEMS</b>											
1.1	Barriers and Handrails											
1.2	Deck (Trip Hazards)											
1.3	Gangway or Ramp Connection (Transition Plates)											
1.4	Pontoon Pile Aperture (Barrier)											
1.5	Lighting											
1.6	Safety Ladder(s)											
1.7	Markings											
1.8	Anti-skid Treatment and Slip Hazards											
<b>2</b>	<b>VEHICLE ACCESS BARRIERS</b>											
2.1	Non-Mountable Kerbs											
2.2	Vehicle Barriers											
<b>3</b>	<b>EMERGENCY PROVISIONS</b>											
3.1	Fire Hose, Hydrants and Extinguishers (check service date)											
3.2	Lifebuoys – Spacing & Type											
3.3	Accessways / Exits Clear of Obstructions											
<b>4</b>	<b>SIGNAGE</b>											
4.1	Load Limitations											
<b>5</b>	<b>OTHER CONSIDERATIONS (refer Charts*)</b>											
5.1	Overall Accessibility to Disabled											
5.2	Tactile Indicators											
5.3	Signage - Warnings on Usage – no diving / fishing											
5.4	Signage -Owners name /contact											
5.4	Signage - Emergency Response (plans visible)											
<b>CONDITION ASSESSMENT</b>												
<b>6</b>	<b>GANGWAY AND FIXED STRUCTURE</b>											
6.1	Deck											
6.2	Girders											
6.3	Headstocks											
6.4	Piles											
6.5	Berthing Piles											
6.6	Rubbing Strips and Fenders											
6.7	Mooring Cleats and Bollards											
6.8	Connections and Tie Rods											
6.9	Stairs, Steps and Low Level Landings											
6.10	Other:											
<b>7</b>	<b>PONTOON</b>											
7.1	Waling											
7.2	Rubber Fenders											
7.3	Berthing Piles / Strips											
7.4	Aperture Plates											
7.5	Aperture Protection											
7.6	Gangway connections, sliding plates, hangers											
7.8	Gangway safety chains											
7.9	Mooring cleats / Bollards											
7.10	Hatch covers											
7.11	Other -											
<b>8</b>	<b>SERVICES</b>											
8.1	Water, Sewage and Fuel											
8.2	Electric cables and connections											
8.3	Other:											
<b>9</b>	<b>SEATING / SHELTER AREA</b>											
9.1	Seating / Walls											
9.2	Roofing											
<b>10</b>	<b>OTHER</b>											

<b>OVERALL CONDITION</b>	<b>G</b>	<b>F</b>	<b>P</b>	<b>Comments:</b> _____
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<b>OVERALL ACTIONS</b>			
Is Engineering or Specialist Inspection or Assessment Required?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
Does the Wharf need to be closed?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	

**COMMENTS**

\*Refer to Appendix C for Flow Charts  
G = Good    F = Fair    P = Poor    TBC = to be confirmed  
H = High    M = Medium    L = Low

