DEVELOPING WORKPLACE HEALTH & SAFETY GUIDANCE

for the

RECREATIONAL & LIGHT COMMERCIAL BOATING INDUSTRIES

FINAL REPORT – OCTOBER 2011

Final Report –23rd October 2011

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)

Principal Investigators

Andrew Mernagh
BBSc, GradDipOHS

Fiona Weigall
MasterPubHlth, BAppSc(OT)
GradCertAppErg, GradCertAdEd

A&S Risk Solutions Pty Ltd

& Alison Bell
MasterSc, BAppSc(OT)
GradDipSafeSc, GradCertHlthSc(Ed)

University of Wollongong

Acknowledgements

The report authors wish to acknowledge the invaluable assistance from:

The Project Steering Committee
- Alan Barrett, Manager BIA (NSW) Divisions and BIA (NSW) representatives
- WorkCover NSW

Members of the BIA (NSW)
- Aaron McKenna, BIA (NSW) Member Support & Development
- Those attending and contributing to the workshops
- Those participating in site visits
- Those providing input into the development of industry specific guidance material

Table of Contents

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 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 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 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 Final report that: - draws together findings from the literature, data analysis, industry consultation and site assessments; and - 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)

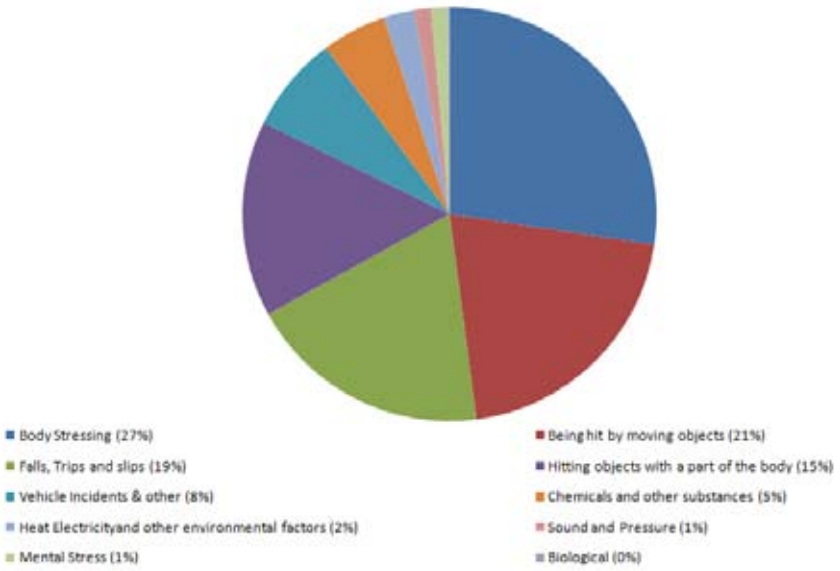

Figure 1. Boating Industry Claims by the Mechanism of Injury/Illness 2004/2005 – 2008/2009 (Adapted from WorkCover NSW Workers Compensation Data)

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. Tasks of most concern were: - Working on boats on the hard stand - Detailing boats in and out of the water - Climbing ladders and other support systems - Working from scaffolds - 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. Tasks of most concern were: - 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. - 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. Tasks of most concern were: - Getting in and out of boats - Moving boats - Postures used to sand and polish boat hulls and servicing engines while they are within small spaces - Lifting heavy loads, often in narrow spaces within boats - 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. Tasks of most concern included: - Building tasks - Repairs - Cleaning - Painting - 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. Tasks of most concern included: - Using forklifts with towing attachments (sometimes uncertified) - 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. Issues of most concern were: - Pedestrian safety with vehicles and trailers being moved on their sites - Visitors entering work areas - 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: - Exposure to the sun - The need to work over the water - Working in the rain and the wind
8. Workplace design and layout	The main concerns were: - Limited space on the site to achieve a good design - Limited space in the work areas - Poor equipment storage
9. OHS procedures	The main concerns were: - Developing and updating Safe Work Method Statements; providing staff education and training in OHS issues; improving documentation; - Having procurement procedures; - Undertaking regular risk assessments**;** - Undertaking OHS audits; and - 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: - Eye protection - 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***