
# DEVELOPING WORKPLACE HEALTH & SAFETY GUIDANCE

for the

# RECREATIONAL & LIGHT COMMERCIAL BOATING INDUSTRIES

Prepared by

## The Boating Industry Association of NSW

under the

## WorkCover Assist Program

WorkCover Assist - Project No. 2009/035959

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# Developing WHS Guidance
for the
# Recreational & Light Commercial Boating Industries

WorkCover Assist – Project No. 2009/035959

***Prepared under a WorkCover Assist grant to the BIA (NSW)***

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# Executive Summary

Under the WorkCover Assist Applied Research Grants Program, the Boating Industry Association of NSW in partnership with the University of Wollongong and A&S Risk Solutions undertook a research project into the OHS/Workplace Health and Safety (WHS) issues of the recreational and light commercial boating industries. The objective of this research was to identify those hazards of most concern to the recreational and light commercial boating industry, and to identify current practices being used to manage these hazards. It was anticipated that the research would find good practices being used in industry and that these could then be communicated to industry in the form of tailored guidance for the management of industry specific tasks. This information can be used by industry to help the industry reduce injuries and improve their compliance with OHS requirements (From January 2012 the OHS legislation will be replaced by WHS legislation. Both terms are contextualised throughout this report).

A literature review and data analysis was undertaken to identify WHS issues. Accessing both Australian and overseas databases provided only limited information relating to safety issues within the Australian boating industry with the main focus being on the use of styrene and incidents recorded in legal proceedings. An analysis of workers compensation data for the 5 years from 2004 to 2009 revealed that body stressing, being hit by moving objects, slips, trips and falls and hitting objects with parts of the body were the most common mechanisms of injuries and those injured were in the marine trades. Sprains and strains and open wounds were the most common injuries.

Consultation with the BIA (NSW) members was undertaken at 6 locations throughout Sydney and NSW, to present the findings of the literature review and data analysis and to seek input from the industry on the WHS issues that are impacting on their business. Following these sessions the research team and project steering committee met to discuss the data and agreed to look further into four areas, these being:-

- Working at heights
- Hazardous manual tasks
- Working in confined and/or enclosed areas including working with chemicals
- Using plant to move boats

Site visits were undertaken at 29 locations across NSW focusing on those businesses that manufacture, repair and sell boats. During the site visits the researchers talked to the people undertaking work, reviewed documentation and took photographs of equipment and/or work processes for later review.

From the information gathered throughout the project good practices were identified and documented in consultation with the boating industry and WorkCover NSW. While WorkCover has provided input into the documents, this has been limited to technical review for consistency with legislation and advice on some of the more complex issues (such as confined spaces). Suggestions are also provided in this report to the BIA (NSW) and WorkCover NSW on additional initiatives that may assist the recreational and light commercial boating industries in NSW to further advance safety within the industry.

# 1. Introduction & objectives

This report provides a summary of a project undertaken with the Boating Industry Association of NSW (BIA (NSW)) under the WorkCover NSW Assist Applied Research Grants Program. The work has been conducted by the research team at A&S Risk Solutions in partnership with the University of Wollongong.

The aim of this project is to assist the recreational and light commercial boating industry to further improve their management of occupational health and safety (OHS/WHS) issues including reducing injury and illness, and achieving compliance with the WHS legislation. Objectives of this project include the development of tailored guidance for some of the industry's most hazardous tasks, and complex compliance-management challenges.

The key objectives and deliverables of this project are:

| **Objectives** | **Deliverables** |
|---|---|
| 1. Identify WHS issues impacting on the recreational and light commercial boating sector from past research, litigation and workers compensation data | Progress Report 1 - July 2010<br><br>Literature Review and data analyses. Summary of literature and outcome of data analysis, including a list of identified WHS issues in the industry. |
| 2. Develop and deliver consultation workshops with BIA (NSW) members | Progress Report 2 - September 2010<br><br>Report on findings from the consultation workshops. Summary of WHS issues identified in the workshops, and a comparison between these industry concerns with the literature review and data analysis. |
| 3. Undertake site assessments to identify better work practices within the industry | Progress Report 3 - March 2011<br><br>Summary of the findings from site surveys and a preliminary identification of industry specific control strategies |
| 4. Prepare guidance materials for use by BIA (NSW) members | Final Report - July 2011<br><br>Final report that:<br>- draws together findings from the literature, data analysis, industry consultation and site assessments; and<br>- identifies and documents good practice control strategies, and management practices |

This report provides a synthesis of each of the Progress Reports as well as the researchers' conclusions and recommendations. Copies of the Progress Reports are included in Appendix No.1. Industry guidance material is provided in a suite separate documents.

# 2. Background

## 2.1 The Boating Industry

The Boating Industry Association in NSW is the peak employer body of a diverse group of businesses working within the recreational and light commercial boating industry.

The BIA's (NSW) membership represents over 90% of commercial activity in the sector, which employs around 9000 people. Amounting to around 800 in total, membership comprises boat manufacturers and importers, supply-chain goods manufacturers and importers, brokers and retailers (of vessels and equipment), boat storage and service facility operators (marinas, boat yards and slipways, dry-storage etc), providers of industrial services to the recreational and light commercial boating industry (shipwrights, surveyors, mechanics, engineers, technicians, detailers, riggers, sail-makers and upholsterers, painters etc), and providers of travel/ tourism, advisory, and incidental goods and services (BIA (NSW) 2010).

Typical businesses in the industry are 'small' with 50% having only 1-5 employees, and only 6% with over 25 fulltime employees. The largest employers are boat manufacturers, marinas and marine service centres, and retailers (BIA (NSW) 2009).

Recreational and light commercial boating businesses are located in coastal areas and along inland waterways. While Sydney has a high number of BIA (NSW) members, many are also located away from the major centres including in tourist destinations and more remote locations (ANTA 2003). The hub of the industry tends to be marine facilities such as marinas, slipways, boatbuilding facilities, storage facilities and charter bases.

The recreational and light commercial boating industry in NSW is a large and active group – as evidenced in part by the popular annual 'Sydney Boat Show' and also by the large and increasing number of vessels on NSW's many waterways. For example there are currently approximately 220,000 vessels registered in NSW (NSW Maritime 2011) and this is forecast to grow to more than 350,000 recreational boats by 2026 (BIA (NSW) 2010, President's report).

Despite the size of the industry a preliminary review of the literature confirmed that there is a lack of WHS guidance that is targeted and tailored for this industry. While there is generic guidance regarding key hazard areas, members of the BIA (NSW) have found this difficult to apply to their often unique environments and tasks. Members are also concerned that their current work practices may not suitably address all of the hazards, with their staff, contractors and site visitors at risk of illness or injuries from the business's actions or inactions.

To assist their members to improve their WHS knowledge and compliance the BIA (NSW) have developed the following initiatives:

- Marine Card OH&S General Induction (half day course)
- Managing OHS (2 day course)
- A formal Partnership Agreement between BIA (NSW) and WorkCover NSW, to assist the BIA (NSW) to further guide their members in WHS

This project, *'Develop WHS guidance for the recreational and light commercial boating industries'* is designed to build on these existing programs and the BIA's (NSW) relationship with WorkCover NSW. It will provide BIA (NSW) members with practical, tailored and evidence-based information regarding the OHS hazards that are specific to their industry and to their key tasks.

## 2.2 Limitations of the project

The findings from the project are based on the data that was collected from the literature, the injury data analyses, the workshops and the site visits. As previously outlined, there are limitations with the data:

- There was minimal literature regarding the WHS issues in this industry in Australia, with most studies focused on chemical hazards in the USA
- The injury data only captures those injuries that are reported
- The NSW workers compensation system does not include injuries and illnesses to sole traders, which make up a large percentage of the businesses within the marine industry
- The injury and illness data was taken from those businesses coded as belonging to the boating industry and this may not be accurate for businesses that work across multiple industries
- The attendance at the workshops was limited, with less than 10% of all BIA (NSW) members participating and offering advice and information
- The site visits were undertaken using a convenience sample so the visits do not claim to be representative
- Of the 25 sites visited, they represented the sectors of the marine industry involved in the production, sale and repair of boats
- Small businesses have minimal time or resources to allocate to interviews and site visits
- Site visits fell over the summer period and this is a busy period for many parts of the industry, limiting the researchers' access to their sites

As the BIA (NSW) membership represents a widely diverse group, the hazards that were the focus of this project will not be relevant to all sectors of the industry or all occupations within the industry. Even within the same industry sectors there are many hazards, and the sample selected for investigation and guidance was based on the combination of data obtained in this project. If the data located as the basis for this project was different, the selected tasks and hazards would also be different.

There were also issues within the hazard groups that were not investigated due to: limited access to work sites; limited industry input at the workshops; and time constraints for the project. An example is the work undertaken by Riggers working at heights and the control measures that are commonly implemented for their tasks.

Achieving good WHS practices in small businesses remains a challenge. While this problem is not uncommon, it is important to the boating industry in NSW given the high percentage of small operators and micro-businesses. Past research into small business has identified that the majority do not belong to employer associations and so often fall outside a key provider of OHS information (Caple et al 1996). WorkCover NSW together with the BIA (NSW) may wish to consider the most appropriate strategies to reach this group.

# 3. Methods

The project involved four phases: a literature review and data analysis; consultation workshops; site visits; then the collation of the better practices currently used by industry as identified through this process. The project was designed so that each phase informed and guided the next.

The survey and interview methods used in this project were designed to address the considerations as outlined in the Joint National Health and Medical Research Council/Australian Vice Chancellors' Committee Statement and Guidelines on Research Practice (1997), and the WorkCover NSW Grants Scheme Principles. Ethics approval was also gained from the University of Wollongong.

An overview of the methods for each phase of the project is provided below.

## 3.1 Literature review & data analysis

The following methods were used to locate suitable and relevant literature:

- Undertaking systematic searches through databases from around Australia and internationally, including in formal databases (eg Health and Safety Science Abstracts; Occupational Health & Safety Library; Science Direct; CISDOC, International Labour Organization etc); and web resources (eg National Maritime Safety Committee; Australia Transport Safety Bureau; NIOSH etc).
- Using search parameters relating to occupational health and safety and marine, marinas, boat building, slipways, shipwrights, chandlers and many other terms.
- Focusing on peer-reviewed journals as well as evidence and legal cases from respected occupational health and safety jurisdictions
- Limiting the search to the past 10 years, then as there was a lack of data, extending the search to include all journals and for periods dating back to the 1970s.

For the injury data analysis, the focus was on workers compensation claims made by personnel within the recreational and light commercial boating industry in NSW for the financial years 2004/2005 – 2008/2009. ANZSIC (1993) codes and a membership list for the BIA (NSW) were utilised to identify as many claims as possible that related to the NSW recreational and light commercial boating industries. From the initial 15,000 injuries identified, approximately 900 were selected for further analysis. The resulting list reflected those organisations that were members of the BIA (NSW) or reported that their primary business related to the boating industry.

Specific data that was analysed included the worker's occupation, their age and gender, and all available data regarding the injury or illness including the nature of injury, bodily location, mechanism, agency and any available narrative of the incident.

## 3.2 Consultation workshops

To encourage members of the BIA (NSW) to provide their experiences and advice about their OHS issues, and to ensure the project was focused on issues relevant to the members, the following approach was used:

- Workshops were planned for major regional areas and across the Sydney metropolitan area from late July to September 2010, designed to be close to BIA (NSW) member locations
- BIA (NSW) members across NSW were invited to attend the workshops via: their quarterly industry journal ('The Logbook') to 1100 recipients; a topic specific email to

550 members; an article in the fortnightly E-News newsletter to 550 members; direct email to selected members; and direct phone calls and email to 30 selected members
- The evening workshops provided the BIA (NSW) members with a networking opportunity in a fairly informal, social setting, including the provision of light refreshments

The industry sectors that were the target of the workshop were those who were most represented in the injury data, including those employing the most represented occupational groups.

In the first part of the workshop the researchers informed the participants of the findings to date from the literature review and the injury data analysis. This was achieved with a brief presentation using slides and an explanation of the material, and opportunities for questions and discussion.

The second part of the workshop was structured to encourage focused thoughts and discussion, and included:
- Participants were asked to comment on the findings and how these findings compared with their own experiences;
- Participants completed a brief survey that included the following questions:
  - 'List 5 tasks/OHS issues that need improvement';
  - 'List 5 tasks/OHS issues that you/your business are managing well'
  - 'List the most recent injuries/incidents that had occurred at your work'. .
- Researchers summarised the advice from the surveys and using this as a stimulus for further group discussions
- Informal discussions continued over the refreshments and also after the workshop

The individual surveys and the information gathered through the group discussions were collated and analysed following the workshops, and grouped into key hazard areas. This data was then compared against the literature and injury data, with similarities and differences noted.

## 3.3 Site visits

Site visits were undertaken to validate the findings from the literature review and the injury data analysis, and to check what members believed were their main occupational health and safety issues and the ways to manage them.

The businesses selected for visits were based on a range of criteria and considerations. These included that the site owner or operator:
- Was nominated by the Manager BIA (NSW) Divisions and/or the BIA (NSW) Member Support & Development Officer as having 'good' OHS practices and/or had demonstrated their interest in OHS issues
- Attended the workshops and expressed willingness to be visited and to be interviewed and/or reported having a skill in a high risk area
- Operated a business that was common within the industry and covered the most common occupations, so this included: marine services and marinas; trailer boat sales and servicing centres; and a sample of boat manufacturing businesses
- Was exposed to one or more of the key hazards under investigation – working at heights; using plant to move boats; working in confined or enclosed spaces; and/or body stressing from hazardous manual tasks

A range of geographical locations was also sought in order to capture businesses in the Sydney metropolitan area as well as those in smaller, regional centres, in order to reflect the demographics obtained in the initial data analysis. Site sampling was therefore a combination of convenience sampling, stratification by business type and hazard exposure and

geographical location, and was also targeted to the reported better performers within the industry.

This survey method resulted in a total sample of 29 sites selected for visits and assessments.

To guide the site visits a Site Survey Tool was developed in consultation with the Project Steering Committee. This tool was based on the risk management model, and was focused on the four nominated hazards being investigated. Specific areas explored in the tool were:

- the key tasks/processes that exposed workers to the hazard;
- the features or contributing factors to risk;
- the methods used by the organisation to eliminate or reduce the risks from this hazard;
- and how well the controls had worked over time.

The tool was developed to locate and explore the good practices in use at the business rather than to focus on problems. The survey tool is appended with Report 1.

At the sites the business manager, operations manager and/or the Occupational Health and Safety Officer were the key personnel consulted. Tasks at the visits included:

- Interviewing staff members about the four nominated OHS issues
- Asking staff to describe or to demonstrate selected tasks and/or equipment
- Reviewing the site's documentation such as work procedures, training material etc
- Taking photographs of equipment and/or work processes that the businesses identified as being their best 'controls' for their risks
- Recording equipment details for later review and investigation

## 3.4 Guidance material

The topics chosen for the guidance material were the four key hazard areas as identified from the earlier phases of the project and as agreed in discussions with the Project Steering Committee. The topics were:

- Working at heights
- Hazardous manual tasks
- Working in confined and/or enclosed areas including working with chemicals
- Using plant to move boats

To determine the most useful techniques for information presentation and dissemination the following methods were used:

- A brief literature review of the evidence regarding how to present health and safety information to consumers
- Consultation with the BIA (NSW) members of the steering committee
- Consultation with members of the BIA (NSW) during the consultation workshops and during the site visits
- Consideration for existing and common practices already in use within regulatory authorities and industry groups

# 4. Results

## 4.1 Literature review & data analysis

Despite an extensive search of the literature regarding occupational health and safety issues for the recreational and light commercial boating industry, limited information was located. Most of the studies were based in the USA and in northern Europe, and the focus was on chemical hazards and also on larger vessels.

The occupational health and safety issues that were most frequently investigated were in this order:

- Styrene exposure – mainly from some boat construction
- Carbon monoxide exposure – mainly from boat engine exhaust
- Crush and strikes - from boats slipping off stands and cradles in boat yards and on slipways
- Falls and drowning
- Fire and explosion
- Hazardous manual tasks

Studies in Australia and NZ (NZ Dept of Labour et al 2007; ERMA 2009; Ruttenberg 2001) confirm that styrene exposure is also a serious hazard for our fibre-glass boat building and repair industries, and can result in Chronic Solvent Neurotoxicity (CSN).

Carbon monoxide poisoning is not commonly reported in Australia as it is in the USA, and the risk of carbon monoxide poisoning in Australian light commercial and recreational boating settings remains unclear. A recently completed study has suggested that the lack of injury and illness reports for carbon monoxide may be a function of two things: an improvement in technology, reducing risk; plus a lack of detailed data available from the databases currently used in Australia (Hardman 2011).

The literature did however report incidences and problems in Australia with the boating industry in the areas of moving and blocking boats, falls, fire and explosion and body stressing.

Interestingly, while chemical hazards were the most often investigated and reported hazard in the scientific literature on the boating industry, the data analysis of workers compensation claims made in NSW revealed other hazards. A comprehensive review identified the mechanisms of injury illustrated in the pie chart (See Figure 1)

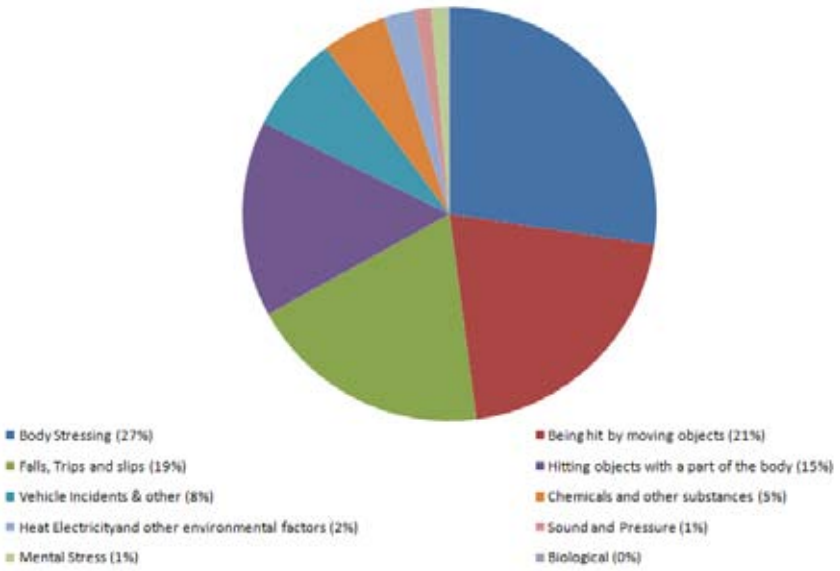


**Figure 1. Boating Industry Claims by the Mechanism of Injury/Illness 2004/2005 – 2008/2009 (Adapted from WorkCover NSW Workers Compensation Data)**

Figure 1 shows that the most common mechanisms of injury, coded by "major groups" are body stressing (27%), being hit by moving objects (21% ), falls, trips and slips (19%) and hitting objects with a part of the body (15%).

Consistent with body stressing being the most common 'mechanism of injury/illness', with injuries from awkward postures, doing repetitive actions, and heavy lifting, the most common 'nature of injuries/illness' are 'sprains or strains' accounting for almost 40% of all claims (Table 2).

The data showed that most of the workers compensation claims in the boating industry in NSW are from the boat building/repair sector, accounting for almost 60% of all claims. This is followed by personnel in marine retailing at 13%, and inland warter transport at 11%. All other sectors of the industry combined have only 12.5 % of claims, with each sector typically accounting for less than 1% of the claims.

The occupational group most represented was 'marine trades', accounting for almost one third of all claims. This group is followed by labourers and mechanical and fabrication tradespersons. In total 66% of the occupational groups in the injury claims data are trades people and labourers, with the least represented groups being managers and engineers. Table 1 lists the five most represented occupational groups in the injury data for the industry

**Table 1. Boating Industry Claims by Occupation 2004/2005 – 2008/2009 (Adapted from WorkCover NSW Workers Compensation Data)**

| Occupation | Percentage |
|---|---|
| Marine trades | 31% |
| Miscellaneous Labourers | 14% |
| Mechanical and fabrication tradesperson | 13% |
| Sea Transport Professionals | 8% |
| Automotive & Electrical Trades | 5% |
| | |
| *All other occupations combined (each <5%)* | *29%* |

**Table 2. Boating Industry Claims by Nature of Injury/Illness 2004/2005 – 2008/2009 (Adapted from WorkCover NSW Workers Compensation Data)**

| Nature of injury/illness | Percentage |
|---|---|
| Sprains and strains of joints and adjacent muscles | 38.3% |
| Open wound not involving traumatic amputation | 18.1% |
| Fractures | 7.4% |
| Contusion with intact skin surface and crushing injury excluding those with fracture | 7.1% |
| Foreign body on external eye, in ear or nose or in respiratory, digestive or reproductive systems | 6.8% |
| | |
| *All other categories were each 2.5% or less, so are grouped here* | *22.3%* |

Further analyses examined the 'agency of injury/illness'. Working with hand tools, appliances and equipment was the largest agency, followed by materials and substances, and mobile plant and other transport, as listed in Table 3.

**Table 3. Boating Industry Claims by Agency of Injury/Illness 2004/2005 – 2008/2009 (Adapted from WorkCover NSW Workers Compensation Data)**

| | |
|---|---|
| Non Powered Hand tools, Appliances and Equipment | 20% |
| Materials and Substances | 18% |
| Mobile Plant and Transport | 12% |
| Environmental | 11% |
| Power Equipment, Tools and Appliances | 7% |
| Machinery and Fixed Plant | 6% |
| Chemicals | 4% |
| Animal, Human and Biological | 3% |
| *Unspecified* | *18%* |

Progress Report No.1, appended, provides the full literature review, more detail regarding all of the injury data and the analyses undertaken for this project. The 'Type of Injury

Classification System' provides definitions for all categories and codes as used in the data tables (see ASCC 2008).

## 4.2 Consultation workshops

Six workshops were conducted across NSW, with four in the Sydney metropolitan area and two in regional areas, with all venues located either at boating businesses or within close proximity to businesses such as marinas and slipways etc. Venues were:

- Sydney International Boat Show, Pyrmont
- Mooney Mooney Club, Hawkesbury River
- St George Motor Boat Club, Sans Souci
- Sydney Rowers Club, Abbotsford
- Royal Prince Alfred Yacht Club, Newport
- Belmont 16 Footers Sailing Club, Hunter Region

A further workshop was planned for the southern region (in Nowra) however due to lack of respondents this workshop did not proceed. The number of participants ranged from four to eleven, with an average of nine, and a total of 50 people attending.

The participation rate was low, with 45 businesses represented or approximately 8% of the BIA (NSW) corporate membership (estimated at 550 in 2009).

The workshop participants included marina owners, marina & boat-yard operators, boat manufacturing operations managers, shipwright and marine mechanical business operators, major suppliers of paints & chemicals, boat- hire business operators, and marine sales & brokerage professionals - this provided a cross section of some of the key areas of interest. They also represented different sized businesses, ranging from micro-businesses to companies employing more than 50 employees.

Table 4 provides a summary of the top ten issues identified through the workshops.

**Table 4. Summary of key hazards reported in the workshops**

| Hazards | Reported concerns / problems |
|---|---|
| ***1. Working at heights*** | Participants reported problems with working on boats due to working on/over the water and of difficulties reaching to all parts of the boats.<br><br>Tasks of most concern were:<br>- Working on boats on the hard stand<br>- Detailing boats in and out of the water<br>- Climbing ladders and other support systems<br>- Working from scaffolds<br>- Working in the rigging of yachts such as in 'bosun's chairs' |

| Hazards | Reported concerns / problems |
|---|---|
| ***2. Working with chemicals*** | Participants described concerns including the storage, use and disposal of chemicals.<br><br>Tasks of most concern were:<br>- Fumes from laminating Fibre Reinforced Plastic (FRP); volatile organic compounds; styrene; the use of solvents such as acetone and Toluol (Toluene); MEKP (methyl ethyl ketone peroxide); isocyanates; and the use of highly flammable substances and hazardous materials.<br>- Achieving good ventilation from the fumes and/or from the particulates |
| ***3. Hazardous manual tasks*** | Participants reported high rates of their workers developing injuries from repetition, awkward postures, heavy lifting, carrying, pushing, and from working in restricted work spaces.<br><br>Tasks of most concern were:<br>- Getting in and out of boats<br>- Moving boats<br>- Postures used to sand and polish boat hulls and servicing engines while they are within small spaces<br>- Lifting heavy loads, often in narrow spaces within boats<br>- Repetitive and forceful movements with many tasks such as buffing, grinding and rolling fibreglass |
| ***4. Working in confined and/or enclosed spaces*** | In each session there was much debate surrounding restricted and/or confined areas, with participants giving different opinions of what exactly determined a 'confined space' as opposed to an enclosed area.<br><br>Tasks of most concern included:<br>- Building tasks<br>- Repairs<br>- Cleaning<br>- Painting<br>- Fitting parts such as transponders etc. |
| ***5. Working with plant to move boats*** | Participants used a range of devices to move and lift boats including forklifts, cranks, cranes and straddle lifts.<br><br>Tasks of most concern included:<br>- Using forklifts with towing attachments (sometimes uncertified)<br>- Moving boats within hardstand areas |

| Hazards | Reported concerns / problems |
|---|---|
| ***6. Controlling site access and activities for visitors*** | Participants described problems they had with contractors and other visitors accessing their sites.<br><br>Issues of most concern were:<br>- Pedestrian safety with vehicles and trailers being moved on their sites<br>- Visitors entering work areas<br>- Members of boat clubs/marinas undertaking work on their boats within the club/marina site that posed risks to others on the site |
| ***7. Working outdoors*** | The main concerns were:<br>- Exposure to the sun<br>- The need to work over the water<br>- Working in the rain and the wind |
| ***8. Workplace design and layout*** | The main concerns were:<br>- Limited space on the site to achieve a good design<br>- Limited space in the work areas<br>- Poor equipment storage |
| ***9. OHS procedures*** | The main concerns were:<br>- Developing and updating Safe Work Method Statements; providing staff education and training in OHS issues; improving documentation;<br>- Having procurement procedures;<br>- Undertaking regular risk assessments**;**<br>- Undertaking OHS audits; and<br>- Ensuring that OHS issues were included as a routine part of their business and daily tasks. |
| ***10. Use of Personal Protective Equipment (PPE)*** | A small number of participants reported that required or requested PPE use was a problem at their site, particularly:<br>- Eye protection<br>- Suitable footwear |

Workshop participants were also confident that there were OHS issues that they were "managing well" or "had under control" and the most often reported were:

- Working with chemicals
- Manual tasks
- Contractor management and site access
- OHS systems and staff training
- Electrical safety

Following the workshops the Steering Committee reviewed the findings and discussed that the boating industry has many hazards, and many of these are inter-related. It was agreed that this project should focus on the areas where members are most at risk of injury or disease; and are managing relatively unique OHS issues, such as using plant to move boats.

Informed by the combination of data - from the workshops, literature review and injury and illness analyses – it was decided that the following hazards should become the focus for the site assessments and for the development of WHS guidance materials:

- Working at heights
- Hazardous manual tasks
- Working in restricted and/or confined areas including working with chemicals
- Using plant to move and lift boats

## 4.3 Site visits

A total of 25 sites were visited, and these included marinas, repair facilities, retailers and boat manufacturers. Some sites from the original list of 29 opted out due to work pressures, and others were sought as replacements. Table 5 provides a summary of the main services undertaken at the visited sites and their locations.

**Table 5. Summary of site visit locations and service types assessed**

| **Main Services*** | Wollongong/ Illawarra area | Sydney Metropolitan area | Newcastle/ Central Coast area |
|---|---|---|---|
| Manufacturing | 1 | 1 | 2 |
| Retail | - | 1 | 4 |
| Repair | - | 5 | 5 |
| Marina/ Boatyard | - | 10 | 4 |

**Note: Some businesses provided more than one service*

The site visits confirmed some good practices that had been described in the workshops, and also revealed tasks and WHS issues that businesses were having some difficulties with.

Some of the positive findings from the visits were:

- Some managers and employees reported undertaking OHS courses to enhance their knowledge and capabilities
- Most businesses had identified hazards in working at heights, moving boats and hazardous manual tasks at their sites.
- When hazards had been identified by the business, various 'controls' were generally implemented
- There were controls that were well researched and successfully eliminated or reduced the risks

There were also businesses that were not well informed and/or had difficulties managing their WHS risks, including:

- A limited understanding of the application of the 'Hierarchy of Control' in risk management
- Lack of risk assessments
- Lack of documented work processes (eg Safe Work Method Statements)
- Ineffective 'controls' that posed additional risk if not properly implemented and supervised
- Being out-of-date regarding OHS legislation, including the false belief that there were weight limits for safe manual lifting etc

The site visits also revealed that while some businesses reported they were managing certain hazards well, the systems or controls they had in place were not always effective or consistent with legislative requirements.

The site visits did however identify some good equipment and innovative methods that served to reduce risks on the identified hazards. Practices noted to be 'good' or the 'best' (as determined by the research team) included the following:

*Good practices for working at heights*

- scaffold systems and work platforms designed and built to standard
- specially made brackets for trestle systems

- platform ladders suited to tasks
- harness system with anchor points built into the ceiling

*Good practices for hazardous manual tasks*
- block systems to reduce lifting
- special trolleys and lifting devices tailored to the tasks
- tool selection to reduce upper limb strain

*Good practices for working in confined and/or enclosed areas including working with chemicals*
- systematic approaches to assessing and managing the risks
- good ventilation systems
- substitution of solvents & other volatile materials

*Good practices for using plant to move boats*
- certified attachments, with safe working loads marked
- a documented maintenance regimen
- competency based training

At all site visits business owners and operators reported being keen to improve their risk management but were often unsure about the options for risk control.

## 4.4 Guidance material

The information from the consultation sessions together with the findings of the site visits and discussions with the BIA (NSW) members of the steering committee confirmed that the industry would benefit from information on the key hazards, the legislative requirements, and how to better manage these hazards.

The following evidence has guided the development of written material for this project (NHMRC 1999a & b; Gleeson & Davenport 1997; AGB McNair 1996 a & b; Forrester 1996; & Vision Australia 2010):

General principles for guidance material

- Tailor information, with images relevant to the industry
- Case studies, illustrate the application of the theory
- Concise information, use summaries of key points
- Terminology commonly used in the industry
- Use images, graphs, diagrams and tables
- Gender neutral or appropriate to context

To aid readability of material

- Use headings and sub-headings to allow skim reading
- Use fonts without serifs, and avoid mixing font styles
- Use dark text on a white background for most information
- Have white space and/or large margins
- Avoid excess use of upper case/capitals
- Have small paragraphs of text
- Use boxed text and shading
- Provide an index/ easy reference system
- Use ‘unjustified’ text
- Use short sentences and short words
- Have a ‘dot points’ format

To achieve action from the user

- Use active rather than passive voice
- Use the second person where possible (eg 'you', rather than ' the owner')
- Require self-assessment of knowledge and/or actions (eg surveys, quizzes etc)
- Provide practical, honest advice
- Be positive and encouraging rather than alarmist
- Provide list of resources for further help/further information

For OHS/WHS issues specifically (Caple & Associates 2003; Mayhew 1997)

- Address common misconceptions and scepticism (eg back injury risk factors)
- Concentrate on short time frames for changes
- Provide a range of options for risk controls, including low and no cost options
- Show where workplaces have adopted successful changes
- Show relevant features of solutions and provide brief descriptions
- Suggest suppliers for follow up
- Consider low literacy and people from non-English speaking backgrounds
- Provide targeted advice for specific issues
- Use a simple and consistent template for material

Based on the above advice regarding guidance materials, the researchers:

- Checked the legislative requirements for each hazard (current and proposed)
- Prepared self-assessment tools for businesses to use to check their progress and compliance
- Compared the work practices observed at the site visits with current and new (draft) standards and codes of practice (eg ASCC 2010 a, b, c & d)
- Identified the good practices for each of the hazard areas
- Gathered data about additional options for managing the hazard
- Reviewed available technical data about relevant equipment and systems
- Took photographs and specifications of possible control options
- Developed 'case studies' from material collected at the site visits

The guidance information developed as part of this project includes an introduction that outlines how to use the material, then four sections that each focus on one of the key hazard areas:

- Working at heights
- Hazardous manual tasks
- Working in confined and/or enclosed areas including working with chemicals
- Using plant to move boats

The material does not provide 'solutions' but rather aims to increase awareness of the risk management process and of the current and also forthcoming legislation regarding these hazards. It also provides real examples of risk controls that are already in use in the industry.

# 5. Conclusions & recommendations

## 5.1 Summary & key findings

The key phases of this project have been:

- a review of the WHS literature regarding the recreational and light commercial boating industry
- analyses of the injury and illness data related to the industry
- consultation workshops with members of the BIA (NSW)
- site visits to view and assess how common hazards are being managed
- the development of WHS guidance for the key hazards

The data gathered from these investigations highlight that businesses working in the recreational and light commercial boating industry in NSW face some complex and also some unique WHS hazards at their sites. For example common scenarios have personnel undertaking tasks at heights, on vessels that are moving, and possibly also working in enclosed and/or confined spaces with hazardous substances.

To address these hazards members of the boating industry have also developed some good practices. These practices includes some well designed elevated work platforms, specially selected trolleys and lifting devices to suit unusual loads, certified attachments for moving boats, systems for managing risks with hazardous substances etc. As part of this project, guidance material has been developed around the key hazards with case studies providing examples of some of the good practices identified at different boating industry businesses.

It is important to note that these practices do not necessarily represent the 'best' in the NSW boating industry, rather they represent the information that was provided to the researchers through the workshops and site visits. (Refer to Section 5.2 for further information).

Findings from the research also suggest that there are certain characteristics of the industry that may pose additional or special challenges for managing WHS issues, and these include:

- There are many small businesses – with limited resources for new equipment and/or services that may assist in controlling risks, and these businesses may also lack awareness of WHS issues
- There are a wide variety of hazards within the industry – from the common body stressing to the less common but potentially fatal fire and explosion hazards and consequently there needs to be a wide knowledge base to manage each hazard group
- Many tasks are undertaken under difficult environmental conditions – typically outdoors and in exposed conditions including working on and over the water
- The current economic climate poses challenges to manufacturers and exporters who are competing with imported products (eg Barrett BIA (NSW) 2010 annual report)
- The topography of the Sydney basin and the value of real estate on the water results in many marinas and marine services being located on fairly small sites with difficult access

The investigations found that the amount of WHS knowledge and expertise in the industry varies, suggesting that businesses' abilities to manage the WHS issues will also be variable. For example there are businesses that have personnel with post-graduate education in OHS and/or in specific hazards, and other businesses that have personnel who are 'self-taught' and have no formal training in OHS but rely more on their past experiences of what appears to work well. The businesses in NSW also range from large, multi-national businesses to small, family-run businesses with minimal human or financial resources.

The BIA (NSW) members who participated in the workshops and those at the site visits appeared to be practical, resourceful, and 'do-it-yourself' people who were used to complex problem solving. While this personality and approach can result in some innovative and

unique control measures, these measures or designs may not necessarily meet the strict design requirements for some built structures, or meet the procedural requirements for some tasks. This includes compliance with WHS legislation, Codes of Practice and Australian Standards.

When some members had identified hazards that they were not confident about controlling on their own they managed them by:

- Subcontracting high risk tasks to contractors who have specialist training and the right equipment to undertake the work most efficiently and safely. For example rather than a marine service trying to undertake all the work on a boat with their own staff, some are now contracting work to people such as experts in height safety who have the right equipment and training to do high work, and/or using experts in chemicals and ventilation to assist with tasks in confined or enclosed spaces.
- Engaging OHS specialists on regular occasions to guide them through the process of risk management and to assist them to keep up to date with legislative changes. For example some BIA (NSW) members engage OHS advisors for a few hours once per month to help them to improve their OHS systems.

However there were also members who were concerned that they were not managing a hazardous task well but were not sure how best to address the problem. The guidance material developed as part of this project should be of assistance to this group.

In addition to managing WHS issues, marine businesses are also affected by environmental laws (DECCW 2007). BIA (NSW) members explained that fairly recent requirements (eg Protection of the Environment Operations Act 1997*)* have resulted in changes to a number of traditional and common industry practices and some marinas, boatsheds and slipways etc have had to alter their designs and/or install new equipment in order to comply with the law. While environmental laws are not unique to the boating industry, the requirements have reportedly had some financial implications, and anecdotal evidence suggests that some boating businesses have since closed due to their difficulty to comply. Complying with WHS legislation can also pose an initial 'cost' in some cases, and this may be a barrier for some businesses, and particularly for small businesses (eg Caple & Associates 2003).

From discussions in the workshops and at the site visits it appears that some businesses within the light commercial and recreational boating industry may be avoiding serious injuries and illnesses using methods that are unstructured and/ or unorthodox, as compared to a contemporary approach.

In summary, the results of the project indicate that many members of the boating industry in NSW are facing major challenges in order to update their WHS systems and improve health and safety for their staff and for others at their sites. There are businesses that have good systems in place and others that require assistance. The guidance material developed as part of this project provides a preliminary perspective of potential options for managing the high risk tasks by:

- Providing the good WHS practices reported to the researchers and observed to date
- Guiding the user to comply with the WHS legislation and to reduce injury and illness risk, and
- Giving the industry a sound basis for further exploration of 'solutions'.

## 5.2 Utilising project outcomes

The research findings indicate that there are ongoing significant issues within the four key hazard areas which became the focus of this project. The areas that may benefit from further work are:

- Working in confined or enclosed spaces - including common chemicals and possible substitutes; chemical storage and safe use; and appropriate PPE when using chemicals

- Height safety - including determining suitable anchor points on boats; selecting harnesses; temporary structures around boats; and the use of bosun's chairs
- Moving boats - including assessing cables; safe winch use; inspection, maintenance and replacement of load shifting plant including slings and cables
- Hazardous manual tasks – including a further review of tools and work methods used in the industry

Other areas that may benefit from further consideration include

- **Develop a dissemination and/or implementation strategy for the guidance material**

  With any information strategy is it suggested that the material is followed up on a regular basis to keep the information in people's minds and maintain impetus, such as small articles or reference to the material in the BIA (NSW) E-News and the Logbook publication. This may also lead to the identification of further 'good practices' that can also be documented and promoted and shared within the relevant industry sectors. Public recognition of contributors may encourage this, and awards or prizes may provide further motivation.

- **Integrate guidance into competency based training**

  There is already WHS training material for the industry and this could be further refined and updated to include special courses/instruction in areas such as WHS management systems, working at heights and working in restricted spaces as they relate to the boating industry.

  It is also recommended by the Australian Qualifications Framework that all training is competency based and provides clear evidence of participants' skills and learning. As an example, the Marina Association of Australia's competency based course in travel lifts could be rolled out as an industry 'ticket', similar to the Elevating Work Platform Association of Australia (EWPAA) 'Yellow Card' ticket for scissor-lift and boom operations. The travel lift course provides an excellent example of competency based training and this model could be used to include slipways and other hazardous plant within the light commercial and recreational boating industry.

- **Promote the cost-benefits of control options**

  Often a new method or new piece of equipment will incur a cost, and it is helpful if businesses can see how the initial 'cost' is often more than paid back through savings in time, effort, man-power, space etc and will then provide increased profits. The guidance material attached to this report provides some case studies where cost-benefits are reported, however members of the boating industry may benefit from seeing some more detailed 'worked examples' that may encourage them to look at 'cost' in a more long term and holistic way.

  Options for showing businesses the benefits of new ways and new products may include industry seminars with brief presentations by members with solutions to share, and utilising existing BIA (NSW) communication methods such as articles in the E-News, Logbook and at boat or trade shows. The work by Oxenburgh et al (2004) provides a good model for quantifying cost-benefits.

- **Support micro-businesses**

  Given the wide variation in resources and knowledge within the industry, consider a 'mentor' type program where the more qualified or experienced personnel can guide those in smaller businesses.

- **Develop additional safety management tools**

The BIA (NSW) has already developed safety management tools such as the 'Contractor Safety Kit' and the 2 day course 'Managing OHS'. Further guidance could be developed based on the outcomes of the WHS research. Given the wide variation of businesses within the industry any WHS systems would need to be tailored to the organisation's size and risk profile.

In conclusion, the light commercial and recreational boating industry in NSW has a number of complex WHS issues to overcome, and this project has explored 4 hazard areas. While this project has provided some preliminary guidance for current good practices for managing the risks, there are many more initiatives that will further assist the industry to continue along the path of improving safety and improving compliance.

# 6. References

AGB McNair Pty Ltd, 1996, ***BackWatch Qualitative Research Report***, unpublished report prepared for WorkCover NSW

AGB McNair Pty Ltd, 1996, ***BackWatch Quantitative Research Report***, unpublished report prepared for WorkCover NSW

ANZSIC, 1993, ***Australia and New Zealand Standard Industrial Classification*** - Industry Division, Subdivision, Group and Class Codes

Australian National Training Authority, 2003, ***Boating Industry qualifications information*** - Policy Document: Metal and Engineering Training Package, Version 4.

Australian Safety & Compensation Council, 2008, ***Type of Occurrence Classification System*** (TOOCS) Third Edition, Revision 1 May 2008

Australian Safety and Compensation Council, 2010a, ***Draft Code of Practice – Confined spaces***

Australian Safety and Compensation Council, 2010b, ***Draft Code of Practice – Hazardous Manual Tasks***

Australian Safety and Compensation Council, 2010c, ***Draft Code of Practice – How to prevent falls at workplaces***

Australian Safety and Compensation Council, 2010d, ***Draft Model Work Health and Safety Regulations***

BIA (NSW) 2011, ***Annual Report 2010***, online at: http://www.bia.org.au/annual-report/BIA-AR-2010.pdf

BIA NSW & NSW Maritime, 2011, NSW Vessel Registrations 1991 - 2007, at: http://www.bia.org.au/data-pdf/BIANSW-DATA04.pdf

Boating Industry Association of NSW Ltd, 2010, Overview 2006/2007, http://www.bia.org.au/data-pdf/BIANSW-DATA24.pdf

Caple D & Associates, 1996, ***Occupational Health and Safety Injury Prevention Strategy Evaluations – Manual Handling***, unpublished report prepared for WorkCover NSW

Caple D & Associates, 2003, ***Physical safety in small and medium-sized enterprises: strategies for addressing special needs of these organisations and their employees***, Issues paper to National Occupational Health & Safety Commission, Canberra

Caple D, Hodgson R, Greig J, Herbstreit S, 1996, ***Identification of the most effective methods for disseminating known solutions across industries***, Research Project undertaken for the National Health & Safety Commission, Canberra.

Comcare, 2004, ***Positive Performance Indicators - Measuring Safety, Rehabilitation and Compensation Performance***

Department of Environment and Climate Change NSW 2007, ***Environmental action for marinas, boatsheds and slipways***

Environmental Risk Management Authority (ERMA), 2009, ***Environmental Risk Management Authority Monitoring Report 2009:*** Monitoring the Effectiveness of the

Hazardous Substances and New Organisms Act 1996, http://www.ermanz.govt.nz/resources/publications/pdfs/Annual%20Monitoring%20Report%202009%20FINAL%20_2009.04.24_.pdf

Forrester H, 1996, ***Analysis of the Backpak***, unpublished internal report for WorkCover NSW

Gleeson S & Davenport R, 1997, ***A guide for developing, selecting and translating written health information***, Central Sydney Area Health Service

Hardman J, 2011, ***The Incidence of Australian workplace death from Carbon Monoxide poisoning - Is it a high or low risk in the Australian marine industry work place?*** Unpublished student research report, University of Western Sydney

Joint National Health and Medical Research Council & Australian Vice Chancellors' Committee, 1997, ***Statement and Guidelines on Research Practice***

Mayhew, C, 1997, Small business occupational health and safety provision, ***Journal of Occupational Health & Safety – Australia and New Zealand***, Vol 13, No 4, 361-373

National Health & Medical Research Council, 1999a, ***How to present the evidence for consumers: preparation of consumer publications***, Commonwealth of Australia

National Health & Medical Research Council, 1999b, ***How to prepare and present evidence-based information for consumers of health services – A literature review***, Commonwealth of Australia

New Zealand Department of Labour, QLD Government, Government of South Australia, WorkCover NSW, WorkCover Tasmania, Worksafe Victoria, Worksafe Australia, 2007, ***Hazardous Substances In The Manufacturing Industry: Fibre Composite Boat Building Sector***. Industry Summary Report.

Oxenburgh M, Marlow P & Oxenburgh A, 2004, ***Increasing productivity and profit through health and safety – The financial returns from a safe working environment***, CRC Press, Florida

Ruttenberg D, Dryson E, Walls C & Curran N, 2001, Hazards associated with the boat building industry in New Zealand: an OSH Audit, ***New Zealand Medical Journal,*** Vol 114, No 1132, p 225-226.

Sanders MJ (Ed), 2004, ***Ergonomics and the Management of Musculoskeletal Disorders***, Butterworth Heinemann, USA

Vision Australia, 2010, ***Guidelines for producing readable text***

WorkCover NSW, 1997, ***WorkCover NSW Grants Scheme Principles***.

WorkCover NSW, 1998, ***BackWatch Scoreboard***

WorkCover NSW, 2007, ***Erection of Timber Roof Trusses – Industry Safety Standard***, Industry Solutions Program.

# 7. Appendices

Progress Report 1, July 2010, ***Literature Review and Analysis of Claims Data***.

Progress Report 2, September 2010, ***Findings from Consultation Workshops***.

Progress Report 3, March 2011, ***Site visits - Summary of Findings***


# DEVELOPING WORKPLACE HEALTH & SAFETY GUIDANCE

for the

# RECREATIONAL & LIGHT COMMERCIAL BOATING INDUSTRIES

# WHS GUIDANCE MATERIAL

# SECTION 1 - INTRODUCTION

Prepared between January 2010 & October 2011 with the generous support & assistance of individuals and businesses within the membership of the Boating Industry Association of NSW (BIA).

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DISCLAIMER: This research was funded under the WorkCover Assist Program. The research conclusions are those of the authors and any views expressed are not necessarily those of WorkCover NSW or the Boating Industry Association of NSW.

*Note: This material provides a brief overview of some of the key issues and readers are directed to the further guidance material provided and to seek expert advice as required. Each business should utilise risk management principles, including consulting relevant workers, to ensure any control measures implemented are properly tailored to the site, workers and tasks.*

*To ensure you comply with your legal obligations you must refer to the appropriate legislation. Information on the latest laws can be checked by visiting the NSW legislation website (www.legislation.nsw.gov.au).*

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# Introduction

Achieving a safe site with safe work practices requires a business's ongoing commitment and action. It is process of continual improvement to adapt to changes in technologies, changes in plant and equipment, taking on new personnel, as well as to meet requirements under various health and safety regulations, codes of practice and Australian Standards.

Australia is moving towards a national model of managing health and safety at workplaces, and from 2012 it is planned that all states and territories will be adopting the new:

- Work Health and Safety Act
- Work Health and Safety Regulations and
- Codes of Practice.

These laws will replace the NSW Occupational Health and Safety Act (2000) and the NSW Occupational Health and Safety Regulation (2001)

The following guidance material has been prepared for BIA members to provide information on managing selected 'hazardous' issues in the industry:

- height safety
- undertaking hazardous manual tasks
- working in confined or enclosed spaces and
- moving boats.

In each section there is:

- an overview of the hazard
- an outline of the legal requirements for addressing each of the hazard areas
- case studies from BIA members illustrating how different businesses have tackled the hazards
- lists of other potential options that could also be considered for controlling risks
- references for where to look for further guidance and more technical information

This guidance is not 'prescriptive' but rather provides BIA members with suggestions and options from businesses that face similar health and safety challenges. It encourages the user to follow the risk management approach to identify hazards, assess the risks and to eliminate or otherwise control the risks so far as reasonably practicable. Under the WHS Act this means "*that which is, or was at a particular time, reasonably able to be done in relation to ensuring health and safety of workers, taking into account and weighing up all relevant matters including:*

*(a) the likelihood of the hazard or the risk concerned occurring; and*
*(b) the degree of harm that might result from the hazard or the risk; and*
*(c) what the person concerned knows, or ought reasonably to know, about:*
*(i) the hazard or the risk; and*
*(ii) ways of eliminating or minimising the risk; and*
*(d) the availability and suitability of ways to eliminate or minimise the risk; and*
*(e) after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk*"

When undertaking risk assessments in the workplace it is a legislative requirement that consultation with workers is carried out as part of the process. By drawing on the experience, knowledge and ideas of the workers a business is more likely to identify all hazards in the workplace and choose effective control measures.

When implementing control measures within a workplace the Hierarchy of Control should be utilised. The Hierarchy of Control ranks the levels of control from the highest level of protection and reliability to the lowest level of protection and reliability.

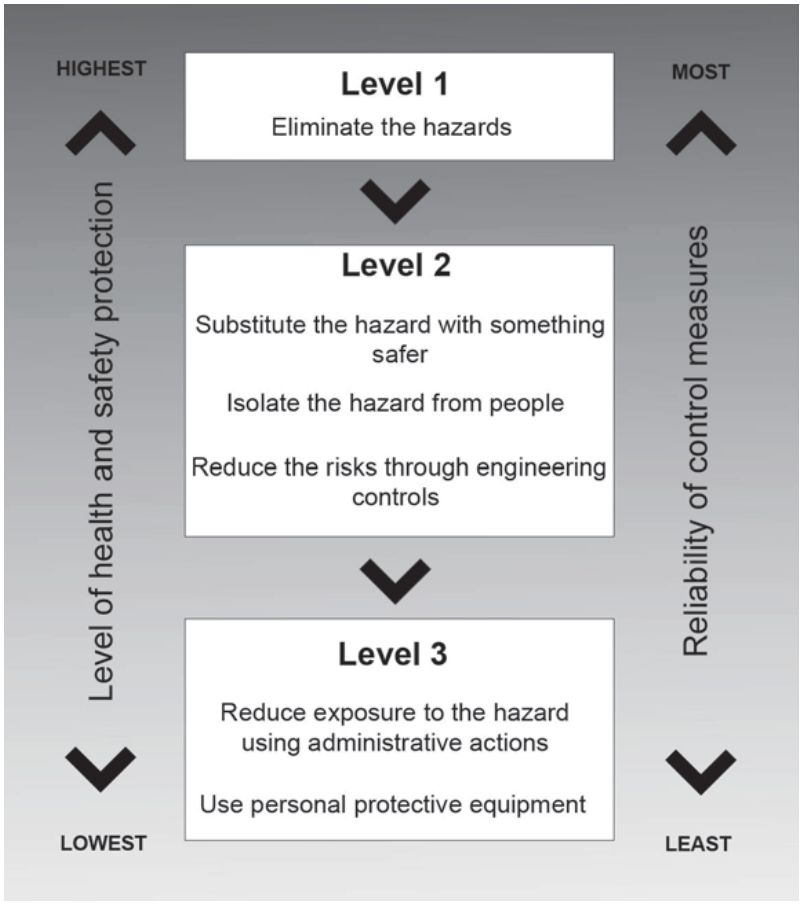


Diagram 1 - Hierarchy of Control (Model Code of Practice – How to Manage Work Health and Safety Risks)

Methods used by other businesses to eliminate or control risks may be easy to copy, or may need to be adapted to suit, or may not suit the conditions and personnel at other businesses. Regardless of which option is the best fit for individual businesses it is hoped that this guidance will assist BIA's members to review and upgrade their existing health and safety management and generate new ideas for managing hazards at work.

**Further Guidance**

Work Health and Safety Act 2011
Work Health and Safety Regulation, Safe Work Australia
Model Code of Practice – How to Manage Work Health and Safety Risks, Safe Work Australia

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# DEVELOPING WORKPLACE HEALTH & SAFETY GUIDANCE

for the

# RECREATIONAL & LIGHT COMMERCIAL BOATING INDUSTRIES

# WHS GUIDANCE MATERIAL

# SECTION 2

# HEIGHT SAFETY

# WORK HEALTH AND SAFETY ISSUE – HEIGHT SAFETY

## The problem

The risk of falls has been identified in the marine industry as a major contributor to serious injuries to workers. WorkCover NSW has nominated 'Falls from Heights' as one of the two key hazards for attention and action during 2011 (the other hazard being manual tasks).

The key fall hazards in the marine industry are when a person is working:

- on ***elevated structures*** such as on planks alongside the hull
- on ***ladders and other equipment*** to gain access to high parts of the vessel, such as flybridges
- near ***openings*** such as hatches and companionways
- at or near the ***edge*** of a deck or other structure
- on or near lightweight or ***fragile surfaces*** and
- on ***slippery, sloping or unstable surfaces***, including wet or polished surfaces.

## The consequence

Injuries and incidents reported to WorkCover NSW by businesses in the recreational and light commercial boating sector over the past 5 years include the following examples:

- A worker fell 3m from a scaffold, injuring his back and a knee.
- A worker was climbing out of a boat 1 metre high and slipped, twisting his ankle.
- A worker fell through an open hatch, injuring his ribs
- A worker slipped off the deck of the boat when cleaning it

In some of the fall cases reported to WorkCover the workers required long periods off work, and often had limited mobility when they finally resumed work.

## The law

The Work Health Safety legislation requires that the person conducting the business or undertaking must:

> Identify all hazards that could rise to the risk of falling in the business or undertaking so far as is reasonably foreseeable.
>
> Eliminate or control the risk of falls so far as is reasonably practicable.

In managing the risks of falls, the WHS Regulations require the following specific control measures to be implemented, where it is reasonably practicable to do so:

1. *Can the need to work at height be avoided to eliminate the risk of a fall?*
    - Carry out any work that involves the risk of a fall on the ground
2. *Can the fall be prevented by working on solid construction?*
    - A building or structure that is used as an existing place of work and includes safe access and egress from which there is no risk of a fall from one level to another, for example properly constructed stairs with fixed handrails, flat roofs with a parapet or permanently installed guard rails around the edges.

It is usually not necessary to implement additional control measures to manage the risk of falls for workplaces in buildings that already comply with the requirements of the National Construction Code of Australia, for example in relation to stairs, mezzanines and balconies.

3. *Can the risk of a fall be minimised by providing and maintaining a safe system of work, including:*

    - providing a fall prevention device (for example, installing guard rails) if it is reasonably practicable to do so, or
    - providing a work positioning system (for example, an industrial rope access system) if it is not reasonably practicable to provide a fall prevention device, or
    - providing a fall-arrest system, so far as is reasonably practicable, if it is not reasonably practicable to provide a fall prevention device or a work positioning system.

In some cases a combination of control measures may be necessary, for example using a safety harness while working from an elevating work platform.

Passive fall prevention devices include:

- temporary work platforms (such as scaffolding)
- elevating work platforms (such as scissor lifts and cherry pickers)
- work boxes
- platforms on trestle ladders
- systems such as perimeter guard rails, safety mesh etc.

Work positioning systems include:

- industrial rope access systems
- travel restraint systems

Fall arrest systems include:

- catch platforms
- industrial safety nets
- individual fall arrest systems (ie with personal harnesses)

The attached guidance notes provide descriptions of how to meet the height safety requirements that are listed above. The notes also provide real examples of how members of the NSW BIA have eliminated or controlled the risk of falls.

**Does your business comply?**

Check how well YOUR business is currently managing height safety by completing the attached *Height Safety - Self Assessment Tool*. Score yourself in each of the areas, and identify areas of non-compliance. This tool also outlines the elements of a good height safety system.

Use this first score as a baseline, and once you have looked over the guidance notes and the case studies you will see where your systems can be improved. By following the guidance you will achieve better height safety for all people on your site, and better compliance with the work, health and safety laws.

**The guidance material**

Use the guidance material to assist you to follow the risk management approach to identify hazards at your workplace, assess the risks, and either eliminate or control the risks. The guidance follows the required 'hierarchical' approach to managing risk, and often the 'control' will require a combination of these measures.

| What the law requires: | Guidance material to help you comply: |
|---|---|
| Can the work that may involve a risk of a fall be carried out on the ***ground or on a solid construction***; | HS 01 - Working from a solid construction |
| Can the risk of a fall be minimised by using a ***passive fall prevention device***; | HS 02 - Fabricated platforms and scaffolds<br><br>HS 03 - Elevating work platforms and work boxes |
| Can the risk of a fall be minimised using a ***work positioning system***; | HS 04 – Using Harnesses |
| Can the risk of a fall be minimised using ***a fall arrest system***; | |
| For access and egress and for light work of short duration ladders may be used | HS 05 - Using ladders |

*Note: This material provides a brief overview of some of the key issues and readers are directed to the further guidance material provided and to seek expert advice as required. Each business should utilise risk management principles, including consulting relevant workers, to ensure any control measures implemented are properly tailored to the site, workers and tasks.*

*To ensure you comply with your legal obligations you must refer to the appropriate legislation. Information on the latest laws can be checked by visiting the NSW legislation website (www.legislation.nsw.gov.au).*

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# Height Safety
# Self Assessment Tool

| Key steps to a safe system: | Hazard Identification | Risk Assessment | Risk Control | Consultation | Documentation | Instruction & Training | Supervision |
|---|---|---|---|---|---|---|---|
| **NON-COMPLIANCE** | No intentional identification of potential fall hazards | No assessments of fall hazards have been done | No attempt has been made to eliminate or reduce risks from falls | No evidence of management consulting with workers | No documents outlining any of the steps taken towards identifying, assessing and managing the risk of falls | No evidence of workers having received training and instruction in height safety or falls prevention | Workers are left unsupervised with no agreed or stated safe work methods for work undertaken at heights |
| **WORKING TOWARDS COMPLIANCE** | Some fall hazards have been identified with or without incidents or injuries occurring | Assessments have been done on an ad hoc basis and/or are incomplete | Some controls have been put in place, but these do not follow the 'hierarchy' and/or are incomplete | Consultation is on an ad hoc basis, and/or workers' feedback and views are not taken into account | Some documentation of some steps in the risk management of this hazard | Some training has been provided in some aspects of height safety or falls prevention | Safe Work Methods have been stated and/or provided but no effort to ensure workers' compliance |
| **COMPLIANCE** | Proactive fall hazard identification is done regularly | Assessments are done regularly and show consideration of risk factors | Height safety guidelines have been followed, with the most appropriate fall prevention measures in place | Workers are consulted on a routine basis regarding height safety and methods to prevent falls | Documents outlining the decisions and their rationale for managing height safety at the business, with Safe Work Method Statements provided | Workers are trained in the safe use of fall prevention and height safety equipment and/or methods, and safe work methods | Supervision ensures the Safe Work Methods are followed and any problems are acted on |

Based on the WorkCover NSW BackWatch Scoreboard, 1998

# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## HEIGHT SAFETY – Working from a 'solid construction'

### HAZARDOUS TASKS identified

Serious injuries can result from falls from relatively low levels. For this reason the law requires that wherever possible people ***avoid*** working at heights (eliminate the risk).

Where work can't be undertaken on the ground, the next step is to consider if the work can be undertaken from a 'solid construction'.

Do you have work areas that you consider provide a 'solid construction' to work from? Solid constructions *may* include working on the deck of a boat or a mezzanine storage area but there are a number of factors to assess to determine if the work area meets the requirements under the new Code of Practice* for being a 'solid construction.'

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

To determine if you have suitable 'solid constructions' you need to check the following:

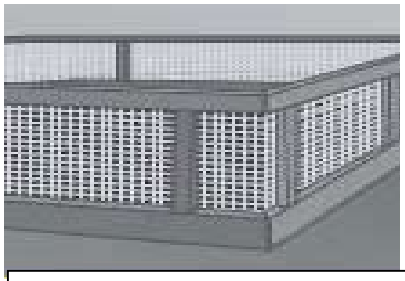
***Structural strength***

- Is the construction strong enough to carry the expected loads (eg workers, materials, tools and equipment)?

***Edge protection***

- Does it have guard rails or other structural components - 900 mm and 1100 mm above the working surface - that prevents a persons or objects falling over the edge?
- Do guard rails have mid rails and toe boards or wire mesh infill panels?


A guard rail with a mid rail and toe-board



A guard rail with wire mesh panels

***Protection of openings and holes (such as hatches or other voids)***

- Are there suitable covers that are securely fixed; or
- Are openings otherwise fenced off or guarded?

***Surface and gradient***

- Are surfaces non-slip and free from trip hazards?
- Does any slope not exceed 7 degrees or 1 in 8 gradient?
- Are cleated surfaces (which provide greater slip-resistance) no steeper than 20 degrees (1 in 3 gradient).

***Entry and exit***

Does the construction have suitable access, such as:

- Permanently installed platforms, ramps, stairways and fixed ladders? Or
- Temporary access ways and temporary stair systems? Or
- Secured single portable ladders (set up at a slope of 4:1 and extending at least 1m above the stepping off point)
- Consideration for environmental factors including rain, strong wind, and lighting

**RISK CONTROL options**

**1. Change the task so that some can be done at ground level**

The best control is always to eliminate the hazard, and in this case this means re-designing tasks to allow all or part of them to be undertaken at ground level.

Consider if any of the following can be applied at your business to reduce the need to work at heights:

- Prefabricating boat parts at ground level
- Removing boat parts for repairs and working on them at ground level
- Cleaning boats when they are still in the water – such as in the travel-lift bay – rather than on the hardstand or slipway (depending on environmental issues)
- Reducing shelving heights so that workers can access items from ground level
- Using tools with extendable handles where possible (eg paint rollers etc)

Any reduction in the need for workers to use ladders and other elevated platforms will have an impact on reducing risk.

**2. Conduct the work on/from a solid construction**

When the work can't be done at ground level, the next best option is to work from or on a 'solid construction'. These 'constructions' must meet the criteria as listed above under the heading 'RISKS to assess'.

**Do safety lines on yachts provide adequate 'edge protection'?**

'Safety lines' are common around the perimeter of yacht decks to reduce the risk of crew washing overboard and into water. Lines are often at a height of between approximately 700 - 850mm or mid thigh height, and with a mid line, and a 'toeboard' style edge may or may not be present at the gunwale.

These 'safety lines' generally do ***not*** meet the strict criteria for providing 'edge protection', and the consequence of a fall onto a hardstand or slipway is much more serious than a fall into water.

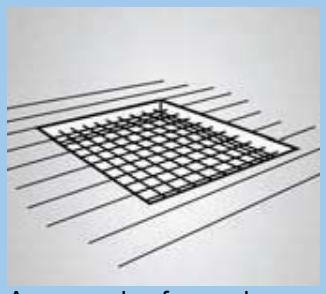
To achieve a safer system as well as being compliant with the Regulation and Code, it's recommended that you consider controls such as using:

- a temporary platform with guard rails by the side of the vessel
- a clip-on temporary guard railing to achieve the required height and strength
- personal fall arrest or travel restraint systems (see Guidance – Using harnesses) or
- other means of catching someone should they fall (eg catch platforms, nets etc).

**Avoiding falls through hatchways**

Injury data for the boating industry shows that falls through hatches and companionways are common. Consider how you can reduce this risk at your workplace.

Fall hazard



An example of a mesh cover

Suggestions for reducing risk include:

- Requiring all hatches are left in the closed position unless actively in use
- Where hatches are not yet built or supplied, use temporary covers
- Where hatches are open for ventilation purposes, consider use of temporary mesh coverings (such as those used in the roofing industry)
- If space permits, use physical barriers around the opening
- Where temporary covers cannot be used, at minimum use visual aids/warnings

Your system for reducing risk may include a written document outlining your company's policy and the recommended controls for different scenarios, based on their risks. Risk would be affected by factors including the number and size of hatches, the number of people working on the deck, tasks undertaken near the hatches, the condition and angle of the deck, and other barriers or equipment on the deck etc. Workers need to be advised about any system to manage risk, supervised, and the policy enforced to aid compliance.

**Further guidance**

- Work Health and Safety Regulation
- Code of Practice – How to prevent falls at workplaces, Safework Australia
- Australian Standard 1657:1992, Fixed platforms, walkways, stairways and ladders – Design, construction and installation
- Australian and New Zealand Standard 4994.1:2009 – Temporary Edge Protection – General Requirements
- Australian and New Zealand Standard 4994.3:2010 Temporary edge protection - Installation and dismantling for edges other than roof edges
- Australian and New Zealand Standard 1891.1:2007 Industrial fall-arrest systems and devices - Harnesses and ancillary equipment
- Australian and New Zealand Standard 1891.2:2001 Industrial fall-arrest systems and devices - Horizontal lifeline and rail systems
- Australian and New Zealand Standard 1891.3:1997 Industrial fall-arrest systems and devices - Fall-arrest devices
- Australian and New Zealand Standard 1891.4:2009 Industrial fall-arrest systems and devices - Selection, use and maintenance

Note: This material provides a brief overview of some of the key issues and readers are directed to the further guidance material provided and to seek expert advice as required. Each business should utilise risk management principles, including consulting relevant workers, to ensure any control measures implemented are properly tailored to the site, workers and tasks.

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## HEIGHT SAFETY – Fabricated Platforms & Scaffolds

### HAZARDOUS TASKS identified

Many tasks undertaken by marine businesses require working at heights to reach the hull and topsides of vessels. Much of this work is done on temporary elevated work platforms when the vessels are on slipways or on various exposed or covered hardstand areas.

> *"Temporary work platforms include scaffolds, elevating work platforms, mast climbers, work boxes, building maintenance units, portable or mobile fabricated platforms or any other platform that provides a working area and is designed to prevent a fall."*
> *Code of Practice – Managing the risk of falls at workplaces*

Depending on the vessel's size, hull shape and/or keel design, workers may be doing these tasks at significant heights, and this exposes workers to fall hazards, especially if the work platforms are not up to standard. How well do your temporary work platforms rate? Do they suitably manage the risks?

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

When assessing the risks arising from using scaffold and other temporary elevated work structures the following factors should be considered:

- the slope and condition of the ground surface including for stability, support and slippage
- the weight and ease of assembly of the scaffold components, ladders and other equipment
- the adequacy of inspection and maintenance of each of the components of the elevated work area
- the safe working load of the structure

### RISK CONTROL options

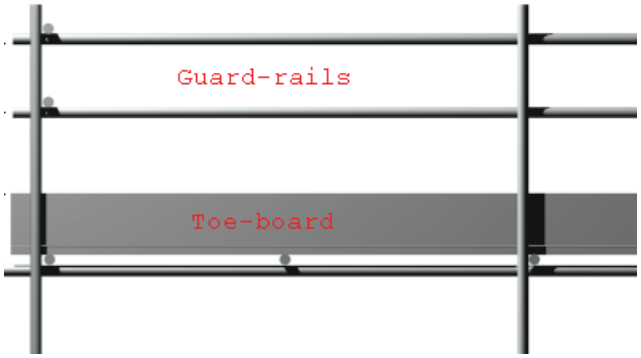
### Mobile fabricated platforms

Many marine businesses make their own custom-designed work platforms, using a range of materials. These systems must meet the requirements under the Code of Practice and the relevant Standards.

Some of the key features of the requirements for platforms are:

- Guard rails at between 900 – 1100mm above the working surface
- Mid rails
- Toe boards (if > 2metres)

See illustration below:




- Height of top rail between 900 – 1100mm above working surface
- Maximum of 450mm between all rails
- Must have toe-board or wire mesh infill if > 2metres

Refer to the guidance list for further details.

Examples of work platforms utilising edge protection systems:

**Scaffold systems**

There are a number of scaffold systems available from heavy industrial to light weight 'Quick-Scaf'. Each system is suited to particular applications, so you need to determine the systems best suited to your worksite and your tasks.

Safety considerations include:

- Scaffolding conforms to AS/NZS 4576 *Guidelines for scaffolding* and the AS/NZS 1576 *Scaffolding* series
- All scaffolding is erected, altered and dismantled by competent persons
- Any scaffold from which a person or object could fall more than four metres must be erected, altered and dismantled by or under the direct supervision of a licensed scaffolder
- Prefabricated scaffolds are of the same type and not mixed components, unless the mixing of components has been approved by the manufacturer
- Safe access to and egress from the scaffold is provided, and

- Edge protection (hand rails, mid-rails and toe boards) is provided at every open edge of a work platform.

Examples of scaffold and trestles that can be used in marine facilities


Mobile scaffold with lockable wheels, platform >450mm wide, kickboard, bracing and internal access.
(Image from Renthire.com)

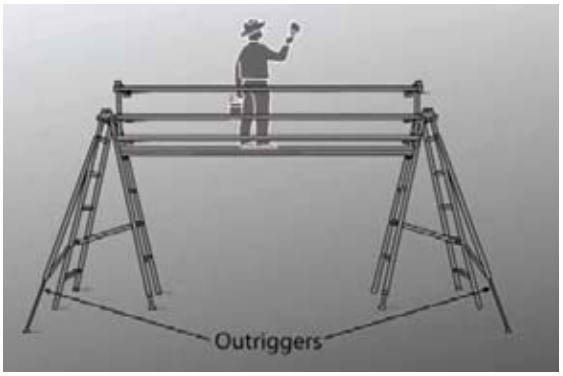
- Trestle and plank system. Both trestle and planks are stamped with safe working load rated

**Training requirements**

Where work is performed from a scaffold, you must ensure that the relevant workers understand:
- what loads the scaffold can safely take
- not to make any unauthorised alterations to the scaffold (such as removing guard rails, planks, ties, toe boards and braces)
- that working platforms need to be kept clear of debris and obstructions along their length, and
- that incomplete or defective scaffolds must never be accessed.

**Platforms supported by trestle ladders**

When trestle systems are used, the Code of Practice requires:
- If used at heights over 2 metres – have guard rails, midrails and toeboards
- Width of the working platform - not less than 450 mm
- Work area - only performed between the trestles
- Tasks - only suited to light duty tasks such as painting
- Components are 'rated' and this is clearly stated on the ladders




Trestle ladder scaffold with guard rails and outriggers for stability

For working over a height of 2 metres the Code recommends safer alternatives to trestle ladders, and these include: small scissor lifts, light duty aluminum mobile scaffolds, boom lifts and modular scaffolding. It's also important to ensure suitable access to the platform, with suitable steps up and easy transfer from the ladder to the platform.

**Case study – Special brackets improve guard rail**

One marine service routinely installs fittings on new racing yachts. They found that the standard scaffold could not be erected close enough to the hulls of the yachts due to their long keels and the hull shape.

To manage the problem the manager now uses trestle ladders with special brackets to attach guard rails securely to the trestles. These new brackets have been designed and constructed by a competent person and approved for use on the trestles. They have also found that the alloy planks and components are lighter and easier to manage than their earlier timber planks

**Further guidance**

- Work Health and Safety Regulation
- Code of Practice – Managing the risk of falls at workplaces, Safe Work Australia
- Australian and New Zealand Standard 4576: 1995 - Guidelines for scaffolding
- Australian and New Zealand Standard 1576 - Scaffolding series
- Australian and New Zealand Standard 1577: 1993 - Scaffold Planks
- Australian and New Zealand Standard 1892.1: 1996 - Portable Ladders – Metal
- Australian and New Zealand Standard 1892.3: 1996- Portable Ladders – Reinforced Plastic
- Australian and New Zealand Standard 4994.1: 2009 – Temporary Edge Protection – Part 1: General Requirements
- Australian and New Zealand Standard 4994.3: 2010 – Temporary Edge Protection – Part 3: Installation and dismantling for edges other then roof edges

WorkCover NSW:

- Collapse Of Scaffolding Safety Alert
- Scaffold perimeter edge protection general residential construction
- Erection platforms - for erecting, altering and dismantling of prefabricated steel modular scaffolding: Factsheet
- Suspended Scaffolding Safety Alert
- Falling objects from scaffolding: Safety alert
- Erecting, altering and dismantling scaffolding Part 2: Aluminium tower-frame scaffolding: A guide on health and safety standards February 2011
- Safe use of frame trestle scaffolding: A guide for employers and others
- Erecting, altering and dismantling scaffolding - Part 1: Prefabricated steel modular scaffolding
- Identification tool for aluminium mobile scaffolds: Hazard profile
- Requirements for trestle ladders in NSW – Position paper, 2006, CatNo.WC04943

*Note: This material provides a brief overview of some of the key issues and readers are directed to the further guidance material provided and to seek expert advice as required. Each business should utilise risk management principles, including consulting relevant workers, to ensure any control measures implemented are properly tailored to the site, workers and tasks.*

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## HEIGHT SAFETY - Elevating work platforms & work boxes

### HAZARDOUS TASKS identified

### Elevating work platforms and work boxes

A number of BIA members have recently begun to use various elevating work platforms (EWPs) to supplement their existing scaffold and other work platforms. EWPs include scissor lifts, cherry pickers, boom lifts and travel towers. A work box can also be elevated to allow tasks to be undertaken at heights however an EWP or scaffold system provides a higher level of safety.

While each of these devices can provide significant time savings as compared with scaffold erection etc, they can also create new hazards for the operators and people working nearby, so a thorough assessment is recommended prior to purchase and use.


A scissor lift EWP

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

Not all EWPs are suited to all work situations. Issues to consider when selecting EWPs include:-

- What height and reach is required for the tasks to be performed?
- Surface conditions in the travel and work areas, eg slope, surface and wheel load limits (eg concrete, soil, suspended slab, timber decking) including localised weaknesses such as pit covers?
- Travel restrictions, eg narrow doorways or paths, or height restrictions?
- Indoor or outdoor use?
- Will the EWP need a licensed operator?
- Is a fall arrest harness required during use?
- Is there a need to exit the EWP whilst elevated?

When assessing the risks arising from using EWPs you should consider the following:

- Are the workers operating the EWP trained in safe operating procedures of that particular brand and type of equipment?
- Has the training included the safe use of fall arrest equipment and emergency rescue procedures?
- Are the EWPs only used as working platforms? (They are not designed as a means of entering and exiting a work area unless the conditions set out in AS 2550.10 are met)
- Are the EWPs only used on a solid level surface? (unless they are designed for rough terrain)
- Has the surface area been checked to make sure that there are no penetrations or obstructions?
- Do persons working in travel towers, boom lifts or cherry pickers wear a properly anchored safety harness?
- Is the EWP to be used within the manufacturer's limitations? eg slope, wind conditions, load capacity?
- Do the workers who operate elevating work platforms with a boom length of 11 metres or more have a High Risk Work License?
- Is the surface area able to support the EWP and free of weak spots (eg pit covers), penetrations or obstructions

A boom lift EWP

WorkCover NSW warns of past accidents relating to forklift systems:

*"Many serious accidents have occurred when people fail to use a correctly designed and constructed work platform, either from falls or being trapped by moving parts of the forklift elevating system. Standing on the forklift tines tines, on pallets or in stillages, are common causes of falls from height, while the improper use of a well-designed work platform can also result in serious injury…"*

From: Work platforms for forklift trucks: Position paper

**Work boxes / work platforms**

Work 'boxes' or work 'platforms' are platforms with edge protection. They may be supported by a forklift truck, hoist, crane or other lifting devices. Work boxes utilised in the boating industry are primarily used on forklifts. When compared with scissor lifts work boxes are more complicated to use, pose a higher level of risk, and should not be used for frequent, routine tasks.

| | |
|---|---|
|  A workbox that is elevated on a forklift |  This is NOT permitted! |

When assessing forklifts with work boxes and their safe use, consider:

- Is the work box designed for the task and securely attached and prevents working coming into contact with any moving art of the forklift?
- Is the work box fitted with a suitable anchorage capable of withstanding the fall forces? (ie as specified in AS/NZS 1891.4 *Industrial fall-arrest systems and devices—Selection, use and maintenance*.)
- Are workers attached to the anchorage by a lanyard and harness where the work is being undertaken outside the confines of the box?
- Is it designed in accordance with AS 2359 *Powered Industrial Trucks*
- Are the workbox, lifting attachments and records checked by a competent person before use?
- Do workers remain within the work box while they are being lifted or suspended?
- Does the operator always avoid suspending the box over people?
- Does the forklift operator stay at the controls of the forklift at all times?
- Does the forklift have a device to prevent uncontrolled lowering of the workbox?
- Is the safety gate self-locking and kept closed when the box is elevated?

**RISK CONTROL options**

When you are deciding if an elevating work platform and/or a work box will be useful in your workplace, business, it's important to talk to suppliers about your site and your needs. A site visit by the supplier can assist you to determine the best options. As well as having the right equipment, verification of competency is critical to ensure all parties know how to operate the specific EWP.

**Case study – Scissor-lifts**

A few marinas now routinely use various scissor-lift elevating platforms. In some cases these are purchased – including from the second-hand market – and others find it more economical to hire or lease them for particular jobs. Whether the device is new or second hand it must be maintained in accordance with the relevant standards (eg AS 2550.10).

One manager was especially happy with the scissor-lift they purchased 2 years ago, saying it was a "really fabulous" aid, saving the business time and effort for many of their jobs.

If the Elevating Work Platform is to be used as a means of access and egress from the boat you must meet the strict requirements of AS 2550.10, and this includes the use of a harness regardless of whether it is a boom lift or a scissor lift.

Scissor lifts used at marinas in Sydney

**Case study – Work boxes vs Scissor lifts?**

A few marinas use work boxes as forklift attachments to access the top of their travel lifts for servicing and maintenance tasks. In hindsight some believe it may have been more economical to use a scissor-lift EWP and/or rent a certified work box when they need one for any unusual or 'one-off' jobs. Scissor-lifts are generally a safer and more versatile option, and work boxes should only be considered for special tasks of short duration.

Workbox used by Mariana. Note upper mesh panel of workbox is not shown.

Businesses also need to ensure that all forklift attachments are certified, used for the intended purpose, and the forklift load plate includes the relevant information as per Australian Standard 2359.1 or similar.

**Case study – Elevating Work Platforms for moving between sites**


This commercially available portable aerial work platform, made from a high-strength steel base with a lightweight aluminium mast and platform, reportedly allows work up to a height of 4.3 metres. The supplier claims that the unit can be assembled in around 30 seconds. The work platform has a work tray to carry tools and materials. The platform is powered using a compact, variable speed power pack with battery packs that can elevate and descend 20 times from one charge.

**Further guidance**

- Work Health and Safety Regulation
- Code of Practice – Managing the risk of falls at workplaces
- Australian & New Zealand Standard 1891.1:2007 Industrial fall-arrest systems and devices - Harnesses and ancillary equipment
- Australian & New Zealand Standard 1891.2:2001 Industrial fall-arrest systems and devices - Horizontal lifeline and rail systems
- Australian & New Zealand Standard 1891.3:1997 Industrial fall-arrest systems and devices - Fall-arrest devices
- Australian & New Zealand Standard 1891.4:2009 Industrial fall-arrest systems and devices - Selection, use and maintenance
- Australian Standard 2550.1:2011, Cranes, Hoists and Winches – Safe Use – General Requirements
- Australian Standard 2359.1:1995, Powered industrial trucks – General requirements
- Australian Standard 2359.2:1985, Powered industrial trucks – Operation
- Australian Standards 2550.10:2006, Cranes Safe Use - Elevated Work Platforms

**WorkCover NSW guides:**

- Work platforms for forklift trucks: Position paper, CatNumber: WC04399
- Overturned boom-type elevating work platform: Safety alert CatNumber: WC03042
- Safe working at heights: Guide, CatNumber: WC01321
- Working at heights - Part 1: Falls from heights: Factsheet, CatNumber: WC05891
- Utilities Working at Heights Resource

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## HEIGHT SAFETY – Using harnesses

### HAZARDOUS TASKS identified

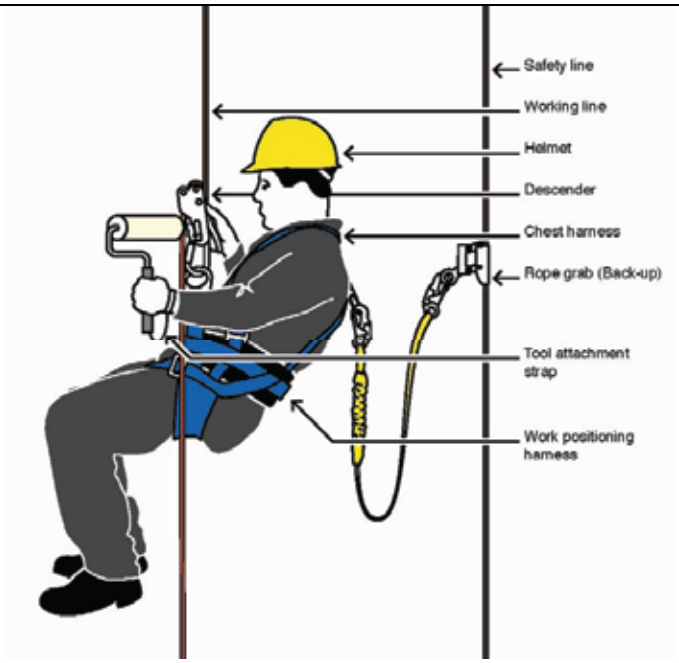
Harnesses are one of the 'lower level' control measures for the prevention of falls as they are less safe and less reliable than other controls. They should only be used where it is not reasonably practicable to use higher level controls or where higher level controls are not fully effective in preventing a fall when used on their own.

Harnesses can cause harm, including death from 'suspension trauma' (as outlined in a case study later in this document). For these reasons it's critical to understand the hazards associated with harness use, and the environments for which they are designed. Some common errors seen in harness use include: harness incorrectly fastened; lanyard / preventer line is too long allowing a fall or not suited to task; unsuitable anchorage point; and lack of supervision.

Despite the potential problems with harness use, when they are properly installed and used correctly they can be useful in the following situations:

- for work positioning or rope access
- as a travel restraint
- for individual fall arrest

Each of these systems is outlined in the following table.

| | |
|---|---|
| **Work positioning or rope access systems**<br><br>These allow a person to be suspended and supported in order to work at an otherwise inaccessible area.<br><br>For example, to clean and polish a large fly-bridge cruiser one approach may be to use a rope access system anchored to a point on or near the top of the fly-bridge to reach areas of the vessel that cannot be reached by other means. |  <br>*Figure 1- Industrial rope access system.*<br>*Where possible it is always better to use other, safer means to access high areas such as Elevating Work Platforms etc.*<br>*Note – A work positioning harness is now referred to as a lower body harness* |

**Travel restraint systems**

These systems prevent the use from reaching an edge where they could fall.

A travel restraint system consists of a harness (compliant with AS/NZ 1891.4 2009) connected by a lanyard to a suitable anchorage point or static line.

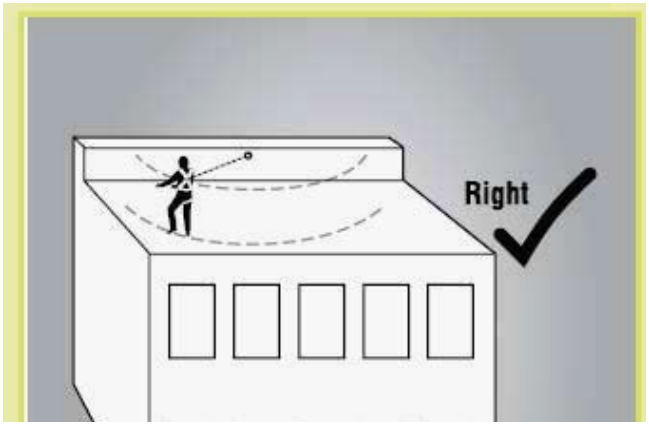



*Figure 2 – Travel restraint. These systems must only be used if it is not reasonably practicable to prevent falls by providing a physical barrier such as a guard rail.*

**Individual fall arrest systems**

An individual safety harness is designed to prevent or reduce the severity of an injury to a person if a fall does occur.

Other fall arrest systems are catch platforms and industrial safety nets.

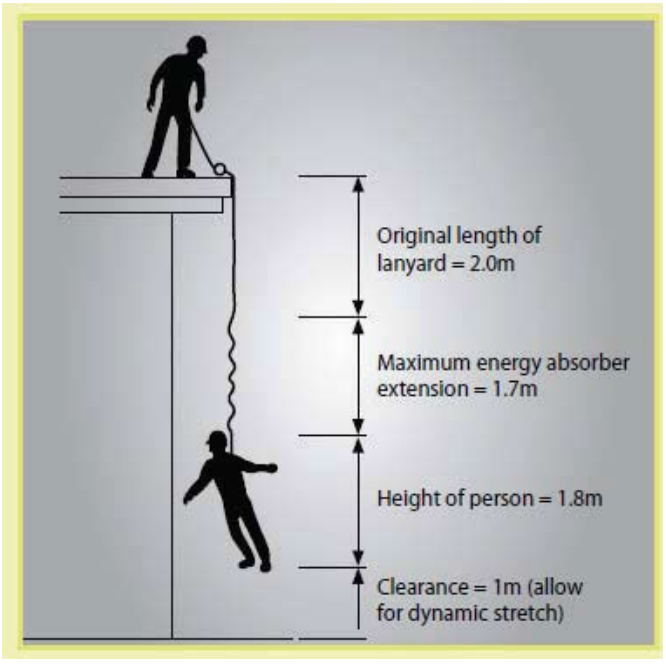



*Figure 3 – Individual fall arrest system showing the clearance required to absorb energy and prevent the user from striking the ground.*

*Individual fall arrest should be used instead of a travel restraint system if **any** of the following apply:*

- *the user can reach a position where a fall is possible*
- *the user has a restraint line that can be adjusted in length so that a free fall position can be reached*
- *there is a danger the user may fall through the surface, for example fragile material*
- *the slope is over 15 degrees*
- *there is any other reasonably likely use or misuse of the system which could lead to a free fall*

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

**RISKS to assess**

Before using a harness other means of gaining safe access to heights must ALWAYS be investigated. Harness systems should only be used when it is not reasonably practicable to:

- work from the ground or solid construction, or
- use a fall prevention system such as edge protection, scaffolding, work platform, scissor lifts or similar.

Using any sort of harness system requires a high level of skill, and comprehensive assessments. For example, just *some* of the issues to assess and to manage ***prior*** to using any harness system are:

- Establish whether the system is designed as a travel-restraint or fall-arrest
- Assess anchor points to be used – are they sound and up to bearing the load (with regard to their intended use and likely weight loadings) in the direction that would result from a fall;
- Assess the line to be used – is it sound, and if so up to the loads to be placed on it
- Assess junctions between line and anchor points
- Assess all of the above with regard to lanyard connecting worker to the line
- Assess the amount of slack in fall arrest line, allowing for energy absorption, height of worker etc as illustrated in Figure 3 above
- Assess if there is adequate clearance
- Assess inertia reels
- Assess that all system components are compatible and are suited to the task and environment

An experienced yachtsman provides these additional suggestions:

- a bow-line knot tied by a competent person should be used in preference to shackles or other couplings
- A suitable line may include a "retired" yacht halyard as this would be rated to a high breaking strain

It is also a requirement that you:

- provide training to workers
- develop and practice a rescue plan
- provide supervision of workers using harness systems
- ensure ongoing inspection and maintenance for anchorages and equipment

**Do you have the right harness for the job?**

There are many different harnesses in use in the boating industry, including:

- yachting harnesses and lines;
- dinghy 'trapeze' harnesses;
- windsurfing harnesses; and
- seat harnesses for fast motor boats.

***None*** of the above harnesses are intended to provide protection from falling from a height.

Harnesses that are specifically designed for falling from a height **must** meet the standards in the series 'AS/NZS 1891 Industrial fall-arrest systems and devices'. This series of standards

(1891.1, 1891.2, 1891.3 and 1891.4) provide detailed advice on: Harnesses and ancillary equipment; Horizontal lifeline and rail systems; Fall-arrest devices; and the selection, use and maintenance of the equipment.

Check your harness, and if it's to be used for protection from falling from a height it should have a statement on the label such as *'This harness meets the requirements under AS/NZS 1891.4'.*


A harness in use at a Sydney marine business, with the harness label showing that it is '*Manufactured to AS/NZS 1891.4'* as well as providing a serial number and when to remove the device from service etc.

Components of a typical height safety kit as seen in a 'roofer's or 'construction' kit.

**RISK CONTROL options**

When correctly installed and used correctly harnesses can assist to reduce falls where other systems are not reasonably practicable. Examples of systems used by marine businesses are provided below.

As previously noted, other fall arrest systems that do not use harnesses and lines may be a better option where there are risks of falls. For example catch platforms, industrial safety nets or cushioning systems may be more practicable options for the task and for the work site.

The use of static (Jack) lines, horizontal lines to which a lanyard attaches, although common practice, should only be used when assessed and installed by a competent person. Suitable anchorage points and suitable static lines are perhaps the most complex part of travel restraint or fall arrest system when used on boats.

The anchorage point's capacity will vary according to how many people are using the point, if the point is used as part of a travel restraint system (to prevent someone reaching an edge where they could fall) or as part of a fall arrest system (to limit free fall).

The requirements for static lines for boats on the hardstand are much more stringent than static lines used on boats in water. All anchorages, lines and attachments must be tested and approved by a competent person to ensure their impact and load capacities suit their intended use.

Two recent, comprehensive studies have confirmed the many problems with these systems (HSE 2004 & HSE 2002), and a summary is provided in the following box.

**Research reports - Common problems with fall arrest systems**

Studies from the United Kingdom examined fall protection systems in use across industries internationally and noted many common problems with both the lines, harnesses and other components.

"*To look at, temporary-installed horizontal life lines (HLLs) are very simple. But in terms of the fall-arresting process, they are very complex. Consequently, the design and installation of temporary-installed HLLs is not just a matter of stringing up some randomly chosen rope in an improvised manner, and in the process relying on a good degree of guesswork. HLLs are engineered systems and require engineering disciplines and approaches in order to ensure that they will perform as intended.*

*There is a general lack of understanding of the criteria involved in the design, installation and control of fall-arresting systems (FAS) based on temporary-installed HLL, particularly by those who have to select and install these systems at the workplace."*

## Legal requirements

All equipment used in fall arrest systems should be designed, manufactured, selected and used in compliance with the AS1891 series of standards, and businesses using these systems also must comply with the new national WHS Regulation. A summary of the key points regarding fall arrest system requirements is provided in the box below.

**Legal requirements for fall arrest systems in WHS Regulation**

The new draft WHS Regulation outlines the specific requirements to meet where individual fall arrest systems are used, and these include:

*"If a person conducting a business or undertaking provides a fall arrest system as a control measure…. the person must:*

- ***establish emergency procedures**, including rescue procedures, in relation to the use of the fall arrest system.*

*The person must **ensure that the emergency procedures are tested** so that they are effective.*

*The person must provide relevant workers with **suitable and adequate information, training and instruction** in relation to the emergency procedures.*

*In this regulation, relevant worker means:*
*(a) a worker who, in carrying out work in the business or undertaking, uses or is to use a fall arrest system; and*
*(b) a worker who may be involved in initiating or implementing the emergency procedures"*

**Case study – Using travel restraint during yacht construction**

A business that designs and builds cruising yachts requires workers to be on the top of the yacht during the construction process prior to guard rails or work platforms being available.

To prevent workers from reaching the edge of the boats and falling off the manager has installed a horizontal lifeline the length of the boat. Staff wear a harness that is attached to the line via lanyards, and this allows them to move and work on the deck more safely. Note that finding suitable anchorage points for harnesses and lifelines is complex and is a common reason for system failure. All components of the system should meet Australian Standards.

Horizontal line above the boat that is under construction

**Case study – Using harnesses for fall arrest**

A large Sydney marine service centre was purpose built to accommodate large vessels for maintenance and repair tasks, and it's not uncommon for personnel to be working at heights from 2 to 12 metres off the hardstand. While the centre utilises a number of 'passive fall prevention devices' - such as scaffold systems and EWPs – the OHS Manager identified tasks that could not be safely done using these aids.

As the OHS Manager explained:
"*The solution that (we) eventually adopted involved staff wearing safety harnesses which they connected via a rope drop line to a fall arrest device mounted in the roof of the work sheds.*

*This fall arrest device is similar in principle to inertia car seat belts. The fall arrest device was attached to an overhead traveller designed and implemented to suit the work sheds and the variety of vessels.*

*The overhead traveller connection runs via multiple high-tension heavy-duty cables strung from the building/work shed roof structures. With six runs of cables, and two fall arrest devices from each cable run, full coverage across the two main works sheds was obtained."*

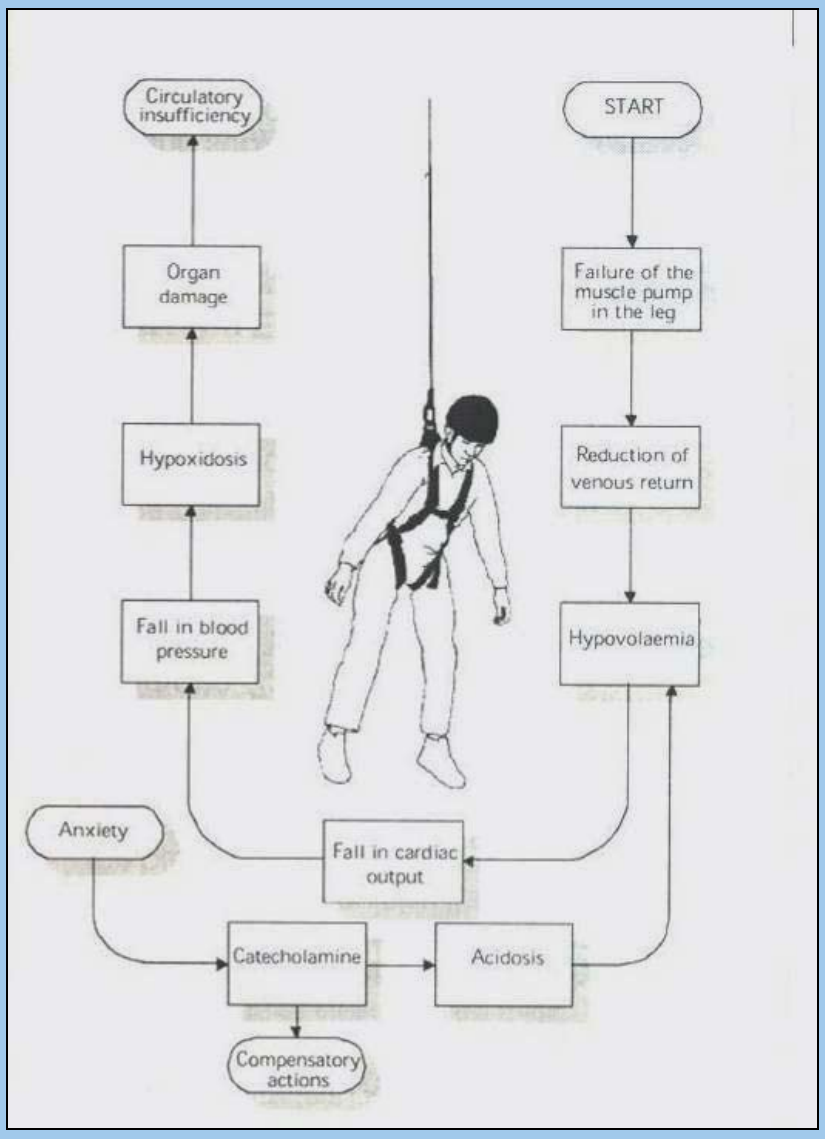
*"The locking snap hook mechanism links to the "D" shackle on the rear of the harness when working at heights of 2-6 metres. The design of the fall arrest device allows only a 300mm fall before an automatic lock off mechanism activates. In effect, this provides a strict limit on sudden fall movement before the fall arrester 'locks'.*

*When working at heights greater than 6 metres, the harness shock absorber lanyard is used. This connects via the "D" shackle with the locking snap hook mechanism. This permits the user to carry out work tasks with a greater degree of freedom. The shock absorber lanyard length is standard at 2 metres."*

HS 04 Using harnesses V3

**Case study – Things that go wrong with individual fall arrest systems …**

There are many things that can go wrong with harness use on individual fall arrest systems including:
- swing downs – allowing the worker to contact the ground
- swing backs – allowing the worker to hit the side of a structure
- anchorage points failing
- incorrect use
- mixing incompatible equipment (such as lanyard too long)
- reliance on user skill and competence
- 'suspension trauma' from hanging in the harness




If a person falls and is unconscious and held suspended in an upright position this posture can result in 'suspension trauma' or 'orthostatic shock'. This syndrome occurs from the impact of venous pooling and reduced cardiac output, as illustrated in the figure above.

***Death can occur in less than 10 minutes***.

Immediate rescue and careful treatment following suspension is also critical to achieve a good outcome for the casualty.

**Further guidance**

- Work Health and Safety Regulation
- Code of Practice – Managing the risk of falls at workplaces Safe Work Australia
- Australian and New Zealand Standard 1891.1:2007 Industrial fall-arrest systems and devices - Harnesses and ancillary equipment
- Australian and New Zealand Standard 1891.2:2001 Industrial fall-arrest systems and devices - Horizontal lifeline and rail systems
- Australian and New Zealand Standard 1891.3:1997 Industrial fall-arrest systems and devices - Fall-arrest devices
- Australian and New Zealand Standard 1891.4:2009 Industrial fall-arrest systems and devices - Selection, use and maintenance
- Australian and New Zealand Standard 4488 Industrial rope access systems

WorkCover NSW advice:

- Code of Practice – Safety Line Systems (WCA)
- Safety Guide – Use of fall arrest systems (WCA)

Other


- Burgess Limerick R, 2003, Issues related to the wearing of fall-arrest harnesses in the construction industry, *Ergonomics Australia*, Vol 17, 3:18-24
- Seddon P, 2002, Harness suspension: review and evaluation of existing information, Health & Safety Executive, Research Report 451/2002
- Rushworth A & Mason S, 1987, Aids to selecting fall-arrest harnesses: the ergonomic considerations, *Safety Practitioner* cited in Burgess Limerick
- Health and Safety Executive, 2004, A review of criteria concerning design, selection, installation, use, maintenance and training aspects of temporarily-installed horizontal lifelines
- Health and Safety Executive, 2002, Harness suspension; review and evaluation of existing information

# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## HEIGHT SAFETY – Using portable ladders

### HAZARDOUS TASKS identified

### Working from a ladder

Each year in Australia there are many accidents associated with portable ladder use, often with serious consequences. When workers are using ladders at heights over 2 metres the risk is further increased. Compared with other methods to undertake work at heights – such as from scaffold systems and other temporary work platforms - ladder use is rated as a fairly poor and 'low level' control.

***Warnings***

WorkCover NSW advises that ladders:

- *"…Should only be used to carry out light duty work of short duration"*

The new Code of Practice specifically states:

- *Ladders must only be used when it is not reasonably practicable to use a higher level control measure.*
- *Make a record where ladders or an administrative control is the only control that is reasonably practicable to implement when minimising the risk of a fall over two metres, and keep the record until the work is completed.*

In the boating industry ladders are commonly used:

- To gain access to the boat when it is out of the water
- To reach a section of the hull or external fittings and fixtures

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

***Portable ladders***

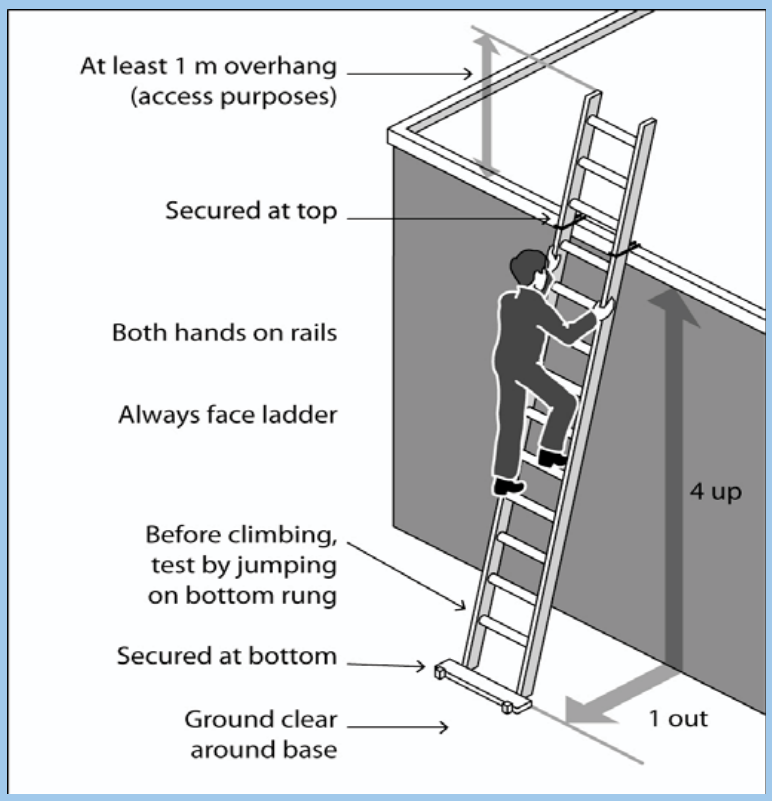
If you are using portable ladders such as step ladders, extension ladders and hanging ladders you must assess:

*Ladder design features*

- Type of ladder use – are extension and single ladders only used for access and egress - not as a working platform?
- Load rating – is it at least 120kg, and manufactured for industrial use?
- Slip resistance – is there some slip resistance on base, rungs and/or steps?
- Condition— is the ladder inspected for faults, such as broken rungs, stiles and footing before it is used?

*Setting up the ladder*

- Ground conditions – is the ladder on firm, stable and level ground? (not on scaffolding or other elevated work platforms)
- Slope of the ladder – is it at a slope of 4:1, with step ladders in the fully open position?
- Attachment methods – is it attached at the top or bottom ends or both?
- Locking devices on the ladder – are they all secured?
- Height – is it suited to task to avoid over-reaching, and with extension ladders extending at least 1 metre above the stepping off point?




*Using the ladder**

- Tool use – are only light tasks undertaken while on the ladder (ie not requiring high force or heavy or awkward loads) and where three points of contact can be used (avoiding 2-handed tools)?
- Rung use – can workers avoid standing higher than the 2nd tread below the top plate of any step ladder (with the exception of three-rung step ladders) or avoid standing on a rung closer than 900 mm to the top of a single or extension ladder?

- Orientation - Can workers always face the ladder when going up or down, or when working from it?
- Position – can work areas be accessed from the ladder without over reaching

**If these conditions for ladder use cannot be met, a ladder may not be appropriate and other methods such as EWPs, scaffolding or temporary work platforms should be considered.*

**RISK CONTROL options**

Instead of using step ladders, consider using platform ladders or step platforms. These ladders are commercially available in a wide range of sizes and to various load ratings. They typically have handrails, are topped by a platform, and are easy to move then lock in position with various wheel systems. Alternatively controls higher up in the Hierarchy of Control such as EWPs, scaffolding or temporary work platforms may be a better and safer option.
The following table illustrates examples of platform ladders used at marine businesses.


A label on a ladder indicating the safe working load. The load rating includes the operator weight plus their tools and materials.

There are many other access platforms that are custom–made and mobile that may suit building, maintenance and repair work in the boating industry and provide a safer option than step ladders and extensions ladders.

**Further guidance**

- Work Health and Safety Regulation
- Code of Practice – Managing the risk of falls at workplaces, Safe Work Australia
- Australian and New Zealand Standard 1892.1:1996 Portable ladders Part 1: Metal
- Australian and New Zealand Standard 1892.2:1992 Portable ladders Part 2: Timber
- Australian and New Zealand Standard 1892.3:1996 Portable ladders Part 3: Reinforced plastic
- Australian and New Zealand Standard 1892.5:1999 Portable ladders Part 5: Selection, safe use and care
- Australian and New Zealand Standard 1657:1992 Fixed platforms, walkways, stairways and ladders – Design, construction and installation
- Australian and New Zealand Standard 4994.1:2009 Temporary edge protection - General requirements

**WorkCover NSW guides:**

- WorkCover Safety Guide: Portable Ladders (Safety Guide No 4503)
- WorkCover Position Paper: Working of stepladders
- Safe working at heights: Guide, CatNumber: WC01321
- Working at heights - Part 1: Falls from heights: Factsheet, CatNumber: WC05891
- Working at heights - Part 2: Falling objects CatNumber: WC05892
- Safe use of portable ladders: Safety alert CatNumber: WC02790
- Position Paper - Working Off Stepladders, CatNumber: not provided
- Utilities working at heights resource, 2006, CatNo: not provided

*Note: This material provides a brief overview of some of the key issues and readers are directed to the further guidance material provided and to seek expert advice as required. Each business should utilise risk management principles, including consulting relevant workers, to ensure any control measures implemented are properly tailored to the site, workers and tasks.*

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# DEVELOPING WORKPLACE HEALTH & SAFETY GUIDANCE

for the

# RECREATIONAL & LIGHT COMMERCIAL BOATING INDUSTRIES

# WHS GUIDANCE MATERIAL

# SECTION 3

# HAZARDOUS MANUAL TASKS

# WORKPLACE HEALTH AND SAFETY ISSUE – HAZARDOUS MANUAL TASKS OVERVIEW

**The problem**

Most jobs and occupations involve some aspect of manual work. Those manual tasks that have the potential to cause musculoskeletal disorders (MSDs) are referred to as *"hazardous manual tasks"*.

Musculoskeletal disorders (MSDs) are the main cause of injury and workers compensation costs in the marine industry in NSW, accounting for almost 40% of all claims ***(****WorkCover NSW Workers Compensation Data 2004/2005 – 2008/2009)*.

MSDs refer to injuries and disease processes that develop from:

- manual tasks such as lifting, carrying, pushing, pulling, holding and restraining
- undertaking repetitive movements
- working in awkward, or unnatural postures
- working in 'static' (sustained or still) postures for long periods
- exposure to vibration (hand / body)

The typical problems that develop from body stressing are 'musculoskeletal disorders' including:

- sprains and strains of muscles, ligaments and tendons
- damage to the spinal discs and spinal nerves
- joint and bone injuries or degeneration
- nerve injuries (eg carpal tunnel syndrome)
- muscular and vascular disorders as a result of hand-arm vibration

**The consequence**

These workers compensation claims are often costly to business, with workers requiring long periods off work followed by a gradual return to their normal work to avoid re-injury. Examples of recent MSD claims ***(****WorkCover NSW Workers Compensation Data 2004/2005 – 2008/2009)* in the boating industry include:

- Working in a cramped posture in an anchor locker – lumbar injury
- Decanting resin from a 44 gallon drum – shoulder strain
- Drilling steel for long periods - elbow injury (epicondylitis)
- Lifting a long roll of material out of a ute - shoulder & back strain

Injuries can be 'acute', 'cumulative' or a combination:

- "**Acute injuries** are associated with a relatively short exposure to loads which exceed tissue tolerance.

- **Cumulative injuries**… occur as a consequence to relatively long term exposure to load… (and) the general mechanism of injury is … an accumulation of microdamage which exceeds the tissue's capacity for repair.

- Injuries may also occur as a **combination** ….where a history of cumulative loading leads to reduced tissue tolerance, which is then exceeded by short term exposure to a relatively high intensity load". (Burgess-Limerick 2003)

This 'combination' is similar to the story of the 'straw that broke the camel's back', where the tissue tolerance is limited from previous stress, and then is more easily damaged by further loading.

Acute injuries may resolve quickly - with a short period of rest and/or undertaking other duties, together with some physiotherapy and/or anti-inflammatory medication. Injuries that have developed from 'cumulative trauma' tend to be more complex, and recovery can take much longer. This is why early injury reporting is so important.

Workers should be encouraged to immediately report if they experience any of the following symptoms as these can indicate injury or illness from body stress: tingling, numbness, pain, stiffness, loss of coordination, loss of strength, differences in temperature in limbs, and skin discolouration.

**The law**

The national Work Health and Safety legislation requires that the person conducting a business must eliminate or control risks from hazardous manual tasks, as listed below.

If it is not reasonably practicable to **eliminate** the risk of a worker being affected by a musculoskeletal disorder then the risk must be **minimised** as far as is reasonably practicable by:
***- changing the design*** of the work area and the layout of the workplace
***- changing the systems*** of work, considering schedules, job autonomy, job control & support
***- changing the nature, size, weight or number of items*** used in the task
***- providing mechanical aids***
***- changing the environment***, or
***- using a combination*** of these measures.

There is also a requirement to:
- *Provide information, instruction and training* to minimise any remaining risk.
- *Review and revise* risk control measures

When undertaking risk assessments in the workplace it is a key requirement that consultation with workers is carried out as part of the process. By drawing on the experience, knowledge and ideas of the workers a business is more likely to identify all hazards in the workplace and choose effective control measures.

The Hazardous Manual Tasks guidance material provides information on how to meet the legislative requirements that are listed above plus provide real examples of how members of the NSW BIA have eliminated or controlled the risks from hazardous manual tasks at their worksites.

**Does your business comply?**

Check how well YOUR business is currently managing hazardous manual tasks by completing the *Hazardous Manual Tasks - Self Assessment Tool*. Score yourself in each of the areas, and identify areas of non-compliance. This tool also outlines the elements of a safety system for managing manual tasks.

Use this self-assessment tool as a baseline first. Then once you have looked over the guidance material and the case studies you will identify areas where your systems can be improved. By following the information outlined in this guidance material, you will achieve better safety for all people on your site, as well as better compliance with work, health and safety legislation.

**The guidance material**

Guidance has been developed on topics that are common to many sectors within the boating industry. The guides follow the risk management approach, providing suggestions of hazards to look for, risks to assess, and options for risk control.

The emphasis of this guidance, as required under the hierarchy of risk control, is to encourage businesses to provide well designed equipment, in well designed work areas, and with well designed work schedules as this allows people to work as efficiently and safely as possible.

The guidance on manual tasks includes:

- MT 01 Handling blocks for standing boats
- MT 02 Climbing in and out of small boats
- MT 03 Handling drums
- MT 04 Handling fibreglass rolls
- MT 05 Handling stern drives
- MT 06 Tipping and pouring from drums & other containers
- MT 07 Selecting hand tools and power tools
- MT 08 Selecting trolleys
- MT 09 Handling very heavy loads
- MT 10 Working in awkward postures
- MT 11 Why team lifting is not recommended

Refer to the guidance material to check if there are further improvements you can make to your work systems or equipment to reduce the risk of musculoskeletal injuries and illnesses.

Further Guidance

Work Health and Safety Act 2011
Work Health and Safety Regulation, Safe Work Australia
Draft Code of Practice – Hazardous Manual Tasks, Safe Work Australia

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# Hazardous Manual Tasks
# Self Assessment Tool

| Key steps to a safe system: | Hazard Identification | Risk Assessment | Risk Control | Review | Consultation | Instruction & Training | Supervision |
|---|---|---|---|---|---|---|---|
| **NON-COMPLIANCE** | No identification of potential MSD* hazards | No assessments of MSD hazards have been done | No attempt has been made to eliminate or reduce potential risk/s of MSDs | No evidence of follow up and review of the key steps in managing MSDs | No evidence of management consulting with workers | Workers have not received training and instruction in managing risks and MSDs, or training is limited to 'correct lifting' | Workers are left unsupervised with no agreed or stated safe work methods for common work tasks |
| **WORKING TOWARDS COMPLIANCE** | Some MSD hazards have been identified with or without incidents or injuries occurring | Assessments have been done on an ad hoc basis and/or are incomplete | Some controls have been put in place, but do not follow the 'hierarchy of hazard control' and/or are incomplete | Some actions are checked and followed up | Consultation is on an ad hoc basis, and/or workers' feedback and views are not valued or taken into account | Some training has been provided in some aspects of managing MSD risks to some workers but is incomplete or inconsistently applied. | The supervision provided does not always ensure that safe work procedures are being followed. |
| **COMPLIANCE** | Proactive identification of all MSD hazards is done regularly & includes observing tasks, consulting workers & reviewing available information | Assessments are done regularly and show consideration of all risk factors – physical factors & systems of work | All risks relating to hazardous manual tasks are eliminated or appropriately controlled. | Guidelines on MSD management have been followed to ensure that new risks were not introduced when new work layouts or equipment were designed or purchased | Agreed consultation arrangements are in place and working effectively. Workers are consulted on an ongoing basis at each step in the management of MSDs | All workers are inducted and trained in the identification, assessment and control of MSD risks before commencing a task | Supervision ensures the safe work methods are followed and any problems are immediately acted on and remedied |

*MSD = musculoskeletal disorders

Based on the WorkCover NSW BackWatch Scoreboard, 1998

3b Hazardous Manual Tasks – Self Assessment Tool V3

# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## MANUAL TASKS – Handling blocks for standing boats

### HAZARDOUS TASKS identified

The most frequently reported hazardous manual task at marine businesses is lifting and handling blocks for standing boats. When boats are taken out of the water for various maintenance tasks (such as anti-fouling and repainting) they are typically positioned on hardwood timber blocks, then have various lateral support systems or cradles. These timber blocks placed under the keels are used in both slipway and hardstand settings.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

When building these supports, workers are exposed to risk of musculoskeletal disorders (MSDs) from:

- lifting, carrying or dragging the blocks
- pushing and manoeuvring the blocks to form a stable stack
- gripping with fully extended hands and fingers
- working with very heavy loads at below thigh height
- may be walking on wet, slippery and sloped surfaces (eg on a slipway to set up a cradle)

Hardwood is known for its strength, and it is also a very heavy material, with a piece of recycled timber railway sleeper weighing almost 40kg per metre (section approximately 250x150mm).

The law requires that risk associated with hazardous manual tasks must be eliminated or reduced.

### RISK CONTROL options

Site visits to marine repairers using slipways and hardstand areas revealed a range of methods for standing boats that reduced many of the risks associated with the traditional and manual methods of using hardwood blocks.

Some labour-saving approaches for standing boats that should be considered include:

- Using lighter-weight materials to support boats where possible
- Developing pre-formed stacks that can be lifted into position by aids such as forklifts or trolleys, with individual timber blocks used just to achieve the final levelling
- Where the boat has been slipped/lifted at the business previously, using this experience and the exact specifications on the best block design to suit the vessel

Examples of each of these approaches are provided in the case studies below.

**Case study – Using lighter materials**

To reduce the heavy lifting associated with hardwood blocks consider using a lighter material – such as softwoods.

Some marine businesses in Sydney have found that for many smaller vessels blocks made with pieces of treated pine provide a suitable support. This material is significantly lighter than hardwood, and can be just half the weight for the same sized piece, making individual pieces much easier and safer to manually lift.

Blocks built using a mix of hardwoods and softwoods

**Case study – Using pre-formed stacks**

One large marina has made pre-fabricated stacks of blocks by building large cube shapes from pieces of treated pine. Various sizes allow for flexibility to suit a range of vessels.

These block stacks are designed to be lifted into place by the tines of a forklift. The only 'manual' handling is to use one or two pieces of timber for any small adjustments. This initiative has reduced the need to lift and carry blocks from approximately 5-12 pieces per stack to just the final adjustment pieces (one or two).

Before:
Manually lifting heavy, hardwood blocks

After:
Using a forklift to move a pre-fabricated block

**Case study – Using pre-formed stands**

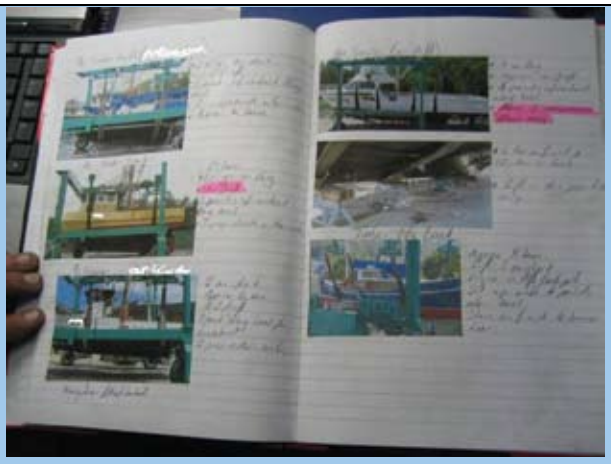
Another marina has also reduced the manual handling involved in supporting boats. They use steel stands which can then be supplemented by timber blocks. The steel stand can be moved into position using a trolley or a mechanised aid.

The steel stand used as part of the boat support

**Case study – Using advice from previous standing or slipping**

Some marinas have developed simple, but very effective systems that save them time and effort when they are seeing repeat customers and standing their boats out of the water and/or using the travel-lift. The first time they take out a customer's boat they make notes of the characteristics of the vessel's hull, keel, engine location, transducer locations and other features that may influence the method of lifting and standing the vessel, taking photos of the key features. They also take photos or make notes of the sling location and block design that they find best suits the vessel.

The notes and information for all their vessels is then utilised each time the vessel is taken out of the water. This allows the marinas to quickly and efficiently build the most suitably designed stack. It's also reduced the need to try and remember the intricacies and differences between their customers' wide variety of boats – reducing any surprises when the underside is revealed.



A page from a marina's notebook showing the different block and sling arrangements they use to ensure they suit different vessels.

**Further guidance**

- Work Health and Safety Regulation
- Draft Code of Practice – Hazardous Manual Tasks, Safe Work Australia

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## MANUAL TASKS – Climbing in and out of small boats

### HAZARDOUS TASKS identified

The action of physically getting in and out of small boats has been identified as contributing to a number of musculoskeletal disorders (MSDs), in particular sprain and strain injuries, typically to the back, knees and ankles. Common locations where these injuries occur are:

- Boat showrooms
- Workshops
- Slipways

People in the boating industry use various step aids as well as workers climbing in and jumping out of boats – some of these methods contribute to injury.

Although the height of the boat may be low (less than 1 – 1.2metres), injuries can develop when the movement involves:

- High forces – such as from jumping – as this places significant stress on the muscles, tendons, ligaments and vertebral discs
- Repetition of a stress on a body part – as this can result in 'cumulative trauma' and the gradual development of injuries including to the: spinal discs; knee meniscus; knee and ankle ligaments etc.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

Check how you and your colleagues currently get in and out of small boats. Also inspect your current step aids for their suitability for the task, including:

- Is the base non-slip?
- Is it rated to support your heaviest staff member, plus any tools and equipment they may be carrying*?
- Are all steps evenly spaced?
- Are all standing surfaces non-slip?
- Is it well maintained?
- Can wheeled devices be locked into position?
- Does the aid bring you to the best height to reach most boats?
- Can the aid be positioned close to the boat's side?
- Is a hand rail required, and if so, is one fitted?

*Most commercial steps are rated to 150kg, while domestic steps are often only rated to 90kg

Old milk crates and other plastic crates are widely used in the boat repair and maintenance industry as step aids and as seats, but the bases and tops are very slippery and these crates fail to provide suitable strength and support. Discussions with workers in the industry indicate that there have been incidents where crates have suddenly slipped or collapsed, resulting in the worker falling.



Unsuitable step aids

The law requires that risks associated with hazardous manual tasks must be eliminated or otherwise controlled following the hierarchy of control.

**RISK CONTROL options**

The table below illustrates some commercially available and custom made products

| | |
|---|---|
|  <br>Shelf-mate order picker<br>2 step tubular frame with sprung castors and push/pull handle. Top step:580mm high<br>These can be ordered without the top handle if required to allow closer access to the hull |  <br>Giant Step<br>Heavy, solid steps for use as a work platform and a step.<br>Top 500mm high, with 480x480mm top area.<br>Weight 18kg, no castors. |
|  <br>Poly Kickstep<br>Dimensions: 385 top dia. x 395 h<br>Rated to 150kg<br>With sprung castors |  <br>Poly Safe-T-Step<br>Dimensions: 380 l x 380 w x 360 h<br>Rated to 250kg<br>'Non-slip' tread |

Commercially available 'walk-up stands'

Features:

- Designed to look into boat rather than for access
- Large top platform
- Handrail
- Non-slip chequer-plate
- Safe working load displayed

Improvements may include:

- Sprung wheels

Custom made steps in a marine workshop

Features:

- Non-slip chequer-plate
- Height and size designed to suit the business's most common boats

Improvements may include:

- Handrail
- Sprung wheels
- Safe working load displayed

**Case study – 3 points of contact rule**

Workers who need to get in and out of small boats face similar injury issues to truck drivers and their vehicles. Climbing in and out of truck cabs and from flat top vehicles has long been identified as a high risk task, with many drivers tripping and falling and/or landing awkwardly and injuring their backs, knees, and/or ankles. The agreed 'safe method' of getting out of truck cabins and off flat platforms is to:
- step backwards
- maintain 3 points of contact at all times
- step, don't jump.


Consider how this technique can be applied at your workplace with small boats

Integral Energy implemented an education and awareness program regarding problems from alighting from trucks, and this resulted in a significant reduction in injuries from this task

**Further guidance**

- Work Health and Safety Act 2010
- Work Health and Safety Regulation
- Code of Practice – Managing the risk of Falls at Workplaces, Safe Work Australia
- Draft Code of Practice – Hazardous Manual Tasks, Safe Work Australia
- Australian Standard 1657 – 1992 – Fixed platforms, walkways, stairways and ladders – Design, construction and installation
- Australian & New Zealand Standard 1892.1 – 1996 Portable ladders Part 1: Metal
- Australian & New Zealand Standard 1892.2 – 1992 Portable ladders Part 2: Timber
- Australian & New Zealand Standard 1892.3 – 1996 Portable ladders Part 3: Reinforced plastic
- Australian & New Zealand Standard 1892.5 – 1999 Portable ladders Part 5: Selection, safe use and care

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## MANUAL TASKS –Handling drums

### HAZARDOUS TASKS identified

Handling heavy and awkward loads are hazardous manual tasks, and this includes handling drums. In the boat repair and manufacturing businesses workers use drums of oils, resin and various solvents. Drum handling has caused sprain and strain injuries in the boating industry, and the law requires that the risks must be eliminated or reduced.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

Features of drums and other large liquid containers that can contribute to injury risk are:

- the large size, that affects ease of rolling, carrying and/or moving the load
- they often lack handholds or easy points to grasp
- the loads are unstable when being moved
- the very heavy weight, with a 205 litre drum of resin weighing approximately 230kg
- the shape and size of the load prevents it from being held close to the person's centre of gravity

The photo shows drums in 'cradles'. Note the bunding around the cradles on the right hand photo that will capture any liquids in case of a spill. Bunding is a requirement under WHS legislation.

The law requires that risk associated with hazardous manual tasks must be eliminated or reduced.

**RISK CONTROL options**

**Handling drums**

The following aids reduce the need to manually handle drums and other large liquid containers, and therefore reduce the risk of workers developing strain and sprain injuries to their backs, necks and arms:

- Mobile drum handlers (eg trolleys)
- Drum attachments for forklifts.

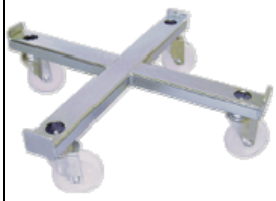
Examples of these options are described in the following table.

Some drum handling can also be reduced through the use of various pumps and other dispensing systems. Refer to guidance document ***'Manual Tasks – Decanting and pouring from drums and other containers'*** for more information.

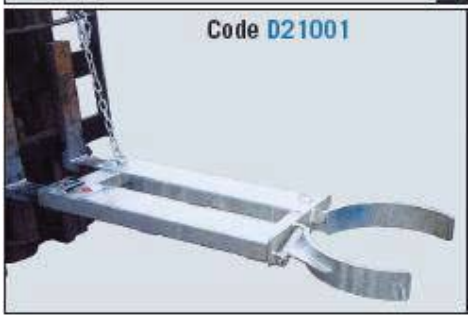
The table below illustrates some commercially available products. Prior to purchasing any aids businesses should review the manufacturer's specifications to ensure the aid is suitable for the task.

| | |
|---|---|
| **Mobile Drum Lifter/Rotator**<br><br>These 350kg capacity units are designed for de-palletising, lifting, rotating, racking, stacking & decanting 205 litre drums.<br><br>There are 3 methods of engaging the drum:<br>• via a cam locked steel band<br>• via grippers operated by a remote quick action toggle latch<br>• via a screw operated rim clamp that grabs the rims of containers. |  <br>DG20 about to safely lift a drum<br>  <br>D21 cost effective drum lifer/rotator "economical one"<br>  <br>DR16 rotating a "Mauser" plastic drum |
| **Drum Jack**<br><br>Designed to lift and move drums up to 300kg<br>• Dual action hydraulic system – clamps drum then lifts<br>• Cast iron pump design<br>• Sealed bearing castor and dolly wheels enable easy positioning in tight spaces<br>• Suited to both open and closed drums |  |

| | |
|---|---|
| **4T4 Drum Trolley**<br><br>Designed to lift and move drums up to 300kg<br>• open or closed drums<br>• fits standard doorways<br>• Available in a large wheel version for rough surfaces 10:1 Leverage Ratio. |  |
| **Multi-Purpose Drum Trolley**<br><br>This drum trolley is used to:<br>• take drums on and off pallets<br>• move the drum on four wheels<br>• place the drum horizontally for emptying<br>• assist to rotate the drum for bung positioning.<br><br>The floating axle reduces operator effort. |  <br>  |
| **Drum Trolley**<br><br>This stainless steel trolley claims to keep forces to below 20kg even when the load being lifted is 300kg.<br><br>Specifications:<br>• Max SWL: 300kg<br>• Max input force: 20kg<br>• Ground clearance: 75mm<br>• Drum sizes: 50-230lt<br>• Width: 795mm |  |

| | |
|---|---|
| **Heavy Duty Drum Cradle**<br><br>Drum cradle fitted with retractable handles<br><br>• Durable zinc plated finish<br>• 300kg capacity |  <br>Left: Handle extended<br>  <br>Right: Handle retracted |
| **Drum Dollys**<br><br>Dollys are designed to store and transport different sized drums. They have a various finishes including galvanised steel, and with or without rims, fitted with castors.<br><br>Capacity is 400kg for the 205 litre versions. |  <br>  <br>  |

**Forklift attachments suited to drums include:**

| | |
|---|---|
| **Auto-clamping drum lifters**<br><br>These engage around the drum and lock under the drum's central rolling hoop. |  <br>  |
| **The Grab Beak**<br><br>This is designed for use with 205litre steel drums, plastic drums, open top and ring lock drums. The design provides a high clamping force, so can also be used over uneven ground. |  |

**Case study – Are drums really necessary at your business?**

A marine business on the Central Coast explained that they used to always purchase products in drums as there was a clear cost saving. However the business has recently moved to buying smaller containers stating the cost advantage was no longer significant.

Other advantages they reported with the small containers were:

- saving time on handling the drums
- saving effort on handling the drums
- no need to tap the container
- less spills
- less waste from product 'going off' in the drum
- less space required for their storage

Instead of moving to smaller containers, other businesses go to bulk systems with dispenser mechanisms. Refer to guidance document ***'Manual Tasks – Tipping and pouring from drums & other containers'*** for more information and other options for making decanting liquids easier and safer.

**Further guidance**

- Work Health and Safety Regulation
- Draft Code of Practice – Hazardous Manual Tasks, Safe Work Australia
- Australian Standard 2359.1, 1995, Powered industrial trucks – General requirements
- Australian Standard 2359.2, Powered industrial trucks – Operation
- Australian Standard 2359.12-1996, Powered industrial trucks - Hazardous areas
- Australian Standard 2359.10-1995, Powered industrial trucks - Fork-lift trucks - Hook-on type fork arms - Vocabulary
- Australian Standard 2359.6-1995, Powered industrial trucks - Safety code
- Australian Standard 4973-2001, Industrial trucks - Inspection and repair of fork arms in service on fork-lift trucks
- Australian Standard 2359.15-2005, Powered industrial trucks - Fork-arm extensions and telescopic fork arms - Technical characteristics and strength requirements
- Australian Standard 1763-1985, Industrial trucks - Glossary of terms

# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## MANUAL TASKS –Handling fibreglass rolls

### HAZARDOUS TASKS identified

Working in the fibreglass boat repair and manufacturing businesses require using rolls of fibreglass. Lifting and handling these loads has been associated with musculoskeletal disorders (MSDs), particularly sprain and strain injuries. The law requires that risks associated with hazardous manual tasks are eliminated or reduced.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

As the weight of a load increases, the risk of injury also increases, although injuries can occur with what can be considered "light" loads. This is particularly the case where the person is in an awkward posture to reach or to lower the object, if the load is awkward to grasp and/or if the lifting task is done repeatedly.

Some of the features of rolls of fibreglass materials that can contribute to injury risk are:

- boxed rolls of fibreglass materials are very heavy – typically between 20-50kg
- the rolls and boxes do not have handholds or easy points to grasp
- the load is long and narrow, so is awkward and hard to hold close
- the material also cannot be held against the skin and tends to be held out from the body
- when the material is out of the box it is relatively fragile and should be kept horizontal where possible
- loads are often lifted above shoulder height (eg to place a roll of fibreglass onto a rack or dispenser above a cutting table)
- the loads are generally too heavy and awkward to be handled safely by one person

A common method of moving and handling rolls of fibreglass is to use 2 person lifts. Unfortunately these 'team handling' approaches pose their own risks and are NOT recommended,

nor are they permitted in the draft Code of Practice – Hazardous Manual Tasks (Safe Work Australia) as a standard means of controlling risks.

Refer to guidance for Manual Tasks: 11. ***Why team lifting is* not *recommended'*** for further information.

The law requires that risk associated with hazardous manual tasks must be eliminated or reduced.

**RISK CONTROL options**

**Handling rolls of fibreglass**

Some of the aids that can assist to move fibreglass loads more safely include:

- Manual roll lifter prong on a mobile lifting device
- Forklift attachments for rolls

The table below illustrates some commercially available products. Prior to purchasing any aids businesses should review the manufacturer's specifications to ensure the aid is suitable for the task.

| | |
|---|---|
| **A slip-on mount roll prong** –<br><br>Prongs of various sizes can be attached to a walk-behind electric forklift – eg 40mm prong x 1200mm long, with a safe working load of 200kg |  |
| **A 'Multi Lift' truck**<br><br>This manual or battery/electric operated lifter can be used to lift and move a wide variety of loads, depending on the selected attachment type.<br><br>Options include:<br>• A custom-made prong, suited to lift rolls (manufacturer suggests a 950mm prong for a 1200mm long roll)<br>• A spool/roll manipulator<br>• A drum tipper |  <br><br>The Multi-lift illustrated to grip and rotate cylinders and long reels. This can also be fitted with a prong to lift rolls |

**Case study – Aids to reduce the need to manually handle fibreglass rolls**

A fibreglass supplier routinely moves and unrolls large quantities of fibreglass materials and then wraps the rolls in plastic. Previously they manually handled the rolls but found the following problems:

- heavy and awkward loads to lift
- risk of damage to the product
- time consuming

To solve the above problems the workers at the company developed a custom-made tool that has a mandrel that inserts into the core, and holds the roll in a horizontal position. This device allows material to be unwound from the roll and transferred onto other rolls for customers who require smaller quantities of the product. They also use a hydraulically operated trolley raised to the required heights to move the rolls around.

Benefits of the roll transfer device and the hydraulic trolley are:

- less labour is required
- less risk of damaging the product
- time saving

The mandrel to assist in moving product between rolls

**Further guidance**

- Work Health and Safety Act 2010
- Work Health and Safety Regulation, Safe Work Australia
- Draft Code Of Practice - How To Manage Work Health And Safety Risks, Safe Work Australia
- Draft Code of Practice – Hazardous Manual Tasks, Safe Work Australia
- Australian Standard 2359.1, 1995, Powered industrial trucks – General requirements
- Australian Standard 2359.2, 1985, Powered industrial trucks – Operation

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## MANUAL TASKS – Handling stern drives

### HAZARDOUS TASKS identified

Handling and working on stern drives is a commonly reported hazardous manual task in boat mechanics and maintenance work. The design of stern drives – with the engine just forward of the transom and the drive unit just outside the hull – often makes service and maintenance tasks of these units difficult.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

Stern drive units are heavy, and can often weigh well in excess of 100kg. Other factors making them awkward to lift and move are:

- unbalanced load
- shape is awkward to grip
- unit is greasy and slippery
- the fragile nature of the load

The law requires that risk associated with hazardous manual tasks must be eliminated or reduced.

### RISK CONTROL options

Moving stern drive units can be made significantly safer, easier and faster through the use of various lifting aids and trolleys.

Some options to consider are commercially available units suited for different engine manufacturers, or custom-made jigs.

Commercially available stern drive lifters / trolleys:

From a catalogue

As seen in a marine workshop

Suppliers of stern drive lifters such as those above claim that they:

- can work on all makes and models
- allow one person to remove and install stern drives
- are useful on boats with integrated swim platforms
- avoid damaging boats while trying to hoist the drive unit
- can be built with extra long clamping arms and wheel base
- have a heavy duty lifting capacity for extra heavy drives
- are suited to dual propeller drives
- reduce injury risk

**Case study - Workshop makes stern-drive lifter from scissor-lift trolley**

A large service centre and workshop in Sydney has also developed their own stern-drive lifter, and theirs is based on an existing, rated scissor lift trolley. As you can see in the following images, the trolley has been extended and has a long bracket on the top to support the stern-drive unit.

A foot pedal allows the trolley to be raised or lowered to the height of the boat and also allows for an easy transfer of the unit to the workbench jig.

A custom made stern drive lifter and trolley

Use of an existing device that is rated and certified for specific tasks will be affected by any modifications. A competent person should assess the device to determine its lifting capacity. By properly assessing the lifting capacity this can assist in demonstrating WHS compliance.

**Case study – Workshop makes stern-drive lifter from hydraulic jack**

Because lifting and moving stern drives was awkward, the mechanics at one marina designed their own stern-drive trolley using a rated hydraulic jack for its base and had it fabricated by a qualified welder. The device has now been in use for 3 years and should last many more given its sturdy construction. Pneumatic tyres were selected so that the load can *"go cross country without bogging down and without losing the load!"* The cost of the materials used to build the trolley was negligible as it was made largely from existing material available from their well stocked workshop.

The custom made *'Leg Lifter 2000'* stern drive trolley

Use of an existing device that is rated and certified for specific tasks will be affected by any modifications. A competent person should assess the device to determine its lifting capacity. By properly assessing the lifting capacity this can assist in demonstrating WHS compliance.

**Case study – Using a commercial stern-drive trolley**

A company specialising in engine servicing utilises a wide range of lifting and handling aids to make tasks safer and easier for staff, including a commercially available stern-drive trolley. As the company is a distributor for one brand of engine it was cost effective for them to purchase the custom-made stern drive trolley. The trolley has been used for many years now and the manager claims it's one of the most useful aids he has bought.

Commercially available stern drive lifters. All lifting mechanisms should display the device's safe working load and all personnel should know the maximum safe lifting capacity.

**Further guidance**

- Work Health and Safety Act 2011
- Work Health and Safety Regulation
- Draft Code of Practice – Hazardous Manual Tasks, Safe Work Australia
- WorkCover NSW Plant Guide

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## MANUAL TASKS –Tipping and pouring from drums & other containers

### HAZARDOUS TASKS identified

Injury data from WorkCover NSW *(WorkCover NSW Workers Compensation Data 2004/2005 – 2008/2009)* shows that tipping and pouring liquids from heavy containers can be a hazardous manual task in the boating industry. In boat manufacturing and repair businesses many liquid substances are delivered in drums and various other large containers, including:

- resins – eg in 205 litre drums
- gelcoats
- catalysts
- cleaning products
- adhesives
- paints – eg in 20 litre containers

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

There are many risks associated with tipping and pouring from containers, especially when the containers are heavy and not well designed for pouring. Musculoskeletal disorders (MSDs), such as sprains and strains, can be caused by:

- high forces to tip the load
- sustained or 'static' forces to hold and balance the load while the liquid is being dispensed
- cumulative 'fatigue' in the muscles when the task is undertaken repeatedly through the day or week

In addition to the stress on the body's musculature are the potential chemical hazards from exposure, spills and splashback onto the worker. Product is also wasted in spills and from dribbles down the sides of the containers.

The law requires that risk associated with hazardous manual tasks must be eliminated or reduced.

**RISK CONTROL options**

The tasks of lifting the container and of manually tipping can each be eliminated through the use of various dispensers, pumps and/or through tipping and pouring aids. A side benefit to using these aids is that they are also more productive and reduce wastage. The following table illustrates some commercially available products to consider.

| | |
|---|---|
| **Dispensers**<br><br>Some suppliers provide bulk deliveries and have various options for dispensing depending on the clients' needs.<br><br>The advantages of these systems are:<br>• Reduced need to carry containers of chemicals<br>• Reduced need to lift and tip out chemicals<br>• Less risk of spills and human error<br>• More accurate measures, so safer<br>• Less chemical wastage |  <br><br>This dispenser is used for various lubricants and is used at company that has a large amount of plant and machinery to maintain. |
| **Hand Pumps – medium sized containers**<br><br>These are designed to be inserted into containers ranging from 15 to 25 litres.<br><br>For example, the pump illustrated is for kerosene, two-stroke mix and non-corrosive liquids. Output is 100mls on the lift stroke. It comes with a 1.8m delivery hose with non-drip metal nozzle and built-in hose hanger & nozzle bung adaptors. |  <br>An example of a hand pump used for small drums and other containers |
| **Drum Pumps**<br><br>The use of a drum pump can be an easy and effective way to decant liquids from vertical drums. Different pump designs are available to suit a range of liquids including motor oils, gear oils, petrol, diesel, kerosene, acetone, and other selected chemicals.<br><br>Pumps are designed to deliver measured amounts of the liquid, and this also reduces waste and the risk of spillage.<br><br>*NOTE: Be careful to choose a pump that suits the liquid as there are different pumps for fluids with high viscosity, high flammability liquids, and concentrated acids and alkalis etc. Check with your supplier and read the Safety Data Sheet.* |  <br>An example of a lever action pump designed for a 205 litre drum of oil |

| | |
|---|---|
| **Drum Decanters eg 'Safe Pour'**<br><br>There are devices to hold 15, 20 and 25 litre round or square containers in secure frames that pivot on a stand. These allow workers to tip the frame and container for precise and safe control of the pouring action while the stand supports the load's weight. |  <br>Safe Pour devices<br>in use in a workshop |
| **Drum Stands**<br><br>This simple stand is designed for supporting drums for tapping.<br><br>This aid allows the drum to be transferred between vertical and horizontal with less effort than doing it manually, and provides an easy means for decanting the product. |  <br>Drum stand with tapped drum |
| **Drum tippers**<br><br>There are various commercially available products to support and tip drums |  <br>  |

**Case study – Using tippers for gelcoats and flowcoats**

A boat manufacturer in regional NSW has a bank of tipping and pouring aids that are used for various gelcoats and flowcoats. They have used these devices for many years now and report that they save effort, save product and reduce some of the mess.

Decanting flow-coat.

**Further guidance**

- Work Health and Safety Regulation
- Draft ode of Practice – Hazardous Manual Tasks, Safe Work Australia
- Code of Practice for the control of workplace hazardous substances – WorkCover NSW
- Safety Data Sheets for all chemicals - checking requirements for their safe use and safe storage

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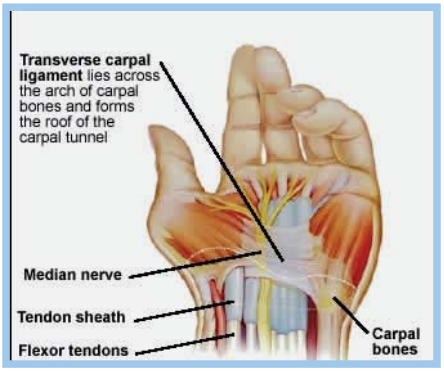
# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## MANUAL TASKS –Selecting hand tools and power tools

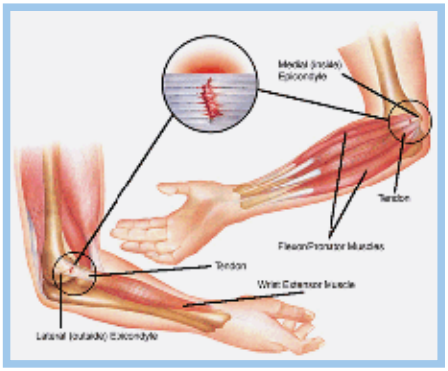
### HAZARDOUS TASKS identified

Injury data for members of the BIA ***(****WorkCover NSW Workers Compensation Data 2004/2005 – 2008/2009)* has revealed that most musculoskeletal disorders (MSDs) – in particular, sprain and strain injuries – are not from heavy lifting but are from using tools, which can be made worse when the task is done for long periods or done frequently.

'Wear and tear' on your joints, tendons and other soft tissues tends to develop slowly, over time, and it is the cumulative impact of this wear and tear that becomes a problem and can result in injuries such as tendinitis, tenosynovitis, 'tennis elbow', carpal tunnel syndrome, 'golfers elbow' etc.




In carpal tunnel syndrome, wrist movements and working with very bent wrist postures can result in inflammation in the narrow wrist space (eg from swelling of the tendon sheath). This swelling presses on the median nerve resulting in tingling, numbness and/or pain in the thumb side of the hand.



In tennis elbow and golfers elbow (or medial and lateral epicondylitis) there is inflammation and/or micro-tearing in the tendons that attach to the outside of the elbow, and this is from repeated and/or forceful movements at the wrist.

Good ergonomic design is crucial for tools that are used for long periods – such as those used for buffing and polishing a hull.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

Tools must be carefully selected to suit the user and their tasks. Some of the most common design problems that increase the risk of wrist and arm injury are those:

- with a grip span that is beyond the user's comfortable reach
- designed for use in the right hand, used by left handers
- that are heavy and are used for long periods, such as a heavy grinder or a buffer
- with triggers that must be held by one finger for long periods such as on a sander
- that require strong grip and transmit high impact forces such as hammers and nail guns
- that create vibration forces, such as impact wrenches ('rattle guns')
- that are poorly balanced, with the heaviest part of the tool in front of the wrist, as this requires additional force to grip the tool and stop it tilting forward
- with handle diameters not suited to the user, or those with prominent edges or are too short that press into the palm
- with a handle shape that requires the wrist to be in a bent or crooked position to hold and operate it
- with a handle surface that becomes moist / slippery when used.- especially for extended periods.

Use the checklist at the end of this document whenever you are choosing new tools to help you choose the most 'ergonomically designed' ones.

As well as tool design, other factors that increase the risk of using hand and power tools are the amount of time that you use the tool each day and each week, plus the general body postures that you need to use to do the task. Refer to guidance document ***'Manual Tasks – Working in awkward postures'*** for further information.

The law requires that risk associated with hazardous manual tasks must be eliminated or reduced.

**RISK CONTROL options**

See the checklist to assist you to choose tools with the best designs. The following table provides some suggestions of commercially available tools that members of the BIA members report are good to use.

**Case Study – New buffer is lighter and easier to use**

A fibreglass repair shop recently purchased a new tool system for grinders, polishers and buffers that is integrated with a mobile vacuum dust extraction system. Workers found that the tools with this system are not only much lighter than their old tools (for example the new buffer is 2.5kg as compared with the old one at 3.5kg) but also provide a better job.



A grinder/buffer with a dust extraction system

**Case Study – Easy ways to cut fibreglass mat**

When using scissors to cut fibreglass, it's critical that the scissors are well maintained and sharp. An experienced fibreglass fabricator and boat repairer advised that a 12"pair costing approximately $50 would be the minimum for suitable scissors.

When cutting is required repeatedly or undertaken for long periods, the cumulative strain on the wrist and fingers from opening and closing the scissor blades can contribute to serious and ongoing MSDs. Tools to reduce effort include manual rotary cutters that are wheeled through the material like pizza cutters, or battery operated tools with a similar rotating blade. A decent blade on these tools is critical to reduce effort and strain and provide a clean edge.


Manual rotary cutters

Battery operated rotary cutter

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A grinder/buffer with a dust extraction system

**Case Study – Pneumatic vs electric powered tools**

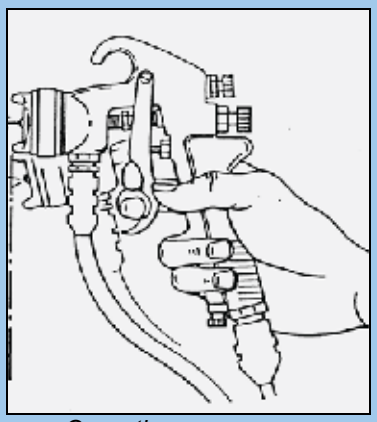
Experienced power tool users provide the following tips for selecting new tools:

***Electric tools***
- heavier units to lift
- no need for air leads, which tend to be stiffer, less flexible to move around
- there's "more to hold"
- are the more traditional tools, so there is a large range of products to choose from

***Pneumatic tools***
- lighter tools
- well suited to manufacturing/indoor service centres where the same tasks are done frequently
- good where the compressor is built-in and doesn't need to be lifted or pulled to the job
- need large compressor and long air lines
- compressors and lines need maintenance
- a limited number of tools can be used at once
- less danger of electrocution

**Case study – Tips for choosing & using a spray gun**

A scientific study into spray gun use revealed that users are at risk of serious hand and arm injuries from the potentially high grips and high trigger forces. Experienced users in the boating industry recommend spending the money to buy a quality gun that provides a good finish while being comfortable to use.



*Operating a spray gun*

The following tips are suggested to reduce fatigue and improve comfort:

***Trigger force***

Trigger force shall be as low as possible, since it decreases the load on the wrist and hand. The trigger force can be lowered through:

1. Decreasing of the spring pressure on the fluid needle through screwing the fluid-flowscrew anti-clockwise until the fluid needle reaches its maximal length of stroke. If there is a fluid leakage or the fluid flow gets too high, you can:
- decrease the fluid pressure from the fluid pump or fluid barrel, or
- control that the nozzle set is proper for the used type of paint and the desired flow (an unsuitable nozzle set may force the user to increase the fluid pressure), or

- change to a new nozzle set, or
- mount an external fluid regulator.

2. Grease the valve-mechanism

3. High-pressure spray guns in general have higher trigger force than other types of guns. To reduce trigger force on these devices you may:
- change to a high-pressure spray gun with adjustable trigger force, or
- change to a servo-assisted high-pressure spray gun, which decreases the trigger force, or
- change to a high-pressure spray gun with a four-finger trigger.

***Handle and trigger design***

The distance between the lower end of the trigger and the lower side of the front heel should be as short as possible.

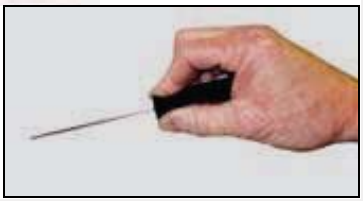
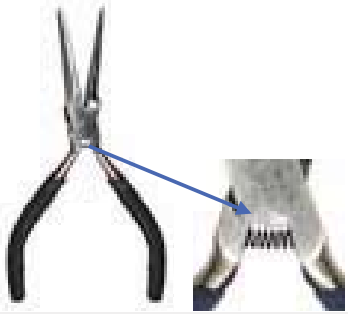
Choose as light and compliant gun-with-hoses as possible, since it decreases the load on the shoulder, the arm, and the wrist/hand. High-pressure spray guns are generally lighter than other spray guns with their hose. There are big differences in weight and compliance between hoses, and there are big ergonomic benefits to be made by changing hoses.

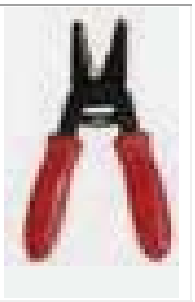
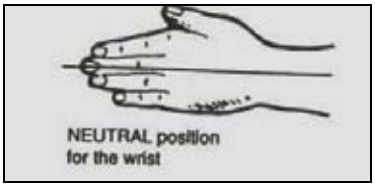
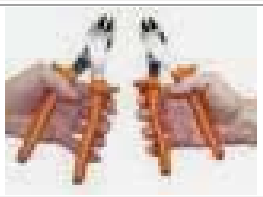
A method to increase the compliance of high-pressure spray gun outfits is to connect the gun to a thin and compliant hose (approx.1 m) which in its turn is connected to a thicker and less compliant, but more durable hose, which goes to the fluid pump.

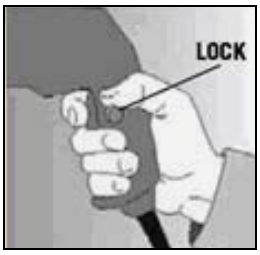
A method to increase the compliance of low-pressure and HVLP spray gun outfits is to use a combined paint and air hose.

Use rotating nipples (swivels) where possible, since they will make it easier to handle the gun. Choose also nipples as short as possible. A first measure is to check that the hoses are not fastened into the spray gun in such way that they tend to twist the spray gun when it is pointed forward.

(Advice adapted from Bjoring & Hagg 2000, image from ITW Finishing Technologies)

| Checklist for buying new tools | | |
|---|---|---|
| 1 | For single-handle tools used for power tasks:<br>Does the tool feel comfortable and have a handle diameter between 33 and 52mm? |  |
| 2 | For single-handle tools used for precision tasks:<br>Is the handle diameter of between 7 – 12mm so it can be held between thumb and fingers? |  <br>  |
| 3 | For double-handle tools used for power tasks:<br>Is the grip span at least 50mm when closed and<br>no more than 90mm when open? |  |
| 4 | For double-handle tools used for precision tasks:<br>Is the grip span no less than 27mm when closed<br>and no more than 75mm when open? |  |
| 5 | For double-handle tools:<br>Is the handle spring-loaded, allowing it to return to the open position? |  |

| Checklist for buying new tools | | |
|---|---|---|
| 6 | Is the tool handle *without* sharp edges or finger grooves? |  |
| 7 | Is the tool handle coated with smooth, soft, slightly compressible material that is also non-slip? |   |
| 8 | Can the tool be used while keeping your wrist straight?   |   |
| 9 | Can the tool be used with your dominant hand or<br>with either hand? |  |
| 10 | For high-force tasks:<br>Is the handle longer than the widest part of your hand (usually 100mm to 150mm)? |  |

| Checklist for buying new tools | | |
|---|---|---|
| 11 | Does any trigger requiring *force* and used for long periods have activation by thumb muscles and a locking mechanism?<br><br>For tasks requiring *precision* for prolonged duration, can the trigger be used by the ends of the finger(s) of either hand and have a locking mechanism (eg latch) which can be deactivated quickly in case of an emergency<br><br>Is the maximum pressure to activate the trigger excessive? (ie > 10N) |  |
| 12 | Do the vibrating tools have damping materials to absorb vibration?<br>Exposure to vibrating tools should be limited.<br>(Check manufacturer's specifications to ensure the tool complies with the Australian Standard 2763-1988 .) |  |
| 13 | Is the weight of precision tools as low as possible but not more than 1.75 kg?<br><br>Is the weight of power tools preferably about 1.12 kg, but no more than 2.3 kg? | |
| 14 | Is the weight of the tool balanced about the axis? | |

Tool selection advice adapted from:

- Mital A & Kilbom A, 1992, Design, selection and use of tools
- NIOSH, 2004, A guide to selecting non-powered handtools, 2004
- Saunders M, 2004, Ergonomics and the management of musculoskeletal disorders, Butterworth Heineman
- Code of Practice – Hazardous Manual Tasks
- Bjoring G & Hagg G, 2000, The ergonomics of spray guns: Users' opinions and technical measurements on spray guns compared with previous recommendations for hand tools, International Journal of Industrial Ergonomics, Vol 25, 405-414

**Further guidance**

- Work Health and Safety Regulation
- Draft Code of Practice – Hazardous Manual Tasks
- Australian Standard 2763-1988 Vibration and shock - Hand-Transmitted Vibration – Guidelines for measurement and assessment of human exposure.
- Specialist tool suppliers

*Note: This material provides a brief overview of some of the key issues and readers are directed to the further guidance material provided and to seek expert advice as required. Each business should utilise risk management principles, including consulting relevant workers, to ensure any control measures implemented are properly tailored to the site, workers and tasks.*

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

**MANUAL TASKS – Using trolleys to move tools and loads**

## HAZARDOUS TASKS identified

While trolleys are designed to reduce effort from lifting and carrying, poorly designed trolleys and trolleys not 'fit for purpose' have caused a range of musculoskeletal disorders (MSDs), including shoulder rotator cuff injuries, wrist injuries and back injuries.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

## RISKS to assess

When you are reviewing your existing trolleys or selecting new ones, consider:
- the tasks you want them for
- the workers who will use them, and
- the environments that they will be used in.

How well suited are the trolleys? How well do they reduce risks, or would different trolley designs be better suited to the tasks at your workplace?

Features of trolley designs that can contribute to MSDs include:

- trolleys that must be pulled, as this places strain on the shoulder's rotator cuff
- trolleys with castors that are used on rough or uneven floor surfaces
- trolleys that do not adequately support or contain the load, causing awkward postures and movements while holding / restraining load and pushing trolley simultaneously.
- hand-trucks that are used over long distances as the user is constantly supporting some of the load
- bin type trolleys where the user needs to bend and reach down into the bin to grasp items

- small wheels as they have a higher rolling resistance than larger ones, and are more affected by gaps, ridges and irregularities in floor and ground surfaces
- wheels made from hard materials such as cast iron and nylon used on surfaces with gravel or other small obstructions
- pneumatic tyres that are not well inflated, therefore increasing the rolling resistance
- trolleys that hold loads at a different height than their destination/origin, such as when a heavy load cannot easily be tipped or slid to or from its storage area
- trolleys that require the operator to stoop or to twist to reach the load being moved

*"Postures and movements that pose a risk if they are **repetitive** or **sustained** include:*

- ***reaching behind the body**"*

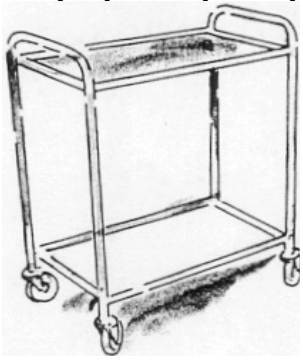
(from the draft Code of Practice – Hazardous Manual Tasks)

The law requires that risk associated with hazardous manual tasks must be eliminated or reduced.

**RISK CONTROL options**

***Trolleys for different tasks***

Ensure you have a range of trolleys that are designed for the different tasks undertaken. The table below illustrates some commercially available products.
Also see section on 'Optimal Design Features' for further information.

| Task requirements | Recommended trolley type |
|---|---|
| ✓ Tall items that must be picked up and set down at floor level<br>✓ Uneven terrain and over gutters<br>✓ Delivery work where the trolley itself is frequently lifted on and off the vehicle.<br><br>For example this trolley would suit moving tall loads such as cylinders, small drums, sail bags, buckets of chain etc.<br><br>  | **Two-wheel trolleys**<br>Two-wheel trolleys or "hand trucks" are versatile and widely used.<br><br>  <br>A D-handled, 2 wheeled trolley. The D-handle design also allows the load to be lowered to horizontal, and slid off if required |
| ✓ Moving large cartons<br><br>✓ Carrying a large volume of stock without the overall height becoming excessive<br><br>✓ Moving loads over relatively long distances without needing to support the trolley weight in the hands and arms | **Low-platform trolleys**<br><br>  |
| ✓ Holding loads at an easy height for transferring on and off<br><br>✓ Holding tools and equipment that are frequently used | **High-platform (traymobile) trolleys**<br><br>  |

| | |
|---|---|
| ✓ Holding and carrying loads of odd sizes and shapes that are not designed to be stacked, and to carry small, loose items<br><br>✓ Easy access to deep boxed trolleys can be achieved with opening sides or spring assisted inserts.<br><br>For example these trolleys would be suited to carrying tools, small tins of paint, bags etc | **Box-sided trolleys**<br><br>  <br><br>   |
| ✓ Very heavy loads are transferred between surfaces<br><br>✓ Loads are regularly moved<br><br>✓ Scissor lifts are made to safely take loads ranging in weight from 150kg to 1000kg | **Height adjustable lift tables / trolleys**<br><br>  |
| ✓ Where loads are routinely moved, it makes good economic sense to have a dedicated, special trolley.<br><br>✓ The trolley opposite is used to test boat trailer electrics, and holds a 12 volt battery and switching unit and a selection of tools. | **Special trolleys**<br><br>  |

| | |
|---|---|
| ✓ Heavy tools must be moved<br>✓ Distances can be long<br>✓ The surfaces suit wheels | **Tool bag & tool box trolleys**<br>  <br>  <br>  <br>There are a variety of commercially available rigid, trolley cases that can be used for tool storage. |
| ✓ Load is a unique shape – eg masts etc<br>✓ These may require custom-made solutions to best suit the load | **Mast trolley**<br>  |

- ✓ Folding trolleys are useful when you need to stow the aid in a car or in a boat etc.
- ✓ The trolley pictured is rated to 250kg, and the lighter version is rated to 125kg

**Folding, compact trolleys**

**Case Study – height adjustable trolley for transferring loads between bench and truck**

This height-adjustable trolley is used by a tradesman to move items from his workshop bench on and off his tray-top vehicle. He no longer needs to lift and carry heavy parts that he's been working on, but can slide them at waist height, unassisted. The trolley top is easy to raise using a foot pedal, and the trolley has a safe working load of 200kg.

Adjusting the trolley height with the foot pedal

**Case study – New red trolleys save time and effort**

One marine business sourced these box-sided trolleys for their tradespeople. A special feature of these trolleys is their hinged, drop down sides that provide easy access to the loads. workers who use these trolleys say that the large pneumatic tyres are easy to move over the hardstand area, and they hold enough tools and equipment to reduce the need for multiple trips back to the workshop. The trolley's drop-down sides provide easy access for any heavy loads.

The new red trolleys showing the detail of the hinge allowing the sides to drop down.

**Optimal design features**

The trolley should aim to minimise push/pull forces, including the forces required to initiate the trolley movement and then to sustain the trolley movement. The key methods to reduce these forces are to:

- reduce the total weight of the loaded trolley
- replace rough ground surfaces with smooth, hard surfaces
- use wheels with a lower rolling resistance such as those with large diameter wheels, hard tyres, and/or good bearings
- keep trolleys well maintained.

In addition, the loads in the trolley must be easy to access, without placing unnecessary strain on the back.

Past research has identified specific design features that can reduce effort and injury risk in trolley use (Lawson & Potiki 1994 & WorkCover 1996):

***Large wheel diameters***

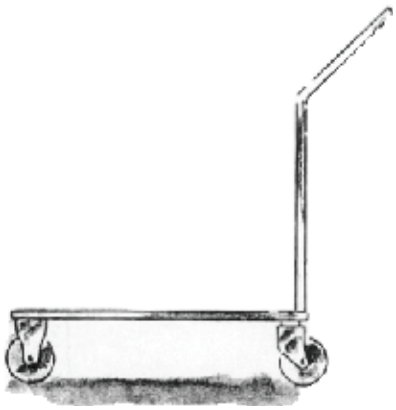
- A minimum diameter of 200 mm is recommended for all trolleys that have a laden weight over 200 kg or that are used outdoors.
- For other trolleys a minimum diameter of 125 mm is recommended.

***Platform suited to load***

- Where possible loads should be positioned so that they are easy to access with the hands between mid-thigh and waist height, and without the need to stoop or twist.
- A trolley with a platform around 800 mm high satisfies this requirement for handling heavy cartons

- A low platform, about 250 mm high, is better for handling items like pails of paint and small drums that have a handle at the top.
- Trolley platforms and storage areas that have smooth shelves without a lip allow the loads to be slid on and off easily.

***Good trolley handle designs***



- Handles that allow the trolley to be pushed (not pulled)
- Optimum height for a handle for pushing and pulling is between 910 mm and 1000 mm above the ground, depending on the height of the workers.
- In general, the handle should be a little below elbow height. A middle height of 950 mm is a good compromise for most people.
- Vertical handles, instead of a horizontal bar, allow users to find their own most convenient height and should be about 450 mm apart to ensure good control of the trolley.
- The handle should protrude at least 200 mm from the back edge of the trolley to provide room for a normal walking stride
- Trolleys with swivel castors at both ends may also have handles at both ends to maximise manoeuvrability in confined areas.

***Suitable bearings***

- Sealed precision ball bearings provide the lowest rolling resistance and are recommended for hand pushed trolleys that are used frequently or over reasonable distances
- Roller bearings are more commonly available for industrial castors but need periodic lubrication to maintain low rolling resistance.
- Plain metal bearings are acceptable on trolleys moved only infrequently and over short distances, but the rolling resistance is higher than ball or roller bearings and increases markedly if not regularly lubricated.
- Plastic (usually nylon or acetal) plain bearings are acceptable for light loads and do not require lubrication.
- Thread guards should be used to stop bearings from becoming clogged when used in environments where there are fibres and dust. They are also reasonably effective at keeping dust and debris out of unsealed bearings, therefore requiring less frequent maintenance.

***Brakes***

- Brakes on at least two wheels are important if the trolley has to be loaded/unloaded on sloping surfaces or where it is important to stop movement while transferring large items
- Castors are available with 'total brakes' that prevent swivelling of the castor as well as rotation of the wheel.

***Wheels and tyres for outdoor use***

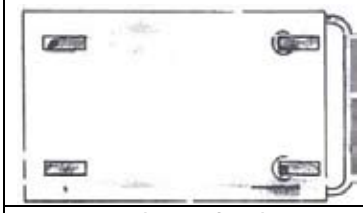
- Pneumatic tyres roll easily over bumps and unpaved surfaces and may be preferred for some outdoor applications. However, they have higher rolling resistance on smooth floors, and correct inflation is critical.
- Some softer tyre materials may have high friction on some floor surfaces and make it hard for the wheels to swivel into alignment when the trolley is started, resulting in a higher initial force.
- For high load applications it is important to try out different wheels on the floor where they will be used, prior to purchase.

***Wheels for indoor use on smooth surfaces***

- Hard materials such as cast iron and nylon have the lowest rolling resistance on hard smooth surfaces such as concrete and are suitable in industrial applications provided there are no obstructions such as stones or waste.

**Wheel / Castor layout**

Different wheel and castor arrangements will affect the trolley's use, with different designs suited to different tasks and different environments. See the options in the following table.

| Wheel / Castor design | Best suited to: | Disadvantages: |
|---|---|---|
| *Four swivelling wheels* | ✓ Most manoeuvrable<br>✓ Can be moved in any direction<br>✓ Short distances in congested or confined spaces on level floors | Not so well suited to long distances as it requires more effort to steer than other arrangements.<br><br>On sloped surfaces it may tend to drift sideways and require twisting effort to maintain straight travel.<br><br>Less stable than two swivelling wheels |
| *Two swivel, two fixed wheels*<br>  | ✓ Best suited to long distance pushing and sloped or uneven surfaces. | The swivelling wheels should be at the handle (rear) end of the trolley so that you can steer by a light sideways force rather than a more hazardous twisting force. |
| *Four swivel, two fixed centre wheels*<br>  | ✓ Best for long trolleys. The trolley pivots in its own length and is easy to steer around corners in passageways | Is not easily manoeuvred into a corner or parked against a wall. |

**Further guidance**

- Work Health and Safety Regulation
- Draft Code of Practice – Hazardous Manual Tasks, Safe Work Australia
- Guidelines for Design and Selection of Trolleys, in BackWatch Collections, WorkCover NSW 1996
- Research Report: Development of Ergonomic Guidlelines for Manually-Handled Trolleys in the Health Industry Lawson J & Potiki J., 1994, (Unpublished). Central Sydney Area Health Service & Worksafe Australia.

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# BEST PRACTICES FOR HIGH RISK TASKS

## MANUAL TASKS – Handling very heavy loads

### HAZARDOUS TASKS identified

In both the maintenance and manufacture of boats, very heavy loads such as engines, gear boxes, masts, rudders, centre boards and lead keels need to be manoeuvred in and out of the boat and/or within the workshop and other work areas.

### RISKS to assess

Features of heavy loads that contribute to the risk of musculoskeletal disorders (MSDs) include the load being:

- unbalanced
- large
- fragile
- have no hand holds or attachment points
- require moving within small access points
- awkward shapes and sizes
- greasy and slippery
- having to be held away from body (eg fibreglass rolls)

The law states that risks associated with hazardous manual tasks must be eliminated or reduced.

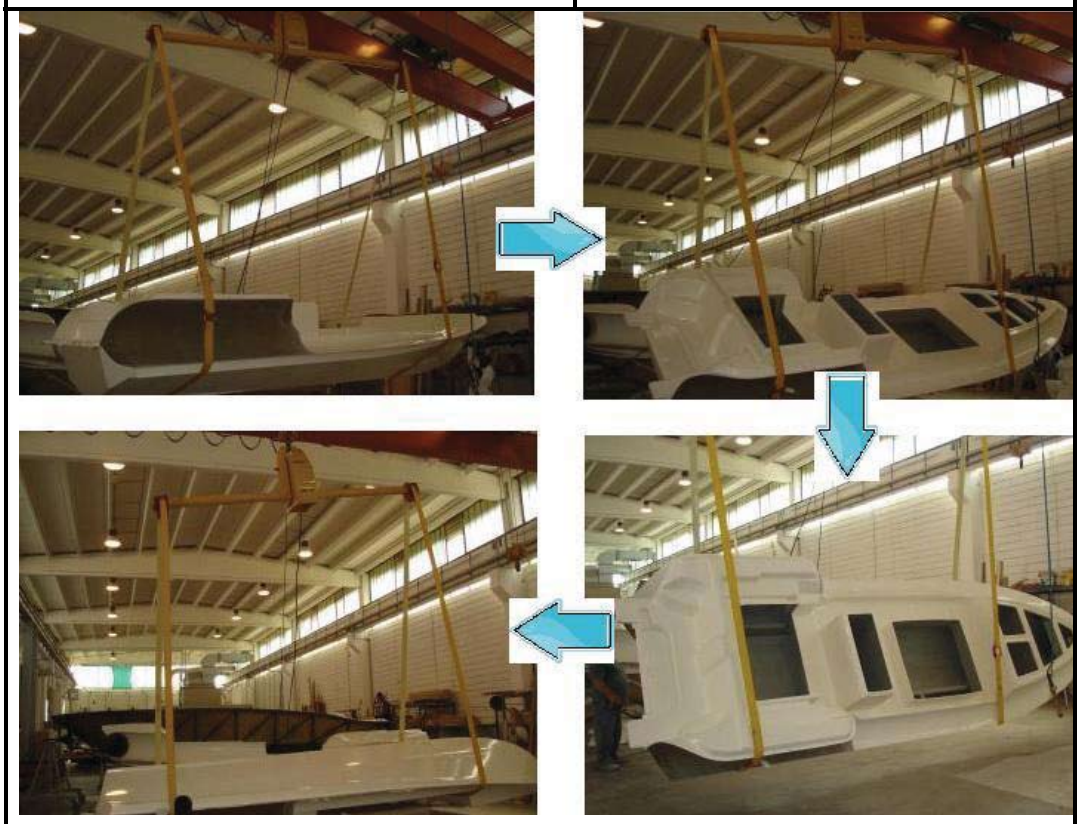
### RISK CONTROL options

Visits to marinas and marine workshops revealed a range of options for reducing the human effort in moving very heavy loads - from simple chain blocks to various crane systems and boat-turning devices. A range of commercially available and custom made devices are illustrated in the following table.

| | |
|---|---|
|  |  |
| Commercial engine lift – folded for easy storage | Custom-made engine lift utilising a rated winch |

Commercial engine lift


Engine stand showing the certification plate with the safe working load



**Load Turner – Pal-Turn**

The above sequence of photos shows a commercially available 'load turner' in operation. This device uses either straps (for loads up to 20 tonnes) or chains (loads up to 45 tonnes) to lift and rotate unusually shaped loads such as boats.

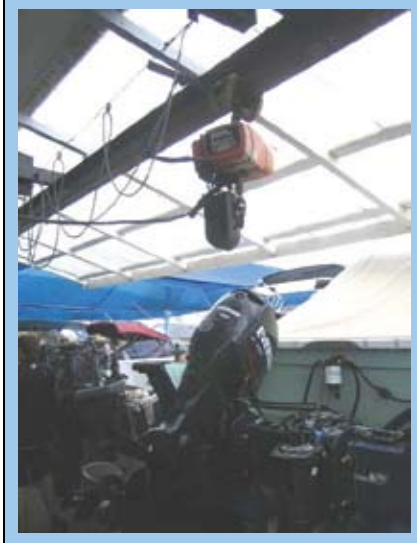

Manufacturer's supplied lifting attachment allowing the use of the above engine lifts

**Case study – Monorail saves time and effort for mechanics**

The manager at a regional marine workshop identified that lifting and moving engines, gearboxes and large outboard motors was not only awkward and dangerous but was also slow (taking at least 2 people to lift and manoeuvre them).

After some preliminary design ideas and material specifications checks, the manager constructed a clever 'monorail' system. This consists of an overhead track that runs in the workshop and extends out to a covered area, including over their test tank.

This innovation has resulted in much safer and easier handling and allows staff to work more efficiently too.



Overhead monorail system within the workshop and extending outside, above the test tank

**Further guidance**

- Work Health and Safety Act 2011
- Work Health Safety Regulation
- Code of Practice – Hazardous Manual Tasks
- WorkCover NSW Plant Guide

Note: This material provides a brief overview of some of the key issues and readers are directed to the further guidance material provided and to seek expert advice as required. Each business should utilise risk management principles, including consulting relevant workers, to ensure any control measures implemented are properly tailored to the site, workers and tasks.

# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## MANUAL TASKS – Handling very heavy loads

### HAZARDOUS TASKS identified

In both the maintenance and manufacture of boats, very heavy loads such as engines, gear boxes, masts, rudders, centre boards and lead keels need to be manoeuvred in and out of the boat and/or within the workshop and other work areas.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

Features of heavy loads that contribute to the risk of musculoskeletal disorders (MSDs) include the load being:

- unbalanced
- large
- fragile
- have no hand holds or attachment points
- require moving within small access points
- awkward shapes and sizes
- greasy and slippery
- having to be held away from body (eg fibreglass rolls)

The law states that risks associated with hazardous manual tasks must be eliminated or reduced.

The law requires that risk associated with hazardous manual tasks must be eliminated or reduced.

### RISK CONTROL options

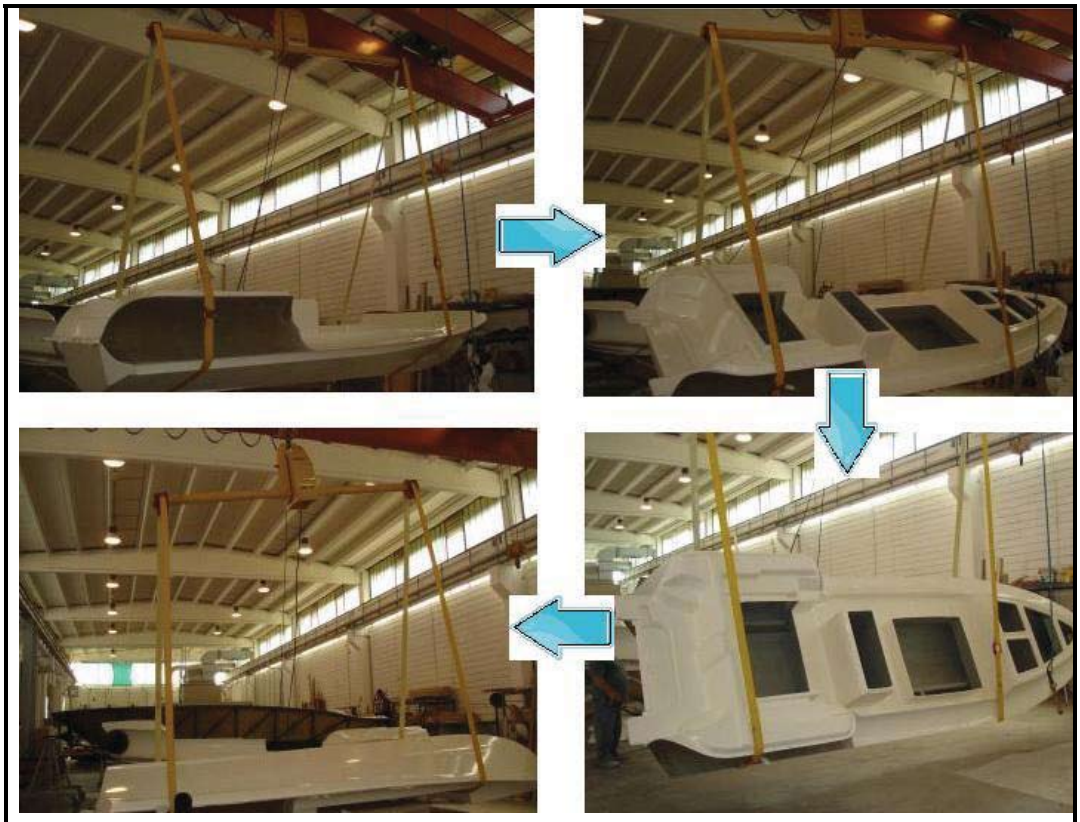
Visits to marinas and marine workshops revealed a range of options for reducing the human effort in moving very heavy loads - from simple chain blocks to various crane systems and boat-turning devices. A range of commercially available and custom made devices are illustrated in the following table.

Commercial engine lift – folded for easy storage


Custom-made engine lift utilising a rated winch

Commercial engine lift


Engine stand showing the certification plate with the safe working load



**Load Turner – Pal-Turn**

The above sequence of photos shows a commercially available 'load turner' in operation. This device uses either straps (for loads up to 20 tonnes) or chains (loads up to 45 tonnes) to lift and rotate unusually shaped loads such as boats.

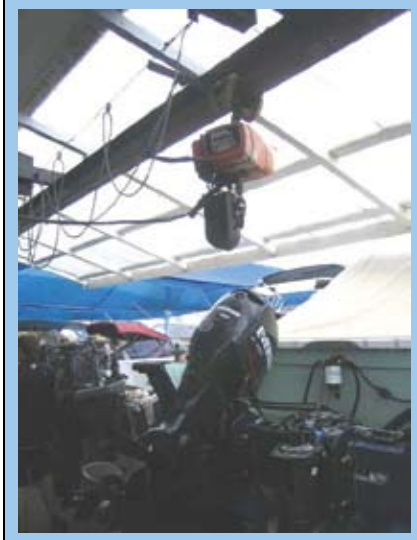

Manufacturer's supplied lifting attachment
allowing the use of the above engine lifts

**Case study – Monorail saves time and effort for mechanics**

The manager at a regional marine workshop identified that lifting and moving engines, gearboxes and large outboard motors was not only awkward and dangerous but was also slow (taking at least 2 people to lift and manoeuvre them).

After some preliminary design ideas and material specifications checks, the manager constructed a clever 'monorail' system. This consists of an overhead track that runs in the workshop and extends out to a covered area, including over their test tank.

This innovation has resulted in much safer and easier handling and allows staff to work more efficiently too.



Overhead monorail system within the workshop and extending outside, above the test tank

**Further guidance**

- Work Health and Safety Act 2011
- Work Health and Safety Regulation
- Draft Code of Practice – Hazardous Manual Tasks, Safe Work Australia
- WorkCover NSW Plant Guide

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## MANUAL TASKS –Working in awkward postures

### HAZARDOUS TASKS identified

The term 'manual tasks' often makes people think of heavy lifting tasks, but sprains and strains and other forms of 'body stress' that contribute to musculoskeletal disorders (MSDs) can also be caused by postures and movements where there is **no** load and **no** lifting.

The injury data from the boating industry *(WorkCover NSW Workers Compensation Data 2004/2005 – 2008/2009)* show there were lots of injuries from people working in awkward postures, with some of the most hazardous tasks being:

- working on engines in small, restricted spaces
- grinding propellers
- working under trailers
- working under and around a hull and a keel detailing
- sanding and buffing, especially above shoulder height

These awkward postures can affect any areas - the back, neck, shoulder, elbows, wrists etc

*In one incident, while working in a cramped posture in an anchor locker to undertake repairs,- a worker developed back strain and was certified unfit to work for more than 10 weeks.*
*(WorkCover NSW Workers Compensation Data 2004/2005 – 2008/2009)*

The law states that risks associated with hazardous manual tasks must be eliminated or reduced.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

**RISKS to assess**

Each joint has its ideal or strongest position, and also its weakest and most awkward positions. Problems are likely to develop if the joint's position causes the body's posture to be awkward and if the task:

- is done repetitively (eg the same movement is performed twice a minute or more often) and/or
- requires the position to be held still or uses a forceful grip for more than 30 seconds at a time – a 'static' posture.

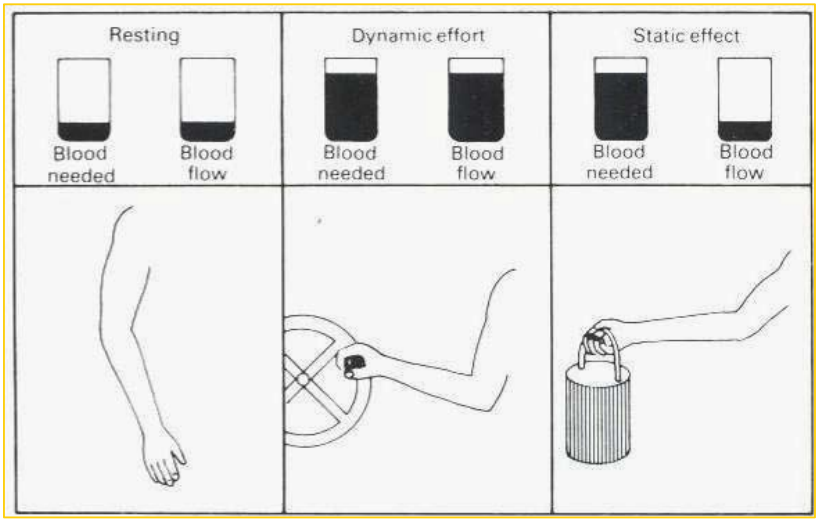
The extreme or 'end or the joint range' positions cause the worst body postures. Some of the most tiring and potentially damaging postures for the body are working with the:

- neck - bent backwards, bent forwards, or twisted
- back - bent backwards, bent forwards, or twisted
- shoulders – working with the hands behind the shoulder or above shoulder height
- arms – reaching a long way from the body
- wrists – bent to any extreme – backwards, forwards or sideways
- hands and fingers – very wide grip, very small grip, using force
- knees – bent to more than 90 degrees

**Why is 'static' work more demanding than 'dynamic'?**

In dynamic (active) work the muscles are moving a joint and the muscles contract then relax then contract, relax etc. This rhythmic movement acts to pump blood around and allows the exchange of blood flow, nutrients and muscle wastes.

In contrast, with static work there is no movement, and the muscles supporting the joint or joints remain in a contracted state. The internal pressure of the muscle tissues compresses the blood vessels and reduces blood flow to the muscle, resulting in a reduction of oxygen and nutrients reaching the muscle cells and causing the waste products to accumulate in the muscle.




(Grandjean 1988)

While static positions are a common requirement for many tasks, it is when the postures are *frequently* required and the postures are held for *long periods* that chronic problems can develop in the muscles. These changes can include a chronic reduction in local oxygen concentration, swelling within the muscle, and complex biochemical changes and degenerative changes affecting joints, muscles, ligaments and nerves These responses are an example of the 'cumulative trauma' that can develop in the musculoskeletal system.

Some of the symptoms that you may experience from cumulative trauma to your musculoskeletal system include:

- Stiffness
- Tingling
- Clumsiness
- Loss of coordination – dropping things unexpectedly
- Loss of strength
- Changes in temperature
- Numbness
- Pain
- Skin discolouration
- Weakness
- Muscle wasting

'Long board' sanding

In 'long board' sanding, there is a combination of both static muscle work and dynamic muscle work. There is static work by the fingers to grasp the board firmly, and dynamic work to move the board. Working above shoulder height (as illustrated) generally requires high levels of static work in the shoulder and neck musculature to keep the arms elevated and these areas can rapidly fatigue. Muscles need some 'recovery' time between these static contractions to replenish the blood supply and to remove the build up of waste products.

The law requires that risk associated with hazardous manual tasks must be eliminated or reduced.

**RISK CONTROL options**

Given the problems with static postures and awkward postures, the main thing to do is to minimise your exposure to them.

**Adjust the work area**
The best way to reduce the need for awkward postures is to adjust the work area as much as possible. So if you need to work with your arms reaching over shoulder level, even a small increase in your height for easier reach can make a significant difference to the impact on the shoulder joints and the strain on the rotator cuff.

**Improve the job design**
Where awkward postures are inherent in certain jobs – such as working in small spaces in a boat's hull etc – try to design your work to provide a range of tasks each day and through the week to allow for variations in postures and variations in the type of muscle work. This may include spending some periods in the awkward and/or static postures, but frequently interspersing those tasks with other tasks where you can be working in a more comfortable, upright and symmetrical posture.

These 'other' tasks may include physical tasks (such as standing and working at a bench) or lighter/more sedentary tasks (such as catching up on paperwork, getting organised for the next job, returning phone calls etc). Research has shown that people are most productive and efficient when they have tasks that provide a variety of physical and cognitive demands, rather than doing one task all the time.

**Do tailored exercises**
There are benefits in doing regular stretches and exercises. The stretches and exercises should be tailored to the posture you have been in, so if you have been working in a very forward flexed posture, do the opposite – and allow your back to slightly extend backwards. Where you have been doing a lot of gripping, it's good to extend your fingers and hold them in an outstretched position. With any exercises or stretching it's important to be doing it correctly and to suit your own body and any past injuries etc, so it's always recommended to see a health professional for tailored advice.

**Case study - Rolling on paint vs spraying**

Using a paint roller to anti-foul a large hull can be time-consuming, and also requires some very awkward postures to reach underneath the vessel. A marina manager described significant savings in terms of both time and effort when comparing roller painting anti-foul on a boat as compared with spraying the paint. The manager estimated he could spray a boat in 30 minutes or roller it in 3 hours. He changed from rolling to spray painting after developing a back injury as he finds that spray painting is much less stress on his back.

While spray painting may place less strain on the back, there can also be musculoskeletal stress from spray gun triggers and grips. See guidance note *'Selecting tools'* for tips on spray gun use. Spray guns also bring additional considerations in terms of air pollution, risk of overspray, an increased amount of preparation for the task (eg masking up), and additional painting skills to achieve an even coverage and a good finish. .

Other ways to reduce awkward postures in roller painting are to use various extension handles, with one operator finding pool poles to be well suited to some reaching tasks.

Applying paint with a roller

Applying paint with a spray gun

**Further guidance**

- Work Health and Safety Act 2011
- Work Health and Safety Regulation
- Draft Code of Practice – Hazardous Manual Tasks, Safe Work Australia
- Grandjean E, 1988, Fitting the task to the man – a Textbook of Occupational Ergonomics, Taylor & Francis

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## MANUAL TASKS –Why team lifting is *not* recommended

### HAZARDOUS TASKS identified

Injury statistics *(WorkCover NSW Workers Compensation Data 2004/2005 – 2008/2009)* from the boating industry show that team handling or 2 person handling methods can be very hazardous.

The draft Code of Practice - Hazardous Manual Tasks states:

***Team lifting…. "should only be used as an interim control measure"***

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

Team lifting can increase the risk of musculoskeletal disorders (MSDs) if:

- there is a lack of coordination of the lift, eg do we lift *on* 3 or *after* 3?!
- there are people of different height, with some needing to lift in a bent posture, and others working at or above shoulder height
- one person is walking backwards and twisting to see, or both moving with the spine twisted sideways
- the load is unevenly carried, with one end taking excessive weight
- the load cannot be held close to each person's body, causing an increased biomechanical disadvantage
- workers do not exert force simultaneously
- people lose their grip or their footing, placing sudden and high forces on the remaining worker/s
- performed on steps or on a slope where most of the weight will be borne by handlers at the lower end

The law requires that risk associated with hazardous manual tasks must be eliminated or reduced.

**RISK CONTROL options**

As with all hazards the law requires that you eliminate or control the risks.

The priority is to eliminate the need to lift, or to redesign the task to allow the use of mechanical equipment. Team lifting is considered a 'low level' control on the Hierarchy of Control as it is less safe and less reliable in controlling the risks.

For specific advice regarding safer alternatives to team lifting, refer to the guidance material on some common lifting situations that occur in the boating industry:

- Handling blocks for standing boats
- Handling drums
- Handling fibreglass rolls
- Handling stern drives
- Tipping and Pouring from drums and other containers
- Handling very heavy loads
- Working in awkward postures

However where a team lift is used in an emergency situation or as a temporary interim control measure, the technique is critical. It is essential to match workers, co-ordinate and carefully plan the lift.

The person organising the lift must:

- select any available aids such as slings, trolleys, lifting bars etc to assist
- plan the route, making enough space and avoiding steps and stairs
- select a suitable number of people of similar height and capability, based on the load weight, size and awkwardness (choosing more rather than less people)
- prior to commencing, brief the group on the task and their responsibilities during the lift
- check training in team lifting has been provided and the lift rehearsed, including the use of aids as well as what to do in case of an emergency
- inform the group of the call or signal for the lift to ensure good coordination

The people assisting in the lift must, where possible

- orient their bodies to avoid twisting and bending
- get a close and firm grip, keeping the load close to themselves

Also ensure that the load is realistic for the number of people. Research has shown that:

"*…the capacity of lifting teams is **less** than the summed capacity of individual team members….*" (Barrett RS & Dennis GJ, 2005)

**Case study – Is training in 'safe lifting' effective?**

To reduce injury risk companies often spend time and money training staff in 'safe lifting'. Much of this training has focused on the "straight back and bent knees" principles, and on lifting rather than any other manual tasks (eg repetitive hand tasks, pushing, pulling, carrying etc).

Research into teaching 'safe lifting' has now proven that teaching lifting techniques is ***not*** an effective intervention by itself. The risk isn't controlled and it relies on worker behaviours.

As the Code outlines, manual handling programs need to focus on design and engineering

controls to remove the need to handle in the first place. It is more effective and safer to spend time and effort in redesigning the task and/or getting good equipment.

Training is an important element to reducing body stress at work, but the most useful training is in how to identify, assess and manage risk and how to design a safe work area. Elements of this may include: how to select the right tools, how to set up the work area, how to use an engine hoist, how to design a work schedule with a suitable mix of tasks, how to identify the early signs of an injury and who to report this to.

**Further guidance**

- Work Health and Safety Act 2011
- Work Health and Safety Regulation
- Draft Code of Practice – Hazardous Manual Tasks, Safe Work Australia

**References**

Barrett RS & Dennis GJ, 2005, Ergonomic issues in team lifting, Human Factors & Ergonomics in Manufacturing and Service industries, Vol 15: 293–307.


# DEVELOPING WORKPLACE HEALTH & SAFETY GUIDANCE

for the

# RECREATIONAL & LIGHT COMMERCIAL BOATING INDUSTRIES

# WHS GUIDANCE MATERIAL

# SECTION 4

# WORKING IN CONFINED & ENCLOSED SPACE

# WORK HEALTH AND SAFETY ISSUE – CONFINED/ENCLOSED SPACES


**The Risk**

Undertaking work on or within a boat can lead to the hazard of working in a confined space. Exposure to chemicals or fumes, the presence of a flammable atmosphere or a lack of oxygen can present a serious risk to the safety of individuals employed in the boating industry.

Defining what is and what is not a confined space on a boat has been a task that members of the BIA have difficult due to the nature of the Business. A large number of tasks are undertaken within enclosed areas of a boat and depending on the nature of that task may turn a non confined space into a confined space.

The key risks when working within confined spaces in the marine industry are when a person is required to:

- Use a flammable liquid within an area.
- Use a chemical that generates gases
- Undertake a task that generate fumes e.g. welding
- Undertakes a task that uses up oxygen e.g. welding
- Disturbs stagnate water

**The consequence**

The consequences of not controlling the risks when working in confined spaces can be fatal or result in serious injury or impairment.

**The law**

Working in confined spaces is controlled by the WHS Act and Regulations and the Australian Standard 2865 Confined Spaces.

A confined space is defined as an enclosed or partially enclosed space that:

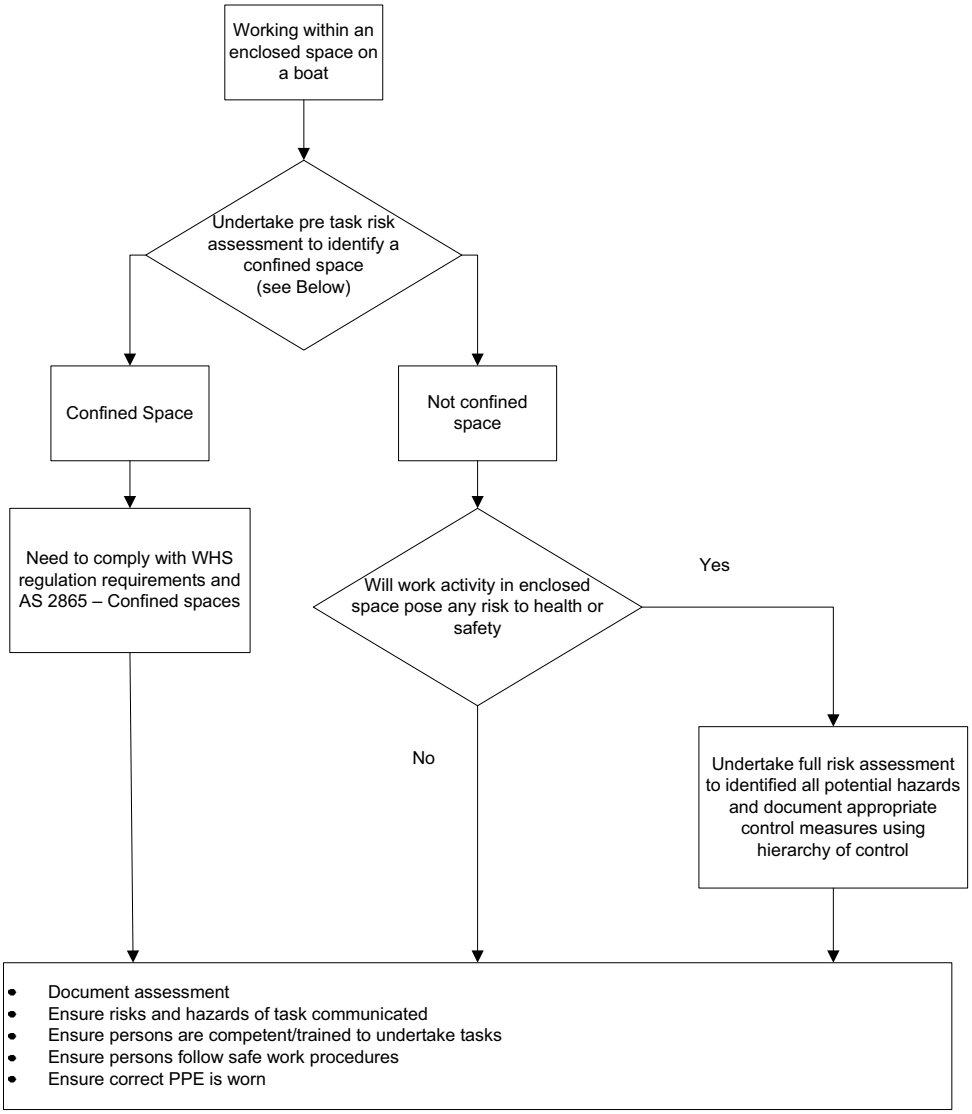
- is not designed or intended primarily to be occupied or entered by a person; and
- is, or is designed or intended to be, at normal atmospheric pressure while any person is in the space; and
- presents a risk to health and safety from:
  a) an atmosphere that does not have a safe oxygen level, or
  b) contaminants, including airborne gases, vapours and dusts, that may cause injury from fire or explosion, or
  c) harmful concentrations of any airborne contaminants, or
  d) engulfment.

Owners, Managers and Operators of marine facilities' need to identify confined or potential confined spaces within their workplaces. Safe Work Australia Code of Practice on Confined Spaces and Australian Standard 2865 Confined Space can help in the identification of a confined space.

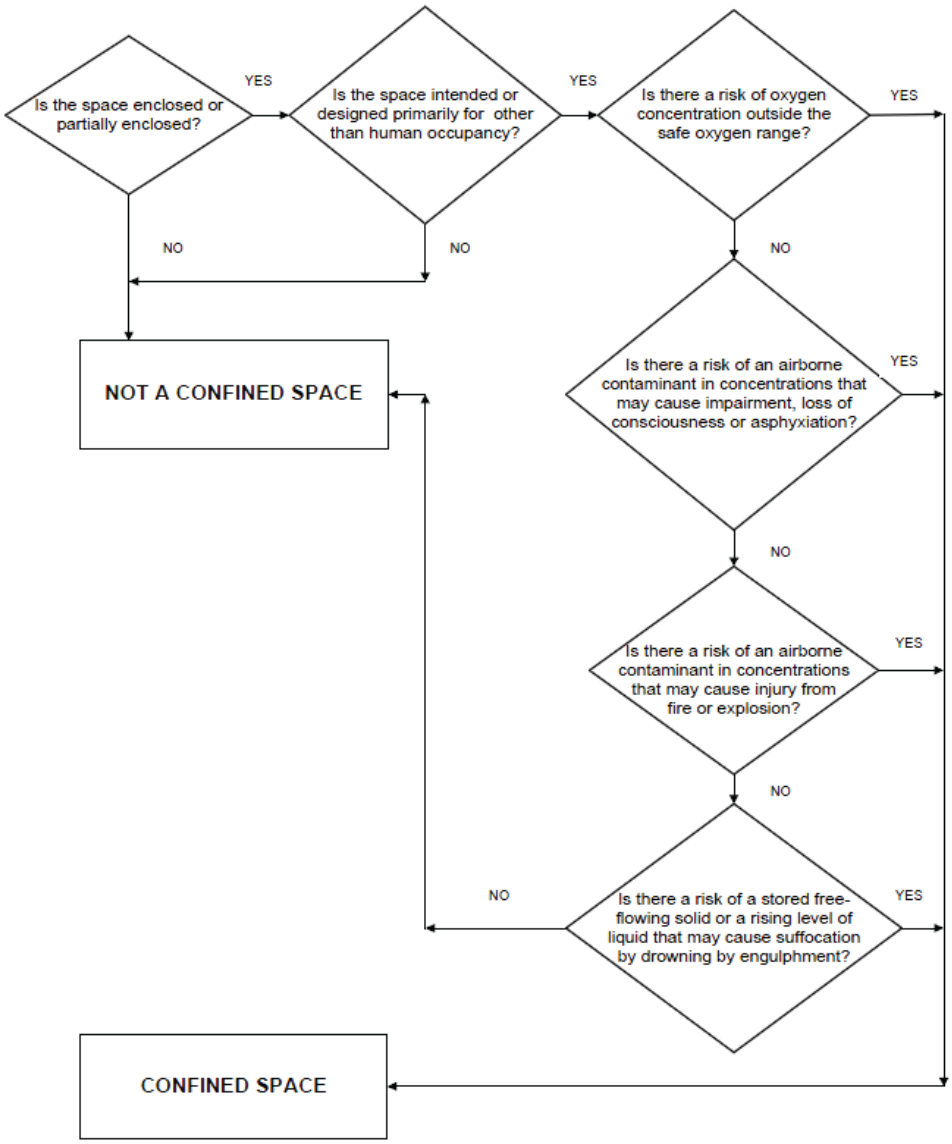
If an area is classified as a confined space then Owners, Managers and Operators of marine facilities' have to ensure that persons can work safely. This includes

- Identifying all the hazards and risks of working in a confined spaces

- Eliminating the need to work in a confined space
- If not able to eliminate the need to work in a confined space then minimising the risks
- Ensuring all persons entering the confined space are trained and competent
- The completion of a confined spaces entry permit
- Ensuring adequate emergency and rescues procedures are in place should something go wrong
- Keeping relevant documentation relating to confined space entry.



Confined space identification




WA Water Corporation

Even though a space may not be a confined space undertaking work in the enclosed spaces of a boat may potentially cause harm to workers. Tasks involving things such as the use of hazardous and/or dangerous goods, noisy equipment, moving heavy objects or working in cramped surroundings may injure or potentially kill workers. Owners, Managers and Operators of marine facilities' need to ensure that the risks of any tasks undertaken in a boat are identified assessed and controlled.

WHS Legislation covers:-

- The use of Hazardous chemicals and Dangerous goods in a workplace
- Exposure to noise
- Hazardous Manual task

The attached guidance notes provide information that may help operators in the recreation and light commercial boating industry reduce injuries and increase compliance with NSW OHS requirements. They also provide real examples of how NSW BIA members can classify and/or controlled the risk of working in confined spaces.

**Does your business comply?**

Check how well YOUR business is currently managing confined and enclosed spaces utilising the information in the guidance material for working in confined and enclosed spaces. These tools also outline the elements of a good safety management system for dealing with the risks of working in confined or enclosed spaces.

By following the guidance you will achieve better safety for all people on your site, and better compliance with the work, health and safety laws.

**References**

- Work Health and Safety Act
- Work Health and Safety Regulation
- Australian Standard 2865 – 2009 Confined Spaces
- Draft Code of Practice – Confined Spaces, Safe Work Australia
- Code of Practice – Control of Workplace Hazardous Substances – WorkCover NSW
- Dangerous goods and hazardous substances - Chemicals in the workplace Fact Sheet – WorkCover NSW
- Code of Practice - Noise management and protection of Hearing at work – WorkCover NSW
- Draft Code of Practice – Hazardous Manual Tasks Safe Work Australia

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## Defining a confined space

**HAZARDOUS TASK Identified**

WHS legislation defines a confined space as enclosed or partially enclosed space that:

a) Is not designed or intended primarily to be occupied or entered by a person: and
b) Is at normal atmospheric pressure; and
c) Presents a risk to health and safety from:
   I. an atmosphere that does not have a safe oxygen level; or
   II. contaminants, including airborne gases, vapours and dusts that may cause injury from fire or explosion; or
   III. harmful concentrations of any airborne contaminants; or
   IV. engulfment.

Many areas aboard a boat could potentially be classified as a confined space depending on the nature of the tasks being undertaken. Some areas may change from a safe work environment to a confined space depending on the task being undertaken.

Owners, managers and operators of marine sites are required to assess the risks of the tasks being undertaken and if an area on a boat is classified as a confined space then there is a need to comply with WHS legislation and the Australian Standard relating to confined spaces.

Any space onboard a boat that is intended or designed primarily for human occupation is not classified as a confined space. This would include areas such as cabins, deck houses, heads, walk in engine rooms etc.

Some spaces onboard boats are not confined spaces when used for their intended purpose but may become confined spaces when certain tasks are undertaken. This may included underfloor engine compartments, inspection compartments etc.

Some spaces onboard boats are confined spaces. This would include fuel tanks, bilge spaces, behind collision bulk heads etc.

During the construction of a boat most spaces would not be considered confined spaces, however, there would be a need to control exposure to chemicals used in construction such as styrene, acetone and welding fumes.

Consultation is a legal requirement and an essential part of managing health and safety risks.

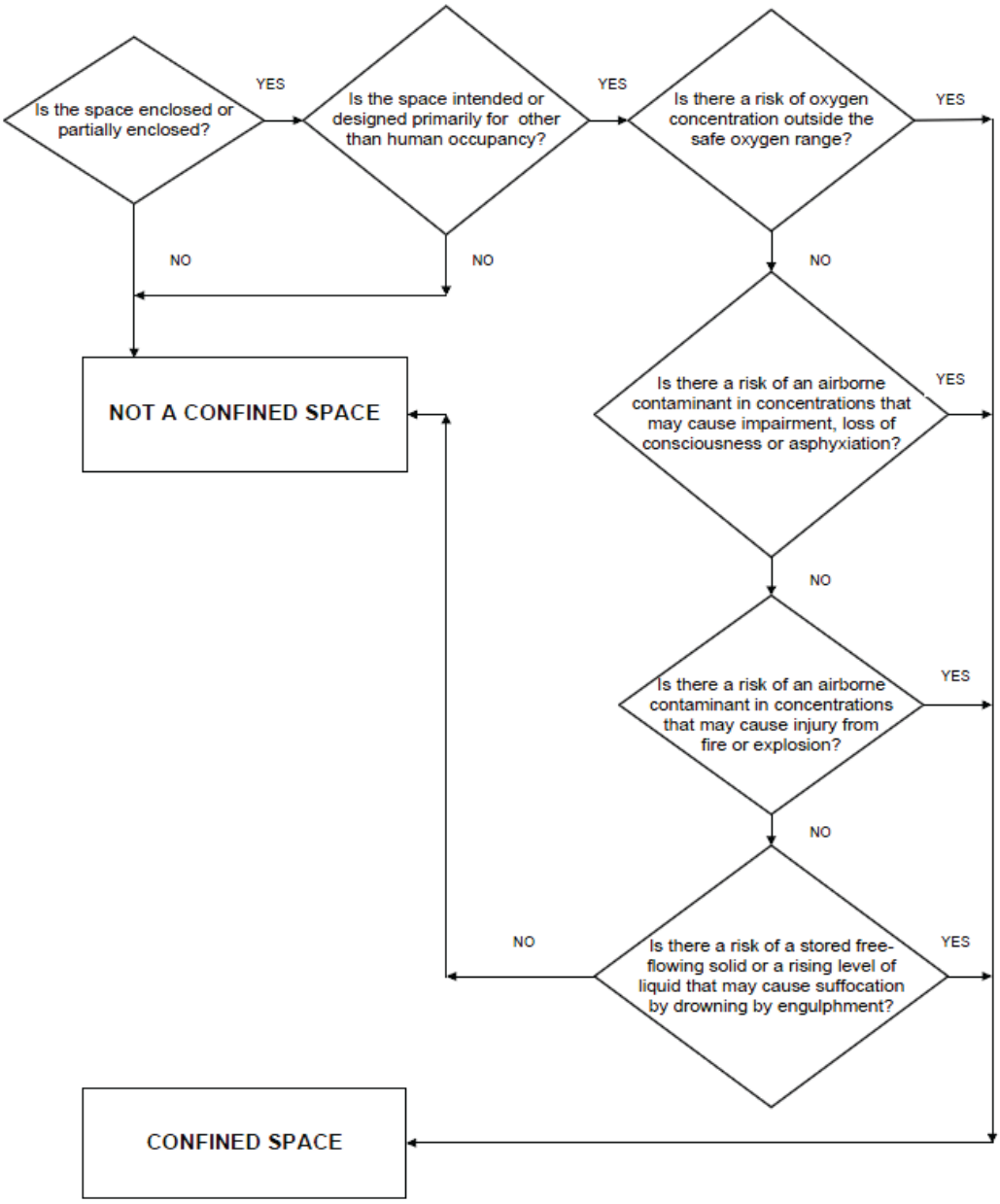
A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work.By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely

**RISKS to assess**

Check the following to see if you are likely to be working in a confined space:-

- Is the space where you are working intended to be occupied/used by a person?
- Are there any likely contaminants present in the space? e.g. fuel vapours
- Are the tasks being carried out likely to create fumes? e.g. welding
- Is there a risk of an explosion or fire? e.g. using flammable substances, using electric power tool
- How do you get in and out of the space?

Confined space identification



**RISK CONTROL options**

Below are some typical boat spaces as examples of what could be classified as a confined space and what is not classified as a confined space.

| | |
|---|---|
|  | Walk in engine room.<br><br>• Intended for human occupation<br>• Not a confined space.<br>• Need to assess risks when undertaking tasks using chemicals or hot work |
|   | Engine room with fixed access.<br><br>• Intended for human occupation<br>• Not a confined space.<br>• Need to assess hazards of entry e.g. potential fuel vapours, exhaust gases<br>• Need to assess task being undertaken in engine room |
|   | Engine compartment access.<br><br>• If being used for intended purpose i.e. switch over battery isolators, maintain stern gland, and inspect fluids in engine not a confined space.<br>• Need to assess risks of access the area e.g. potential fuel vapours<br>• If undertaking work other than what access was intended for need to undertake risk assessment and determine if confined space |
|  | Cabin area<br><br>• Intended for human occupation<br>• Not a confined space<br>• If undertaking task using a hazardous or flammable substance need to undertake risk assessment |

| | |
|---|---|
|   | Storage locker<br><br>• Intended to be accessed by persons<br>• Not a confined space<br>• If undertaking tasks such a fibre glassing or solvent use need to undertake risk assessment. |
|   | Boat steerage inspection compartment<br><br>• If entering for intended purpose then not a confined space i.e. inspection of steering mechanism.<br>• If undertaking other task e.g. fibreglassing or hot work, potential confined space, undertake assessment to determine if a confined space. |
|  | Collision bulkhead entry<br><br>• Not intended for human occupation<br>• Potential contamination of air<br>• Potential confined space – Need to assess risks before entry<br>• Undertaking tasks using hazardous substance need to comply with confined spaces requirements |

**Further guidance**

- Work Health and Safety Regulations
- Draft Code of Practice – Confined spaces, Safe Work Australia
- Australian Standard 2865- 2009 - Confined Spaces

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## Working within a confined space

### HAZARDOUS TASK Identified

A confined space is defined as an enclosed or partially enclosed space that:

a) Is not designed or intended primarily to be occupied or entered by a person: and
b) Is at normal atmospheric pressure; and
c) Presents a risk to health and safety from:
   I. an atmosphere that does not have a safe oxygen level; or
   II. contaminants, including airborne gases, vapours and dusts that may cause injury from fire or explosion; or
   III. harmful concentrations of any airborne contaminants; or
   IV. engulfment.

Many areas of a boat are enclosed but not all are confined spaces. There is a need to identify whether a space on board a boat is a confined space (See Defining a confined space). Once a space is classified as a confined space there is a need to manage the risk associated with working in that confined space. Where reasonably practicable, the risks of working in a confined spaced should be eliminated through redesign of the work space, redesign of the tasks or the use of remote work processes. If the risks cannot be eliminated others means such as engineering controls e.g. ventilation and administrative controls e.g. procedures and training should be utilised to minimise the risks.

Working in confined spaces may cause serious injury and/or death.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work.By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely

### RISKS to assess

Check the following to see if you can work safely in a confined space:

- Can the need to work in the confined space be eliminated?
- Are there any likely contaminants present in the space? eg fuel vapours
- Are the tasks being carried out likely to create fumes? eg welding, fibre glassing
- Is there a risk of an explosion or fire? eg using flammable substances, using electric power tool, use of lights
- Is there enough oxygen or will the task being performed consume oxygen eg.Hotwork

- How do you get in and out of the space?
- How is communication with workers maintained?
- What is the noise level within the confined space?
- Is there a need for additional lighting?

**RISK CONTROL options**

WHS Legislation, Codes of Practice and Australian Standards require a risk assessment to be undertaken on work being carried out in a confined space. Owners, managers and operators of marine sites, in consultation with those undertaking the work, need to identify the risks of working in the confined space, the likelihood of the event occurring and the consequences if it occurred. The risks then need to be eliminated if practical or minimised. The risk assessment needs to be documented.

The risk assessment needs to be reviewed each time entry into the confined space is required to ensure that it is still covering all the hazards involved.

**When working within a confined space the requirements of Australian Standard 2865 – 2009 Confined spaces, needs to be adhered to**.

All persons must be trained and competent. Training should include:-

- Emergency Entry and Exit procedures
- First Aid
- Use of the personnel protective equipment (PPE) involved
- Lockout/tag out procedures
- Fire protection
- Monitoring equipment
- Communication Equipment

Before entering a confined space a documented entry permit needs to be completed and signed by the person controlling the entry. The Entry Permit will document the task being carried out, the control measures needed to allow entry into that confined space including PPE, the results of air monitoring within the space and any other precautions needed such as ventilation, barricades, signage etc. Records of entry permits must be kept for 2 years.

When undertaking work within a confined space a safety observer must be assigned to monitor those working in the confined space and initiate emergency procedures if required. The safety observer shall be:-

a) trained and competent in all relevant aspects of emergency response procedures, including how, when and what procedures will be initiated,
b) capable of being in communication with person inside the confined space which may include verbal, line of sight and/or two way radios, and
c) where appropriate, able to operate and monitor equipment used to control risk. This may include:
    a. operate atmospheric monitoring equipment which is used to monitor for the presence of harmful or flammable contaminants and oxygen levels;
    b. interpret monitoring results so that appropriate control or emergency response measures can be taken;
    c. operate and monitor ventilation equipment being used to provide continuous ventilation of the space; and
    d. operate and monitor other equipment, for example, fall protection/retrieval equipment and air supplied respirator airlines and related air compressors.

The observer should not enter the confined space in an emergency unless they are appropriately trained and is capable of using the equipment provided for rescue e.g. breathing apparatus.

All the requirements for entering confined spaces should be documented in written procedures and made available to those who have to work in and around confined spaces.

Consideration should also be given to the area around the confined space, including Issues such as:

- people falling through confined space entry points
- tasks being undertaken outside the confined space contaminating the space or
- exhaust from ventilating a confined space impacting on others needs.

**Case study - Utilising existing control measures on board a boat.**

Some boats already have ventilation systems installed that can be utilised to control the hazards of a confined space. Bilge blowers or extractor fans (such as below) could be utilised to remove contaminants from a space or create air flow to all allow fresh air into a space.


Boats may have gas detection systems installed (see picture below) that monitor levels of hydrocarbons within engine bays and other areas of the boat. These could be utilised in assessing the atmosphere of a space as part of a risk assessment into a work process. For entry into a confined space gas detection equipment must measure combustible gases, oxygen, carbon monoxide and hydrogen sulphide levels. All monitoring equipment needs to properly calibrated and regularly tested to make sure it is operating correctly

**Further guidance**

- Work Health and Safety Regulation – Confined Spaces
- Draft Code of Practice – Confined Spaces, Safe Work Australia
- Australian Standard 2865 – Confined Spaces
- National Core Training Elements for Safe Work in a Confined Space (NOHSC, 1996)

*Note: This material provides a brief overview of some of the key issues and readers are directed to the further guidance material provided and to seek expert advice as required. Each business should utilise risk management principles, including consulting relevant workers, to ensure any control measures implemented are properly tailored to the site, workers and tasks.*

*To ensure you comply with your legal obligations you must refer to the appropriate legislation. Information on the latest laws can be checked by visiting the NSW legislation website (www.legislation.nsw.gov.au).*

*This publication does not represent a comprehensive statement of the law as it applies to particular problems or to individuals or as a substitute for legal advice. You should seek independent legal advice if you need assistance on the application of the law to your situation.*

**EXAMPLE CHECKLIST**

**ASSESSMENT OF REQUIREMENTS FOR WORKING IN CONFINED SPACES**

| **Checklist** | **Yes/No (✓/×)** |
|---|---|
| Have employees been assessed for aptitude and fitness for task and confined space entry? | |
| Is there a system in place in compliance with the NSW WHS Regulation to ensure planning and supervision of work involving confined space entry? | |
| Have confined spaces been sign posted? | |
| Has there been an identification and assessment of all hazards associated with entering the confined space and performing the planned work? | |
| Are arrangements for rescue, first aid and resuscitation in place? | |
| Is a system in place to identify and control the number of persons entering the confined space? | |
| Is a system in place to identify the persons required outside the space to:<br>❑ maintain equipment essential for the confined space task<br>❑ ensure adequate communication with and observation of the persons within the confined space<br>❑ properly initiate rescue procedures | |
| Is there a system in place to identify, assess and control all proposed operations and work procedures, especially those that:<br>❑ may cause a change in the conditions in the confined space<br>❑ are unusual or non-typical<br>❑ include any personal protective equipment and mechanical or other equipment to be used | |
| Has the soundness and security of the overall structure and the need for illumination and visibility been assessed? | |
| Has the identity and nature of the substances that may be present in the confined space been confirmed? | |
| Has the availability and adequacy of :<br>❑ appropriate personal protective equipment<br>❑ protective clothing<br>❑ rescue equipment<br>for all persons likely to enter the confined space been assessed? | |
| Has the extent to which cleaning will be required in the confined space been assessed? | |
| Has the need for hot work to be undertaken within, or near, the confined space been assessed? | |

| **Checklist** | **Yes/No (✓/×)** |
|---|---|
| Have employees been trained in the following minimum requirements:<br>❑ Emergency exit and entrance procedures<br>❑ Use of applicable respiratory protection devices<br>❑ First aid including cardio-pulmonary resuscitation (CPR)<br>❑ Lockout procedures<br>❑ Safety equipment use<br>❑ Rescue drills<br>❑ Fire protection<br>❑ Communications | |
| Have the relevant legislation, regulations, Codes of Practice and Australian Standards been taken into consideration when selecting and using the appropriate fall arrest devices, safety mesh, scaffolding safety nets and guardrails? | |
| Is there an entry permit system in place that conforms to the requirements of AS 2865 – Confined Spaces? | |

# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## Working within enclosed areas on and around boats

### HAZARDOUS TASKS Identified

Although an enclosed area of a boat may not be a confined space, it may still pose a threat to the health and safety of individuals working in the area depending on the nature of the tasks being carried out.

The use of cleaning agents, undertaking welding, doing fibreglass work or the presence of petrol fumes can all potentially cause harm or, in extreme circumstances, death.

There is a need for owners, managers and operators of marine sites to assess the risks of the tasks being undertaken within the enclosed spaces on and around boats.

Employees can be working in enclosed spaces during the production of boats, during the maintenance of the inside of a boat and whilst undertaking work on the hull of a boat. Working within sheds can also pose risks to health and safety when certain tasks are undertaken.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

Check the following to see if you can reduce the risks of the tasks being undertaken in enclosed spaces:

- Does the task require the use of hazardous substances? Check the label or the SDS to see if it is a hazardous substance
- Does the task involve the use of flammable substances? Could a fire start or an explosion occur?
- Is there adequate ventilation? Do fumes need to be removed or fresh air brought in?
- Does the task involve hot work e.g. welding, braising or grinding.
- Is there going to be noise generated whilst undertaking the task?
- Are heavy or awkward objects being moved around?
- Does the task require workers to adopt awkward positions?

**RISK CONTROL options**

If you are going to use a hazardous substance or dangerous good whilst working on a boat it is important that you understanding the risks and hazards involved in using that substance.

Read the label carefully and obtain a copy of the Safety Data Sheet (SDS). An SDS contains important information of the safe use of the substance.

All dangerous goods are labelled with a coloured diamond indicating the harmful properties of the product e.g. flammable, corrosive, toxic etc.

All hazardous substances should be clearly labelled as hazardous and state the risks to health.

The SDS for a hazardous substance contains important health and safety advice about a hazardous substance including the makeup of the substance, the risks of using the substance, the type of safety precautions needed to use the substance safely, the first aid requirements is someone is exposed to the substance, emergency instructions on how to deal with a spill and disposal of the substance. A SDS should be obtained for all hazardous substances used on site and they should be readily available to those who may use the substance.

A risk assessment needs to be undertaken for the use of any hazardous substances to ensure adequate control measures are put in place to reduce the risk. The risk assessment should be carried out in accordance with NSW Code of Practice for the Control of Workplace Hazardous Substances and in consultation with the workers involved in carrying out the task. Risk assessments need to be kept for a minimum of 5 years.

Workers may be exposed to hazardous substances throughout the life cycle of a boat.

During the production of a boat workers may be exposed to styrene, acetone, welding fumes, paint vapours and solvents. The risk from using these substances increases when the working within a hull, when the hull and deck are joined and when undertaking production and fit out within the interior of a boat. Adequate ventilation needs to be provided and appropriate PPE should be worn. This should be identified during a risk assessment.

During the maintenance of a boat workers may be exposed to solvents, cleaning agents, paints, welding fumes, fuels etc. If protective coatings, such as paints, are being removed using heat then decomposition products can affect workers. Workers may be in an enclosed space when working below decks or in an area enclosed by covers or clears. Adequate ventilation needs to be provided and appropriate PPE should be worn. This should be identified during a risk assessment.

As part of a hazardous substances risk assessment consideration should be given to substituting a hazardous substance for a less hazardous one. Consulting with a marine products or chemical supplier to understand what other alternative products are available for use could result in a safer working environment.

**Case Sudy – Substitution of hazardous cleaning chemicals**

Acetone is a widely used chemical in the boating industry as both a thinner and a cleaner. Acetone is a highly volatile solvent that when used within an enclosed area of a boat without adequate ventilation can quickly produce a hazardous and flammable atmosphere.

A NSW boat manufacture has substituted acetone as a cleaning solvent with a less hazardous and volatile solvent in around 80% of their cleaning tasks in and around the boats they are producing. Substituing acetone with a less hazardous chemical has reduced the exposure of employees to acetone, reduced the likelihood of creating flammable atmospheres within boats and reduced the environmental impact of using solvents.

When assessing the suitablitity of substituting one chemical with another, consult with the chemical supplier, obtain a safety data sheet, conduct a risk assessment and ensure all exposed employees are trained in how to use the chemical safely.

During the maintenance of a boat an enclosed space may be formed due to the use of tarps or other protective material to protect the boat from weather, contain contaminants, protect the boat from other processes around etc. Working on a boat inside a shed may also increase the risks of a task and should be taken into consideration when assessing the risks of a task.

**Case study – Enclosed areas of a boat**



The enclosed areas of a boat include those areas below deck such as cabin areas, walk in engine rooms, storage areas etc. The presence of covers, tarps, clears, boat covers etc. may also make an area of a boat enclosed or restrict ventilation. This needs to be taken into consideration when assessing the risks of a working around a boat.


When undertaking work in an enclosed area of a boat a risk assessment needs to be undertaken beforehand to ensure that all potential risks are identified and appropriate control measures are implement. Tasks which may appear low risk when working outside of a boat, such as painting, cleaning or welding, may have an increased risk due to working in an enclosed space.

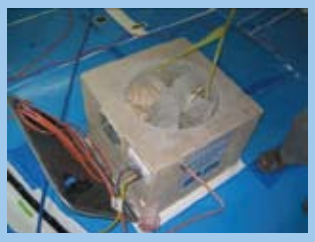
When working in an enclosed space using air movement to remove contaminants from the work area is a key control measure. Mechanical ventilation can be used to either extract the contaminants from the air or introduce fresh air to a space. Mechanical ventilation can take the form of inbuilt systems such as engine room and bilge blowers or portable units that can be moved from job to job. The ventilation can be used to remove a contaminant at the source, such as extracting fumes from a welding job, to remove contaminants from the surrounding area or to create air flow around or through an enclosed space.

As part of a pre task risk assessment the need for and the type of ventilation should be considered. Also if contaminants are being extracted, consideration should be given to where they are extracted to, so as to minimise the possible impact on others working around the area.

**Case Sudy - Ventilation in enclosed areas**

Various types of mechanical ventilation can be found in the recreational and light commercial boating industry.





In built ventialtion systems such as engine room extractors and bilge blowers can be used to increase air flow within enclosed spaces on boats. The use of external ventilation system can remove contaminants or provide clean air to a work environment. Inhouse designed fan boxes placed over a hatchway is also a way of increasing air flow through the hull of a boat and removing contaminants from the enclosed space. Any mechanical ventilation used should be suitable for the task ie. Ignition proof fans for use with flammable substances

The use of volatile or flammable chemicals in enclosed areas of boats has in the past led to catastrophic events. Cleaning agents, solvents and fuels used in the boating industry can be highly flammable and when vapours are generated within enclosed areas of boats, can lead to fires and explosions.

**Case Sudy – Use of flammable chemicals**

It has been widely documented in NSW, throughout Australia and the world that the use of flammable chemicals on boats can lead to serious injuries, loss of property and fatalities.



The above incident resulted from the use of a flammable substance (contact adhesive) by a lone worker within an enclosed area of a boat and then the

introduction of a ignition source (a vacuum). The incident resulted in the loss and damage of numerous boats, injury to the person undertaking the task and to those responding to the incident and potentially could have led to loss of life.

There is a need to understand and control the risk of using flammable chemicals aboard boats. A documented risk assessment should always be carried out before starting any task involving the use of flammable chemicals within the confines of a boat. What may seem to be a simple task in an open area can be highly dangerous in an enclosed area. During the assessment alternative chemicals should be look at to see if the flammable substance can be eliminated or substituted for a less flammable substance. There is a need to ensure adequate ventilation to remove vapours from the air to prevent exposure to hazardous substances and the develpment of an explosive atmosphere. Ignition sources such as smoking, elctrical equipment, lights, radios, extraction equipment etc. should be removed from the work area or only used if they have been rated for use in a flammable atmosphere. If flammable substances are to be used vapour detection systems should be used, such as flammable gas monitors, to ensure that a flammable atmosphere is not present. All persons undertaking the tasks need to be trained and competent in the use and handling of the chemicals and the control measures required to ensure the task can be carried out safely. Proper supervisory arrangements need to be inpace and emergency procedures documented and known.

When working with chemicals in enclosed areas of boats it is necessary to understand the nature of the chemical. Reading the label and SDS for a chemical before use and a risk assessment needs to be carried out before the task is started. Persons need to be trained in the safe use of the chemicals

Decreasing the risk of a fire or explosion can be achieved by:

- substituting the flammable chemical for a non flammable chemical,
- opening up the enclosed space to allow better ventilation,
- using mechanical ventilation to extract the flammable vapours,
- using gas detection equipment, whether fixed or portable, to detect flammable vapours,
- controlling ignition sources such as smoking and electrical power tools,
- ensuring lids on flammable chemical containers are closed,
- storing rags in sealed metal containers.

When assessing the risks of using flammable chemicals in an enclosed space ignition sources need to be controlled.

- Smoking should be banned from work areas.
- Mechanical extraction systems should be rated to work in flammable areas.
- Hot work such as welding, braising and grinding should not be carried out in the immediate vicinity
- Electrical equipment e.g. power tools, light sources, radios etc. should be tested and tagged and only used when the atmosphere is safe
- Engines should not be running

Internal combustion engines should not be used in enclosed spaces on boats. This would include portable petrol, diesel or gas powered generators, compressors, power tools etc. Using this type of equipment in an enclosed space can lead to the build up of toxic gases such as carbon monoxide and nitrogen dioxide. The use of internal combustion engines in enclosed spaces has caused fatalities. When using internal combustion engines around boats, such as on docks or on a deck of a boat, consideration should also be given to where the exhaust is directed. Toxic exhaust gases could be directed towards an enclosed space of a boat impacting on others working in the area.

The use of noisy equipment in enclosed spaces will cause hearing loss if not properly controlled. The effects of noisy equipment can increase when working in enclosed spaces. Owners, operators and managers of marine facilities need to understand the risks of using noisy equipment in the workplace by undertaking a risk assessment. The risks of noisy equipment can be reduced by:-

- Knowing the noise levels of equipment being used
- Buying quite equipment
- Isolating the noisy work from the rest of the work area
- Scheduling noisy work for when others aren't around
- Signposting noisy areas
- Using hearing protection (hearing protection should only be used as a last resort)

Working in enclosed areas on boats can lead people having to work in cramped postures. This can lead to health problems. Refer to guidance on Manual Tasks – Working awkward postures for control options.

**Further guidance**

- Work Health and Safety Regulation
- Managing chemical hazards in the workplace: Advice for managers and supervisors, WorkCover NSW
- Labelling dangerous goods, WorkCover NSW
- Dangerous goods and hazardous substances chemicals in the workplace – WorkCover NSW
- Code of practice for the control of workplace hazardous substances – WorkCover NSW
- Code of practice for the storage and handling of dangerous goods – WorkCover NSW
- Code of Practice for Noise Management and Protection of Hearing at Work – WorkCover NSW


# DEVELOPING WORKPLACE HEALTH & SAFETY GUIDANCE

for the

# RECREATIONAL & LIGHT COMMERCIAL BOATING INDUSTRIES

# WHS GUIDANCE MATERIAL

# SECTION 5

# MOVING BOATS

# WORK HEALTH AND SAFETY ISSUE – MOVING BOATS


## The Risk

The movement of boats has been identified in the marine industry as an area where operators find it difficult to achieve compliance with OHS legislation and there is a potential risk to workers safety.

The key risks when moving boats in the marine industry are when a person is required to:

- Move trailer boats around yards and workshops.
- Move trailer boats around showrooms
- Operate straddle carriers
- Operate winches and cradles on slipways

The task of moving boats is made more complicated by the different sizes, weights, configurations and surfaces on which they are moved and different types of equipment involved.

Due to the nature of the boating industry eliminating or substituting the risk of moving boats is usually not reasonably practicable. The most common form of control is engineering controls such as the use of straddle carriers and slipways for moored boats and forklift attachments and dollys for trailer boats. These controls would be supported by administrative measures such as procedures and training to ensure equipment is maintained, operators are competent and can operate equipment safely.

## The consequence

The consequences of not controlling the risks when moving boats include muscle strain and back injuries, crush injuries, damage to property and potentially a fatality.

Examples of incidents involving moving boats include:-

- A NSW company was convicted and fined when a motor cruiser slipped sideways off a cradle, injuring two workers. The court found there was no safe system and there was a lack of a risk assessment (Industrial Court of NSW 2005).
- A similar incident occurred in the USA in 2001 when a worker was placing wooden blocks under a 33 foot boat and the boat fell on him, causing death (NIOSH 2003).
- Another case recorded in NSW related to a yard hand having his hand crushed while operating a boat winch (Industrial Court of NSW 1999).
- In the United Kingdom a worker was crushed to death after being struck by a moving load which was being lifted by a crane (The Safety & Health Practitioner 2009). A lack of adequate assessment and planning was blamed for the accident.

**The law**

There is no specific legislation or codes of practice in relation to slipways and travel lifts. Under WHS legislation they would be covered by the WHS Plant requirements. Under these requirements employers must ensure that:

- the plant is not operated by a person unless they have received adequate information and training and are supervised to the extent necessary to minimise the risks to health and safety
- plant is used only for the purpose for which it was designed unless a competent person has made an assessment that the change in use does not present an increased risk to health or safety
- if safety features or warning devices are incorporated into plant, the features or devices are used as intended
- plant is subject to appropriate checks, tests and inspections necessary to minimise risks to health and safety

Plant needs to be maintained in accordance with the requirements of the designer or manufacturer of the plant and there are systems in place to minimise the risks to health and safety of people maintaining, inspecting, altering, repairing or cleaning the plant.

All safety features and warning devices associated with the plant need to be maintained and tested.

Any plant designed to lift or move equipment or materials must have a clearly legible notice affixed, in a conspicuous place specifying the rated capacity of the plant in appropriate metric units.

Whilst using plant designed to lift or move equipment or materials:
- as far as practicable, no loads are suspended or travel over a person
- plant that is not specifically designed for lifting or suspending loads is not used for those tasks unless the plant provides at least an equal level of safety to that of plant that is specifically designed for those tasks, and
- all lifting or suspending is done within the rated capacity of the plant.

In relation to industrial lift trucks (Forklifts) employers must ensure that:
- they are equipped with appropriate lifting attachments specifically designed for the load to be lifted or moved, and
- they are used in a way that minimises exposure of the operator to risks arising from work practices or systems and the particular environment in which the industrial lift truck is used.

When using attachments on a forklift the attachments must have a rated capacity displayed on the attachment. The attachment must be:

- designed by a competent engineer
- manufactured by competent people
- safely used on the forklift.

The attached guidance notes provide information that may help operators in the recreational and light commercial boating industry reduce injuries and increase compliance with WHS requirements. They also provide real examples of how members of the NSW BIA have eliminated or controlled the risk of moving boats.

**Does your business comply?**

Check how well YOUR business is currently managing the risk of moving boats by completing the attached *Moving Boats - Self Assessment Tool*. Identify areas of non-compliance (those in the red) and areas that need improvement (those in the orange). This tool also outlines the elements of a good safety management system.

Use your first assessment as a baseline, and once you have looked over the guidance notes and the case studies you will see where your systems can be improved. By following the guidance you will achieve better safety for all people on your site, and better compliance with the work, health and safety laws.

**References**


- Work Health and Safety Act 2011
- Work Health and Safety Regulation
- Work Health and Safety Plant regulations
- Plant Guide – WorkCover NSW
- Recording plant maintenance – WorkCover NSW
- Forklift safety: Reducing The Risks – NSW WorkCover
- Making your forklift work for you – 10 minute checklist for managers and supervisors – NSW WorkCover
- Australian Standard 2359.1-1995, Powered Industrial Trucks – General Requirements
- Australian Standard 2359.2-1995, SAA Industrial Truck Code Part 2 Operation
- Australian Standard 2359.6-1995, Powered Industrial Trucks Part 6: Safety Code
- Australian Standard 2359.15-1995, Powered Industrial Trucks Part 15: Fork-arm extensions and telescopic fork arms – Technical characteristics and strength requirements
- Australian Standard 1418.1 Cranes, Hoists and winches Part 1: General requirements
- Australian Standard 1418.3 Cranes, hoists and winches—Bridge, gantry, portal (including container cranes) and jib cranes
- Australian and New Zealand Standard 2550.1 Cranes, hoists and winches - Safe use - General requirements
- Australian Standard 2550.3 Cranes, hoists and winches - Safe use - Bridge, gantry, portal (including container cranes), jib and monorail cranes
- Australian Standard 2759 Steel wire rope - Use, operation and maintenance
- Australian Standard 2089 Sheave blocks for lifting purposes
- Australian Standard 1353.1 Flat synthetic-webbing slings Part 1: Product specification
- Australian Standard 1353.2 Flat synthetic-webbing slings Part 2: Care and use

# Moving Boats
# Self Assessment Tool

| Key steps to a safe system: | Hazard Identification | Risk Assessment | Risk Control | Consultation | Documentation | Instruction & Training | Supervision |
|---|---|---|---|---|---|---|---|
| **NON-COMPLIANCE** | No intentional identification of hazards of moving boats | No risk assessments on moving boats have been done | No attempt has been made to eliminate or reduce risks from moving boats | No evidence of management consulting with workers | No documents outlining any of the steps taken towards identifying, assessing and managing the risk of moving boats | No evidence of workers having received training and instruction in the processes of moving boats or in using the required plant | Workers are left unsupervised with no agreed or stated safe work methods for tasks requiring mthe movement of boats |
| **WORKING TOWARDS COMPLIANCE** | Some hazards have been identified with or without incidents or injuries occurring | Assessments have been done on an ad hoc basis and/or are incomplete | Some controls have been put in place, but these do not follow the 'hierarchy of control', adhoc and/or are incomplete | Consultation is on an ad hoc basis, and/or workers' feedback and views are not taken into account | Some documentation of some steps in the risk management of this hazard | Some training has been provided in some aspects on an adhoc basis. No assessment of competency | Safe Work Methods have been developed and/or provided but no effort to ensure workers' compliance |
| **COMPLIANCE** | Proactive hazard identification is done regularly and documented | Assessments been done on all tasks relating to moving boats in accordance with regulatory requirements and show consideration of risk factors | Plant safety requirements have been followed, all plant and equipment certified to appropriate standard, all risk controls implemented and reviewed | Workers are consulted on a routine basis regarding safety and methods used to move boats | Documents outlining the decisions and their rationale for managing the movement of boats at the business, with Safe Work Method Statement and/or safe operating procedures provided | Workers are trained and assessed as competent in the safe use of equipment used to move boats, hold appropriate high risk work licenses and, and are trained and competent in safe work procedures | Supervision ensures the Safe Work Methods are followed and any problems are acted on |

# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## Moving Boats – Trailer Boats

**HAZARDOUS TASKS identified**

Moving trailer boats around yards, workshops and show rooms is a common task carried out by businesses in the recreational and light commercial sector. From construction to delivery, selling and maintenance there is a requirement to move boats on trailers.

Common methods used include employees pushing boats, use of manual trolleys, forklifts with attachments and motor vehicles. The trailers need to be moved on a variety of surfaces and sometimes in areas with restricted room to manoeuvre the trailer.

Any reduction in the need for and/or the force used by workers to manually push boats on trailers will have an impact on reducing risk.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work. By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

**RISKS to assess**

Check the following to see what the risks are of moving trailer boats at your business:

- What is the weight of the boat you are moving?
- How many axles does the trailer have?
- What surfaces do you need to move the boat on? Are there any gradients, bumps or holes in the surface?
- What obstructions or restrictions are present?
- Is other traffic or people around that could be struck by the boat?
- What aids do I have available to eliminate or reduce the need for people to push the boat?

**RISK CONTROL options**

**Mechanical Means of Moving Boats on Trailers**

**Use of Forklift**

Operators of forklifts must hold a High Risk Work License.

Use of an attachment on a forklift is the most common method of moving trailers.

WHS Legislation requires any attachment on a forklift to be:
- designed by a competent engineer
- manufactured by competent people
- safely used on the forklift.

All attachments must have a rated capacity affixed to the attachment and must be secured correctly and safely on the forklift. You should only use attachments designed for the forklift they are used on. Ask the manufacturer of your attachment whether it is suitable for the forklift it will be used on.

When moving trailers with a forklift attachment the tow ball mass weight must not exceed the rated capacity of the attachment.

Specific skills require specific additional training and supervision. Employers must ensure that where attachments are used, further training is given to forklift operators and adequate supervision is provided.

**Case study**
At various trailer boat retailers and repairers they have sourced towing forklift attachments that have a compliance plate attached. These are secured to the forklift securely via chain.

Compliance plate affixed to attachment indicating rated capacity

In utilising these certified attachments they have also worked to meet the requirements of OHS legislation

**Other mechanical methods**

Other mechanical for moving boat trailers are available. These range from purpose built towing tugs to hand operated tugs.

When assessing the risks of using these mechanical devices things to take into consideration include:-

- Weight of the trailer
- Tow ball mass weight
- Area in which it is going to be used e.g. avoid using internal combustion engines indoors or in poorly ventilated areas
- The type of tyres/wheels on the equipment

An example of a commercially available electric powered tow tug with non marking tyres suitable for use indoors. The type of tyres would make it unsuitable for use over rough or broken ground. This particular tow tug is able to move loads up to 6500kgs

**Manual Means of Moving Boats on Trailers**

Whilst not eliminating the need to push boats on trailers around, manual dollies can reduce the risk of injury. Manual dollies may be used in areas where there is restricted space to manoeuvre, where the use of internal combustion engines is not permitted or in moving lighter boats.

When assessing the risk of utilising manual dollies things to take into consideration include:-

- Weight of boat and trailer
- Surfaces and gradients
- Distance the boat needs to move
- Amount of boats to be moved

**Case study**

At various trailer boat retailers and repairers they have manufactured trailer dollies that allow them to move trailer boats around their yards.

The use of large pneumatic wheels assists in manoeuvring the dolly and trailer around.

Examples of an industry built trailer dolly and a commercially available trailer dolly. Note both have large pneumatic tyres.

**Ratchet Jockey wheel**

The use of a ratchet jockey wheel to move boats around reduces the force required to manoeuvrer boats.

**Boat Handling Jacks and Dolly systems**

Removing the trailer and moving boats around on dolly system may be useful in showrooms and at boat shows.

The use of commercially available boat handling jacks and dollies remove the need to manipulate a trailer. The unidirectional wheels on a dolly may make it easier to fit boats into tight areas. Utilising boat handling jacks can assist in changing or customising trailers for boats.

**Further guidance**

- Work Health and Safety Act 2011
- Work Health and Safety Regulation
- Forklift safety: Reducing The Risks – NSW WorkCover
- Making your forklift work for you – 10 minute checklist for managers and supervisors – NSW WorkCover
- Australian Standard 2359.1-1995, Powered Industrial Trucks – General Requirements
- Australian Standard 2359.2-1995, SAA Industrial Truck Code Part 2 Operation
- Australian Standard 2359.6-1995, Powered Industrial Trucks Part 6: Safety Code
- Australian Standard 2359.15-1995, Powered Industrial Trucks Part 15: Fork-arm extensions and telescopic fork arms – Technical characteristics and strength requirements

Attachment 1 – Overseas models of certified forklift towing attachments

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# WORK HEALTH AND SAFETY INDUSTRY GUIDANCE

## Moving Boats – Slipways and Straddle Carriers

### HAZARDOUS TASKS Identified

The movement of larger boats in and out of the water for maintenance tasks usually involves a piece of load shifting plant such as a slipway or straddle carrier. The operation of lifting and shifting large boats usually involves the use of winches, cables and/or slings.

Previous incidents have shown that when the risks of moving larger boats are not properly controlled injuries can occur to people and damage to boats can occur.

Although there is no specific legislation covering the use of the boat shifting equipment there is a need to ensure the plant is fit for purpose and compliant with general plant requirements and Australian Standards.

Consultation is a legal requirement and an essential part of managing health and safety risks.

A safe workplace is more easily achieved when everyone involved in the work communicates with each other to identify hazards and risks, talks about any health and safety concerns and works together to find solutions. This includes cooperation between the people who manage or control the work and those who carry out the work or who are affected by the work.By drawing on the knowledge and experience of your workers, more informed decisions can be made about how the work should be carried out safely.

### RISKS to assess

With the operation of plant on marinas it is important that the equipment is fit for purpose, safe to use and operators are trained in using the equipment. When assessing the risks of using boat shifting plant and equipment it is important to take into consideration:-

- The load being shifted
- The inherent risks of the plant/equipment
- The environment it is working in
- The skills and competencies required to operate the plant/equipment
- The daily, periodic and annual checks required
- The maintenance requirements
- Compliance with Codes of Practice and Australian Standards

### RISK CONTROL options

All equipment used to lift and shift boats should have safe operating procedures. These may be the equipment manufacturer's instruction, instructions written by the marina operator or a combination of both. Australian Standards for the safe use of cranes, hoists and winches requires the detailing of processes to be followed for safe operation and the identification of any risks in operating the crane. This must be available to the operator.

All equipment should be operated by a competent person who through training, qualification, experience or a combination has acquired the knowledge and skill to enable them to correctly and safely perform the task.

**Case study – Training of straddle carrier operators**

There is no High Risk Licence for operating a straddle lift in NSW, however many of the principles involved in using a straddle lift are similar to using a gantry crane. Marina operators need to ensure that people using straddle lifts are competent to do so with the necessary training and knowledge to ensure the safe operation of the straddle lift. Incorrect operation of a straddle lift can cause serious injury to personnel and significant damage to boats being lifted.

The Marina Industries Association of Australia has devised a competency based course for operators of straddle lifts. The course is based on nationally endorsed competencies and on completion of a log book and practical assessment a Statement of Attainment is obtained. The course also allows for recognition of prior knowledge.


By having straddle lifts operators undertake competency based training you can demonstrate that the operators are competent to carry out the tasks of lifting and shifting boats using the marinas straddle lifter.

Controls on any lifting equipment must be labelled in accordance with Australian Standards. Labelling should indicate the function and/or operation of each control. Appropriate emergency stops should be located in within easy reach of the operator. If the operators view can be obstructed by the load then suitable audible and/or visual warnings should be on the equipment and should be activated automatically when the machinery is in motion.

**Case study – Controls and emergency stops**

Ensuring all controls on plant used to move boats are labelled correctly showing the operation of that control. Emergency stops should be readily available. Plant should also be able to be isolated or locked so as to prevent unauthorised use. Keys should always be removed when plant is not in use.

There may be circumstances where the operator of boat lifting and shifting equipment cannot physically see what is happening around the area due to the load blocking their view. The use of a spotter to assist in guiding the operator and warning of any pedestrians or obstacles in the way can reduce the likelihood of an incident. The spotter should be competent to undertake the tasks involved in guiding the operator, always remain in communication with the operator or be in a position where they are visible to the operator

The inspection and maintenance of plant/equipment used to lift and shift boats is required to ensure that it is fit for purpose and safe to use. Documenting the inspection and maintenance requirements, in accordance with suppliers specifications and regulatory requirements, and the recording of when those inspections or maintenance were carried out not only allows those persons controlling a site to be sure that inspections and maintenance are carried out correctly but aids in demonstrating compliance

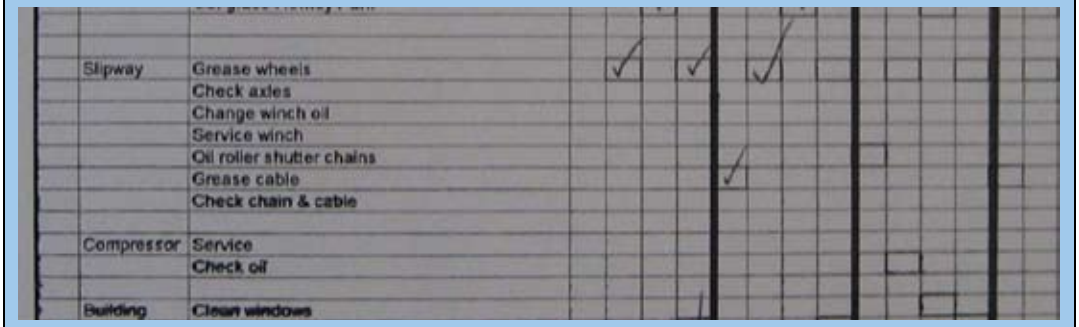
Scheduling of inspections and maintenance may include:

- Daily checks e.g prestart checks
- Periodic checks e.g. weekly, monthly or quarterly
- Annual checks e.g. Major Servicing or third party inspections

**Case study – Scheduling and documenting inspections and maintenance**

Regular inspections and maintenance of straddle carriers and slipways is required to ensure that they are safe to operate. In order to ensure that key components are inspected and maintained a documented inspection and maintenance regime should be established.

A number of marinas have adopted a spreadsheet that visually indicates when the inspection/maintenance needs to be carried out and by whom it was carried out


Documenting inspection and maintenance allows an organisation to show compliance with WHS legislation

Most boat lifting and shifting equipment utilised by marinas (straddle carriers and slipways) consist of a winch/hoist and cable. To ensure that the cables are capable of lifting the loads required some marina operators have gone through the process of quantifying the loads pulled up on by their equipment. Some slipway operators have hired cable strain gauges to measure the strain put on their winch cable. This has allows them to purchase the right cable for that particular slipway. Not only does this show compliance but potentially saves the operators money as they are not buying a heavier rated cable that they don't need.

Cables need to be inspected regularly and replaced if necessary. The inspection needs to be undertaken by a competent person. There is no set time frame for the replacement of a cable. It was found that replacement of cables by marinas ranged from annually to ten years plus. Due to the environment that most cables are exposed to there is a need to ensure proper lubrication of the cable to limit corrosion

Essential points to be taken into consideration when inspecting cables include:-

- State of internal lubrication
- Degree of corrosion
- Indentation of wires caused by pressure or wear
- Presences of wire breaks (these are not necessarily visible).

**Examples of cable corrosion**

**Minor rust of surface of cable. Lubrication required**

**Rust on surface of cable. Lubrication required and internal inspection should be carried out before using again**

**Rusted cable. Pitting has started to occur. Cable ready to be discarded**

**Major rust, cable should be discarded imediately**

When externally inspecting cables things to look for

- ☑ Inspect termination of rope at the drum and other points.
- ☑ Inspect for broken wires.
- ☑ Inspect for corrosion.
- ☑ Inspect for deformation.
- ☑ Inspect for surface wear.
- ☑ Inspect for defective coiling.
- ☑ Inspect for deterioration due to snatch loading.
- ☑ Inspect lengths that run through blocks, particularly those which lie on the sheaves when the appliance is in the loaded condition.

Documentation of wire rope inspections is required under Australian Standards and can help show compliance with WHS legislation.

Many slipways utilise snatch blocks or sheave blocks. The blocks need to be rated to carry the loads required and have a compliance plate attached. The blocks should also conform to the requirements of Australian Standards.

**Case study – Utilising rate sheave/snatch blocks**

Whilst pulling boats up on slipways some marinas utilise blocks as part of their winching systems or to double up the cable to achieve a greater winching capacity.

Any blocks used in the winching system should be rated with the capacity of the block clearly stated on a compliance plate (Note – Compliance plates were present on blocks pictured below but are difficult to view). The blocks should also be compliant to Australian Standards. Australian Standard 2089 – Sheave Blocks for lifting purpose provides guidance on the requirements for the blocks

Having rated blocks as part of your winching system allows an organisation to show compliance with WHS legislation

When lifting boats with a straddle carrier the direct contact point between the load and the lifting device is the slings. Slings need to be compliant with Australian Standards. The slings need to be inspected and maintained on a regular basis and discarded if necessary.

Things to look for when inspecting slings include:-

- External Wear
- Local Abrasion
- Cuts and Contusions
- Internal Wear
- Damage to any protective coating or sleave
- Sunlight degradation
- Chemical Attack
- Label Damage
- Deterioration of stitching
- Damage to any eyes
- Damage at the connection to any terminal attachment
- Damage to any end fittings

Australian Standards require slings be inspected, as a minimum, every 3 months. However, with the conditions in which the slings are utilised in the marine environment, shorter intervals for inspection may be required. Some marinas require slings to be inspected before every lift. Inspections of slings should be documented.

**Further guidance**

Work Health and Safety Plant regulations
Plant Guide – WorkCover NSW
Recording plant maintenance – WorkCover NSW
Australian Standard 1418.1 Cranes, Hoists and winches Part 1: General requirements
Australian Standard 1418.3 Cranes, hoists and winches—Bridge, gantry, portal (including container cranes) and jib cranes
Australian Standard 2550.1 Cranes, hoists and winches - Safe use - General requirements
Australian Standard 2550.3 Cranes, hoists and winches - Safe use - Bridge, gantry, portal (including container cranes), jib and monorail cranes
Australian Standard 2759 Steel wire rope - Use, operation and maintenance
Australian Standard 2089 Sheave blocks for lifting purposes
Australian Standard 1353.1 Flat synthetic-webbing slings Part 1: Product specification
Australian Standard 1353.2 Flat synthetic-webbing slings Part 2: Care and use

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