NATIONAL MARINE SAFETY COMMITTEE

Regulatory Impact Statement

National Standard for Commercial Vessels

Part C Section 1 – Arrangement, Accommodation and Personal Safety

March 2011

EXECUTIVE SUMMARY

Under the auspices of an Intergovernmental Agreement, and the Australian Transport Council, the National Marine Safety Committee has progressively developed a comprehensive, cohesive standard for domestic commercial vessels: the National Standard for Commercial Vessels (NSCV). NSCV sections have progressively replaced the Uniform Shipping Laws (USL) Code; the basis of standards for domestic vessels since the late 1970s.

The revision of the USL Code is almost complete, and this Regulatory Impact Statement (RIS) considers one of the final pieces of the NSCV – Part C, Section 1, Arrangement, Accommodation and Personal Safety.

The requirements contained in the proposed standard, NSCV Part C Section 1, have been influenced considerably by international standards and international agreements. Australia has committed to ratifying the Maritime Labour Convention 2006 (MLC).[1] By ratifying the MLC, Australia agrees to be bound by, and to implement the requirements of, the Convention.[2] The proposed NSCV Part C Section 1 requirements have incorporated MLC requirements where appropriate, and are consistent with the intent of the MLC.

Similarly, Australian policy regarding health and safety in workplaces is reflect in occupational health and safety legislation, which applies to commercial vessels just as it does any other workplace. The proposed standard assists with meeting occupational health and safety requirements with respect to vessel construction.

National disability discrimination legislation established minimum standards for access to transport – standards that apply to large passenger vessels, such as ferries. The disability discrimination law has been taken into account in the development of the proposed NSCV Part C Section 1.

In addition to aligning domestic commercial vessel standards to national laws and international agreements, the proposed standard covers aspects of vessel design and construction that are vitally important to the health, safety and wellbeing of passengers and crew. This Regulatory Impact Standards concludes that, although it is difficult to quantify the impact of the proposed standard, it will provide a net benefit to Australia, by reducing the risk of an incident, reducing the risk of injury or death, while increasing flexibility for boat designers, builders, owners and operators.

[1] Maritime Labour Convention Regulation Impact Statement
[2] Maritime Labour Convention Regulation Impact Statement

CONTENTS

List of Tables

1. INTRODUCTION

1.1. Intergovernmental response to marine safety

In November 1997 an Intergovernmental Agreement Establishing a National Marine Safety Regulatory Regime (IGA) was signed by the Prime Minister, State Premiers and the Chief Minister of the Northern Territory.

The IGA included the establishment of the National Marine Safety Committee (NMSC) as part of a strategic response to a report on national marine safety undertaken for the Australian Transport Group by Thompson Clarke. This report identified a number of deficiencies in the administration of marine safety by States and the Northern Territory, including the lack of consistency between the jurisdictions in the application and administration of standards for commercial vessels.

The NMSC consists of an independent chair and CEOs from the Commonwealth, States and the Northern Territory Marine Safety Authorities, and is supported by a secretariat. The mission of the NMSC is:[3]

> "to improve marine safety in Australia, for the benefit of the community and the maritime industry by facilitating and supporting a co-operative and coordinated approach to the efficient and effective administration of marine safety within the Australian Federation, comprised of the Commonwealth, States and Territory Governments".

The NMSC's strategic priorities are governed by the principles identified in the IGA. The IGA states that its goals will be achieved by ensuring that:[4]

> "standards for vessels and marine personnel and infrastructure are established adopted and implemented in a timely and consistent or uniform manner throughout Australia …
>
> …legislation and marine safety standards comply with the "Principles and Guidelines for National Standards Setting Bodies and Regulatory Action by Ministerial Councils and Standards Setting Bodies" endorsed by the Council of Australian Governments."

1.2. Regulatory impact assessment of new standards

Regulatory actions or standards produced by the NMSC are endorsed by the Australian Transport Council (ATC) and then implemented by the Commonwealth, States and Territories around Australia.

As such, and as identified in the IGA, the standards produced by the NMSC are subject to the *COAG Principles and Guidelines for National Standard Setting and Regulatory Action by Ministerial Councils and Standard-Setting Bodies* (COAG

[3] http://www.nmsc.gov.au/nmsc_and_you/index.php?MID=11&COMID=1&CID=11
[4] IGA, recitals

Guidelines). This requires, prior to a Ministerial Council adopting a standard, the Ministers being assured that a regulatory assessment process has been adequately completed.[5]

The Office of Best Practice Regulation (OBPR) approves Regulatory Impact Statements (RISs) for both public consultation and decision making based on compliance with *COAG Best Practice Regulation - A Guide for Ministerial Councils and National Standard Setting Bodies,* October 2007.

1.3. Replacing the USL Code with the NSCV

The Uniform Shipping Laws (USL) Code has been the basis of standards for domestic vessels since the late 1970s. The current USL Code contains provisions relevant to arrangement, accommodation and personal safety in Subsection 5E Construction – Passengers, Passenger Accommodation, Guard Rails And Bulwarks; Subsection 5F – Structural Fire Protection; Section 7 – Load Lines; Section 9 – Engineering, Section 13 – Miscellaneous Equipment; and Section 18 – Hire and Drive.

The USL Code was originally developed from the international requirements applicable to ships (Safety of Life at Sea (SOLAS))[6] and from the US Code of Federal Regulations (CFR) 46[7] requirements for domestic vessels in the USA. Since it was printed in 1979, the USL Code has been amended in 1981, 1984, 1989, 1993, 1996 and 1997.

In accordance with the objectives of the IGA, a broader review of the USL Code was commenced in 1998. The new standard, which has now largely replaced the USL Code, is the National Standard for Commercial Vessels (NSCV). The proposed standard was developed through a review of the arrangement, accommodation and personal safety aspects of the USL Code, and is one of the last aspects of the review to be completed, as shown in Table 1.

Table 1 — Status of Change from USL Code to NSCV

Uniform Shipping Law (USL)	National Standard for Commercial Vessels (NSCV)	Status
New	Part A Safety Obligations	Approved by ATC in 2002
Section 1	Part B General Requirements	Approved by ATC in 2002

[5] Principles and Guidelines for National Standard Setting and Regulatory Action by Ministerial Councils and Standard-Setting Bodies, amended by COAG June 2004

[6] International Maritime Organization International Convention for the Safety of Life at Sea (SOLAS), 1974

[7] US National Archives & Records Administration, Code of Federal Regulations 46 Shipping

Uniform Shipping Law (USL)	National Standard for Commercial Vessels (NSCV)	Status
	Part C Design and Construction	
Section 5 Subsection F, E, Section 6, Section 7 and Section 18	Section 1 Arrangement, Accommodation & Personal Safety	Subject of this RIS
Section 5 Subsection C & D Section 7	Section 2 Watertight & Weathertight Integrity	Approved by ATC in 2010
Section 5 Subsection A, B, G, H, K, L, M	Section 3 Construction	Approved by ATC in 2008
Section 5 Subsection F, Section 11	Section 4 Fire Safety	Approved by ATC in 2004
Section 9, New Subsection for LPG for engines	Section 5 Engineering	Approved by ATC in 2002
Section 8, Subsection A, B, C, Section 5, Subsection C	Section 6 Stability Subsection A Intact Stability Criteria Subsection B Buoyancy and Stability Subsection C Stability Tests	 Approved by ATC in 2008 Approved by ATC in 2010 Approved by ATC in 2008
Section 10, 12, 13, 16	Section 7 Safety Equipment Subsection A Safety Equipment Subsection B Com Equipment Subsection C Nav Equipment Subsection D Anchoring Systems	 Approved by ATC in 2004 Approved by ATC in 2008 Approved by ATC in 2008 Approved by ATC in 2008
Sections 2, 3	Part D Crew Competencies	Approved by ATC in 2002

Uniform Shipping Law (USL)	National Standard for Commercial Vessels (NSCV)	Status
Section 15	Part E Operational Practices	Approved by ATC in 2004
	Part F Special Vessels	
New	Section 1 Fast Craft	
	Subsection A General Requirements	Approved by ATC in 2002
	Subsection B Category F1	Approved by ATC in 2002
	Subsection C Category F2	Approved by ATC in 2007
	Subsection D Category F3	Future Development
Section 18	Section 2 Leisure Craft	Approved by ATC in 2010
New	Section 3 Novel Vessels	Future development
New	Section 4 Special Purpose	Development started

The review of the arrangement, accommodation and personal safety requirements of the USL Code was necessary in order address the strategic actions specified in the National Marine Safety Strategy,[8] including to:

- Meet technological changes in the design, construction and operation of vessels;
- Incorporate a more performance-based framework that better matches the safety requirements for the vessel to the level of risk;
- Address problems of application or interpretation of the current USL Code;
- Address safety issues that may not be adequately addressed in the current USL Code;
- Take account of public benefit when determining safety requirements;
- Provide for more flexibility; and
- Remove redundant and obsolete provisions.

[8] National Marine Safety Strategy 1998

1.4. The proposed standard – NSCV Part C Section 1

NSCV Part C Section 1, Arrangement, Accommodation and Personal Safety covers:

- Operating stations: field of vision, layout, design and operating station layout;
- Arrangements for provision of navigation systems: masts, signals, navigation lights, side lights, stern light, all-round light;
- Accommodation spaces: crew accommodation, passenger accommodation, facilities for sick and injured persons, crew mess facilities, galley and food storage, sanitary facilities, crew cloak and laundry facilities and potable water;
- Access, escapes and evacuation: escape from spaces, evacuation paths, doors and hatches, passageways, handrails, stairways, ramps and ladders and safety information; and
- Personal Safety: protection from the elements, bulwarks and guard rails, hazardous plant, safe movement on board, and access to and from the vessel.

The requirements contained in the proposed standard have been influenced considerably by international standards, international agreements (including the Maritime Labour Convention, which Australia has committed to ratify), occupational health and safety legislation and disability discrimination law. All of these requirements are compulsory; leaving little or no discretion for the requirements of the proposed standard, NSCV Part C Section 1.

Beyond implementing international agreements and aligning domestic commercial vessel standards with other laws, the review of the USL Code provisions relevant to arrangement accommodation and personal safety supports the safety, health and well-being of the community at large.

Standards relevant to arrangement, accommodation and personal safety significantly impact the safety of passengers and crew on vessels. The arrangement of the operating station is vitally important for safe navigation, while the size of openings on railings, and the height of bulwark, impact on the safety of persons on board the vessel. Similarly, access within and to and from the vessel are vital elements of safety, particularly arrangements for escape and evacuation in times of an emergency.

The of size of cabins, and number of persons allocated to cabins, sanitary facilities, access for persons with disabilities, and the provision of sick bays, impact on a range of social issues.

Finally, the proposed standard is a vital final piece to the broader review of the USL Code, and allows for a cohesive, single standard to be implemented that governs the construction and operation of domestic commercial vessels in Australia.

1.5. Performance-based nature of the NSCV

The USL Code, including those requirements relating to arrangement, accommodation and personal safety, is a prescriptive standard in that it sets out requirements that must be adhered to by a designer, builder, operator and owner.

The NSCV, on the other hand, is performance-based. It contains required outcomes that can be met either through:

- Deemed-to-satisfy solutions contained within the standard. The benefit of adopting a deemed-to-satisfy solution is that there is no onus on the applicant to prove compliance with the corresponding performance standard. The convenience of this option comes at a cost in that flexibility in the solution is limited; or
- Equivalent solutions. These are solutions proposed by the applicant that achieve the required outcomes by means other than that which is deemed-to-satisfy. An equivalent solution must be "proven to satisfy" the required outcomes, either directly or by showing its performance is at least equivalent to that of the deemed-to-satisfy solution.

The benefit of the performance-based nature of the NSCV is that it greatly increases the options available for achieving the required outcome. This allows for innovation and the adoption of new technology, while still providing a prescriptive alternative for designers, builders, owners and operators who wish to utilise them.

The NSCV's performance framework was assessed in the *Regulatory Impact Statement for Part B: General Requirements* and approved by the ATC in 2002.

1.6. Application of the NSCV and the proposed standard

In the absence of legislation to the contrary (which would be the subject of a separate RIS), the standards contained within the NSCV (including, if approved, the proposed standard) are applicable to new vessels, existing vessels being surveyed for the first time, and vessels upgrading survey (that is, exposure to higher risks if it were not for additional safety measures being applied). For most of these vessels, compliance is verified by an independent initial survey. Surveyors look at both deemed to satisfy solutions specified within the NSCV and any vessel designer/builder or operator proposed equivalent solutions.

After a vessel has been in service, periodic surveys (usually once a year, every second year or when convenient due to operational considerations) are undertaken by marine authorities (except in Queensland) to ensure that the vessel is maintained and its operators address various equipment and safety issues.

2. STATEMENT OF THE PROBLEM

2.1. Overview

The review of the USL Code, and in particular of the arrangement, accommodation and personal safety aspects of the USL Code, is designed to address a number of problems with marine safety standards and administration in Australia.

In summary, these problems relate to:

- **Commercial vessel incidents**: The risk of incidents involving commercial vessels, and their impact, can be reduced by an appropriate risk-based standard. Developing safety initiatives that reflect relative risk was a strategic action endorsed by the ATC in the National Marine Safety Strategy;[9]
- **Different standards for fishing vessels**: The current USL Code contains different standards for fishing and other non-passenger vessels, while the level of fatalities on fishing vessels remains significantly higher than on other non-passenger vessels;
- **Lack of alignment with current national and international standards**: The USL Code was developed in the 1970s. It was based on international standards which have since been updated, and applies international and Australian standards that are out-of-date or which no longer exist. Developing standards based on recognised and approved national and international standards for the design and construction of vessels was a strategic action endorsed by the ATC in its National Marine Safety Strategy;[10]
- **Pending ratification of the Maritime Labour Convention 2006**: MLC 2006 applies to certain passenger and cargo vessels, including those operating only in domestic waters. The current requirements for accommodation, arrangement and personal safety contained in the USL Code are inconsistent with the MLC;
- **Out of step with current circumstances**: People, technical and social expectations have changed since the arrangement, accommodation and personal safety requirements of the USL Code were developed;
- **Prescriptive nature of current requirements**: The USL Code is out of step with modern performance-based safety regulation. Introducing performance based standards as an alternative to prescriptive requirements was another strategic action endorsed by the ATC in its National Marine Safety Strategy;[11]
- **Inconsistencies with other legislation**: Maritime-specific legislation is not the only law that affects commercial vessel construction and operation.

[9] National Marine Safety Strategy 1998
[10] National Marine Safety Strategy 1998
[11] National Marine Safety Strategy 1998

Inconsistencies in the USL Code with occupational health and safety (OHS) and disability discrimination legislation can impose costs on designers, builders, owners and operators down the track;

- **Lack of clarity as to requirements**: A lack of clarity as to some of the requirements contained in the USL Code has led to different interpretations around Australia and inconsistencies between jurisdictions in requirements for arrangement, accommodation and personal safety; and
- **Piecemeal presentation of requirements**: The current USL Code contains provisions relevant to arrangement, accommodation and personal safety in many different sections, leading to inconsistencies and confusion.

Each of these issues is explored in more detailed below.

2.2. Commercial vessel incidents

2.2.1. Data limitations

There are a number of difficulties associated with marine incident data. Firstly, the data collected includes only *reported* incidents. As a result, incident data provides only a partial picture of the level and type of marine incidents.

Secondly, marine incident data will be skewed if an incident occurs that involves a large passenger vessel. One such incident can escalate fatality and personal injury figures. Conversely, if, over the relevant period, large passenger vessels are not involved in an incident, the figures may appear low. In either case, the data may not represent the real risk of an incident occurring in the future.

Despite these limitations, the data analysed in this RIS is the best available data. It is the only data that reflects the current standard of the Australian domestic commercial vessel fleet and the Australian conditions.

2.2.2. Reported marine incidents

Between 2005 and 2008 there were 2760 *reported* marine incidents involving commercial vessels. Table 2 presents the breakdown of incident types for this period.

Table 2 — Reported Commercial Vessel Incidents in Australia 2005-2008, by Incident Types[12]

Incident Types	Reported Incidents	Records in %
All types of Collision	1102	40
Grounding unintentional	419	15.2
Structural failure	130	4.7
Falls within vessel	130	4.7
Other onboard incident	120	4.3
Unclassified	118	4.3
Person overboard	103	3.7
Fire	95	3.4
Sinking	89	3.2
Swamping	85	3.1
Other incident caused by an operating vessel	84	3.0
Capsizing	65	2.4
Hit by propeller or vessel	56	2.0
Onboard crushing or pinching	51	1.8
Flooding	34	1.2
Diving incident	28	1.0
Loss or presumed loss of a vessel	12	0.5

[12] Source: Commercial Vessel Incidents in Australia 2005 – 2008, NMSC 2009, Table 10

Incident Types	Reported Incidents	Records in %
Skiing incident	12	0.5
Grounding intentional	10	0.4
Parasailing, explosion & loss of stability	6	0.2
Total	**2760**	**100**

Forty percent of all reported commercial vessel incidents involved some form of a collision (see yellow shading in the table). Collision is often associated with poor visibility from the operating station, one of the aspects of the USL Code that has been reviewed as part of the proposed standard.

Visibility can also be a factor in grounding incidents (see orange shading in the table). Sighting the hazard is a last chance opportunity to avoid the hazard (and the grounding), should an error in navigation have been made. This also applies to some other incident types such as injuries caused by being hit by a propeller or a vessel, onboard crushing or pinching, skiing incidents, intentional grounding and parasailing incidents (also orange shading in table). The extent to which improved visibility would have allowed the incident to be avoided depends upon the root cause of the incident and whether sighting the hazard could have resulted in avoidance.

Falls within a vessel, other onboard incidents and persons overboard account for another 13% of incidents (see blue shading in the table). The arrangement and personal safety aspects of the USL Code, which have been reviewed as part of the proposed standard, affect the likelihood of falls on the vessel, and the chance of persons falling overboard.

Arrangement and personal safety standards can also shape the consequences of fire, collision, grounding, explosion, sinking, swamping and capsizing (see yellow, orange and pink shading in the table) by increasing the chances of survival. For example, improvements in arrangement, including in emergency escapes, have the potential to reduce the impact of the 65 capsizing incidents by allowing better evacuation routes.

Likewise, improvements in escape routes may reduce the consequences of the 85 swamped vessel incidents. Although detailed analysis of the exact circumstances of the 103 persons who fell overboard is not available, it is reasonable to assume that one or more of them may have been due to the height, strength or arrangement of the bulwarks, or inadequacies in boarding or disembarking the vessel – all of which are addressed in the proposed standard.

In other words, at least 87% of vessel incidents are impacted by the arrangement, accommodation and personal safety aspects of the vessel – those aspects that have been reviewed as part of the proposed standard.

2.2.3. Commercial vessel losses

Between 1992 and 2009, 120 Australian commercial vessels were lost (sunk or otherwise destroyed), as shown in Table 3, and average of 6 per year.

Table 3 — Analysis of 120 Australian Commercial Vessel Losses from 1992 to 2009[13]

Incident Consequences	Number of Vessels lost	Per cent of total vessel losses
Foundered	59	49
Wrecked	25	21
Burnt or Explosion	18	15
Collision	10	8
Lost or Missing (cause unknown)	8	7
Total	120	100

Rarely does a single factor cause an incident, or a vessel to be lost. Contributing factors relate to the circumstances or behaviour that best describe the major reason(s) for the occurrence of a marine incident.

Factors that contributed to the occurrence of incidents are classified into three broad groups, namely: human, environmental and material. Within each of these there are more specific categories which provide further detail, for example, lack of maintenance which is a specific human factor.

Results presented in Table 4 show environmental factors contributed to 29.6%, human factors contributed to 52.9% and material factors contributed to 17.5% of commercial vessel incidents. Nine percent of incidents were due to factors which were unknown.

[13] Register of Australian and New Zealand Ships and Boats compiled by Mori Flapan & NMSC Database.

Table 4 — Contributing Factors to Occurrences of Commercial Vessel Incidents in Australia 2005-2008[14]

Contributing Factors	Records	Percentage to all Factors
Wind/sea state	594	14.1
Other environmental factor	191	4.5
Floating or submerged object	138	3.3
Tidal conditions	115	2.7
Restricted visibility	94	2.2
Environmental: Wash	82	1.9
Bar conditions	33	0.8
Environmental Total	**1247**	**29.6**
Error of Judgment	607	14.4
Other human factor	603	14.3
Failure to keep a proper lookout	254	6.0
Human: Inexperience	243	5.8
Human: Navigational error	230	5.5
Human: Excessive speed	85	2.0
Lack of maintenance	72	1.7
Human: Insecure mooring	57	1.4
Alcohol or Drugs	43	1.0
Human: Fatigue	15	0.4

[14] Source: Commercial Vessel Incidents in Australia 2005 – 2008, NMSC 2009, Table 11

Contributing Factors	Records	Percentage to all Factors
Human: Lack of fuel	13	0.3
Human: Overloading	8	0.2
Human Total	**2230**	**52.9**
Other material factor	307	7.3
Equipment – Machinery	244	5.8
Equipment - Hull failure	77	1.8
Equipment – Electrical	50	1.2
Equipment – Navigation	38	0.9
Inadequate stability	20	0.5
Material Total	**736**	**17.5**
Grand Total	**4213**	**100**

Standards for arrangement, accommodation and personal safety contain measures aimed at reducing the likelihood of an incident by addressing these contributing factors. For example, the layout of operating stations, and distractions (light and noise) nearby the operating station, impact on the likelihood of human error causing an incident.

Research conducted on behalf of the NMSC found that the main incidents contributing to fishermen's deaths were: person overboard, sinking of the vessel, capsize and being trapped within/under the vessel. The main factors contributing to these incidents were hazardous conditions, errors of judgment, unsafe work practices and failure to wear a PFD.[15]

Standards for arrangement, accommodation and personal safety also establish measures that reduce the consequences of the contributing factors (such as the consequences of poor weather or human error) – by setting minimum requirements for railing height and for the protection of crew moving about the vessel.

[15] Flapan, Mori. Fishing vessel safety - A new approach. Ausmarine East 2003

Human error can be caused by a number of factors including the health and wellbeing of the crew — in particular fatigue. Minimum standards for accommodation and sanitary arrangements directly influence crew health and wellbeing.

In addition, minimum standards for accommodation and sanitary arrangements can also help to reduce the likelihood of social risks, such as alcohol and drug abuse, which can be linked to incidents caused by human error. A study undertaken by DnV[16] indicated that fatalities on ships could be classified into three types: ship fatalities (arising from involvement of the vessel in an incident) 25%, workplace fatalities (arising from accidents not involving the vessel being in an incident) 25% and social fatalities (arising from suicide, homicide and drug abuse) 50%. It was suggested that MLC accommodation standards would impact safety in two ways:

- By reducing the incident of social fatalities and injuries; and
- By improving social conditions on board, as there was a correlation between decent living and working conditions and safety.[17]

2.3. Differences in standards applied to fishing vessels

2.3.1. Fishing vessels are overrepresented in terms of fatalities

Fishing vessels are over represented in terms of fatalities. Table 5 shows that fatalities in fishing vessels amount to 44.7% of the total while they represent only 32.9% of the total fleet.

Table 5 — Proportion of fatalities in fishing vessels relative to the size of fleet Australia 2005-2008[18]

Vessel Type	Fatalities		Fleet
	Number	% of total	% of total
Fishing	21	44.7%	32.9%
Non-Fishing	26	55.3%	68.1%
Total	47	100%	100%

[16] DnV Technical Report. Social Factors and Human Performance on Ship Operation. 28 July 1995.
[17] DnV Technical Report. Social Factors and Human Performance on Ship Operation. 28 July 1995.
[18] Source: Commercial Vessel Incidents in Australia 2005 – 2008, NMSC 2009, Figure 7

Between 2005 and 2008, of the factors that contributed to fatalities, only fishing vessels recorded wind and sea state as a significant factor.[19] This indicates that fishing vessels tend to continue operating in conditions that might cease operations on other vessel types. Crew on fishing vessels are also more likely to be on deck in those conditions. Hence, injury rates from wind and sea state factors on fishing vessels are much higher than on passenger (Class 1) or non-passenger (Class 2) vessels.

2.3.2. Yet standards for fishing vessels are lower

A means of addressing the high fatality rate is through reviewing the standards that apply to fishing vessels. To this end, there are currently differences in safety requirements for fishing as opposed to other commercial vessels.

Until recently, the dangers associated with fishing were seen as (and accepted as) an inevitable risk of being involved in such an industry. However, this is no longer accepted. One of the strategic actions endorsed by the ATC in its National Marine Safety Strategy[20] was the development of broad safety initiatives that reflect relative risk, based on an assessment of an incident and other safety data.

Artificial distinctions between types of vessels that cannot be justified on the basis of safety outcomes is also out of step with the modern performance-based approach to safety regulation. Furthermore, there are increasing numbers of vessels with dual certification; i.e. Class 3 and Class 2 survey. It is unreasonable that a Class 3B crayfishing boat meets such low standards that it must be upgraded in its safety standards to operate in Class 2C when the operations in Class 3B are hundreds of miles from a safe haven and are subject to higher risks than Class 2C.

While fatality rates in the fishing industry have been improving over the long term,[21] there is still more that needs to be done to achieve parity in safety with other forms of seafaring.

2.4. Out of step with international standards

During the last 30 years, since the development of the USL Code, there have been significant revisions to arrangement, accommodation and personal safety standards adopted for vessels around the world.

The ongoing revisions of SOLAS standards by the International Maritime Organisation (IMO) take into account the lessons learned from many vessel incidents since the original development of the USL Code, including incidents due to deficiencies in arrangement, accommodation and personal safety on the vessel, such as:

[19] National Marine Safety Committee. Commercial Vessel Incidents in Australia 2005-2008. Sydney. Nov 2009.
[20] National Marine Safety Strategy 1998
[21] Flapan, Mori. Fishing vessel safety - A new approach. Ausmarine East 2003

- The sinking of N'gluka in 1990, killing 5 young children. The coroner investigating the incident concluded that the possible tampering of a second set of controls, located in a passenger assessable area may have contributed to the tragedy. The disabling of the unused station of dual controls is now addressed in international standards for arrangement, accommodation and personal safety.
- The sinking of the Marchioness on the Thames in 1989, caused by a collision with a dredger was a result of poor visibility. The investigation report was particularly critical of the failure of the regulators to ensure that river boats were designed in such a manner that enabled the crew to keep an efficient watch and lookout.[22] International standards now contain quantifiable requirements for visibility.

As result of these developments, some of the requirements in the USL Code no longer align with relevant national and international standards. Visibility from the operating station provides a clear example of this. The USL Code requires:

> Section 9, Clause 21.4: The steering arrangement shall be such that the operator has a clear view ahead in the normal steering position.

This Clause has no quantifiable criteria and has been interpreted very widely with some modern commercial vessels having significant visual obstructions. In recent years, IMO has revised SOLAS Chapter V to specifically address the need for good field of vision from the helm. Internationally, even smaller craft including recreational vessels are now subject to quantifiable criteria such as those specified in the American Boat and Yacht Council (ABYC) Rule H1.

Since the development of the USL Code, there have been new international standards for vessel types that were not accommodated in the USL Code – for example high speed craft, Ro-Ro ships and even recreational boats. The USL Code needs to be reviewed in the context of these developments. For example, relevant small craft standards applicable to recreational craft now have the potential to act as the lower benchmark applicable to simple and small commercial vessels.

2.5. Pending ratification of the Maritime Labour Convention 2006

The USL Code crew accommodation standards drew heavily on MLC conventions for crew accommodation of the day. Since then, the MLC Conventions have been revised and updated on a number of occasions.

The most recent, the MLC 2006, significantly increases requirements for crew accommodation on passenger and cargo vessels. Under the terms of the MLC, it applies to certain passenger and cargo vessels, including those operating only in

[22] Butcher (2010) Shipping: safety on the River Thames and the Marchioness disaster, Standard Note: SN/BT/769; http://www.parliament.uk/briefingpapers/commons/lib/research/briefings/snbt-00769.pdf

domestic waters. Once ratified, Australia must implement these requirements. The current requirements for accommodation, arrangement and personal safety contained in the USL Code are inconsistent with the MLC 2006.

2.6. Out of step with modern technology, practise and circumstance

The present requirements of the USL Code need to be updated to accommodate the wide variations in the design and operations of domestic vessels and changes in approach by government and industry. Advances in technology have given rise to new or alternative solutions to managing risks.

In addition, the last 30 years has been a period of significant change in the standards applicable for personal protection worldwide. Increases in community expectations for safety impact on the standards relevant to commercial vessels – and the USL Code needs to be reviewed to account for changing community expectations.

Just as fundamentally, there have been significant changes in the demographics of the population arising from:

- people getting larger and heavier;
- a larger proportion of the population being classified as elderly; and
- increased mobility of persons with disabilities.

These changes have rendered a number of the requirements of the USL Code inadequate. For example, the USL Code specifies a minimum height of 1.9 m for all vessels. This aligns with an international standard (the ILO C92) that dates from 1949. Changing demographics conservatively give rise to an increase in the average height of males of 0.74 cm per decade.[23] Over 61 years, this amounts to 4.5 cm, providing significant impetus for reviewing the 1.9m headroom requirements.

2.7. Prescriptive rather than performance based

The present USL Code provisions for arrangement, accommodation and personal safety are in a prescriptive technical form that does not meet the modern requirements for marine safety standards that are endorsed by the ATC, industry, and marine authorities.

The preferred framework for standards requires that performance is specified in terms of required outcomes (i.e. safety outcomes), with prescriptive technical standards (deemed-to-satisfy solutions) specified to meet those required outcomes, with the option of providing an alternative equivalent solution.

[23] Tomkinson, G., Clark, A and Blanchonette, Peter. Body Size Changes of Royal Australian Air Force Aircrew: 1971 – 2005. Defence Science and Technology Organisation. University of South Australia. DSTO-TR-2339. p.19

Being a prescriptive standard, the USL Code concentrates on specifying the solution without referring to the safety outcome that is to be achieved. Thus the safety outcomes intended by specific clauses are sometimes unclear and subject to different interpretations, especially when considering exemptions and equivalents.

2.8. Inconsistent with other laws

Maritime-specific legislation are not the only laws that affect commercial vessel construction and operation. Inconsistencies in the USL Code with occupational health and safety (OHS) and disability discrimination legislation can mean greater costs for the designer, builder, owner and operator down the track.

These laws – particularly OHS and disability discrimination – have changed significantly over the past thirty years. One of the strategic actions endorsed by the ATC in its National Marine Safety Strategy[24] was the incorporate OHS principles into design and construction standards. In addition, the disability standards for accessible public transport were formulated under the *Disability Discrimination Act 1992* and came into operation on 23 October 2002. Although they apply to ferries, the USL Code remains inconsistent with the disability standards.

2.9. Lack of clarity and consistency in application

Some of the current USL Code provisions relevant to arrangement, accommodation and personal safety lack clarity. As a result, jurisdictions have had to apply additional or alternative requirements administratively, which adds cost, both for the administrators and for designers, builders, operators and owners.

An example of this can be seen in the lack of requirements for the provision of alternative escapes for control spaces that are likely to be occupied in an emergency. Alternative escapes ensure that control spaces don't have to be abandoned prematurely in an emergency. This weakness in the USL Code is evidenced by the fact that some authorities have applied the requirement administratively to vessels.

A lack of clarity, and/omissions within the standard, has lead to inconsistencies in application. For example, there is no clear indication in the USL Code for when a seagoing vessel should have protection for persons on board. As a result, the requirements for protection vary amongst the States and Northern Territory.

[24] National Marine Safety Strategy 1998

2.10. Piecemeal presentation of requirements

The piecemeal presentation of requirements does not facilitate a holistic performance-based overview of risk control measures. The current USL Code contains provisions relevant to arrangement, accommodation and personal safety in Subsection 5E Construction – Passengers, Passenger Accommodation, Guard Rails And Bulwarks; Subsection 5F – Structural Fire Protection; Section 7 – Load Lines; Section 9 – Engineering, Section 13 – Miscellaneous Equipment; and Section 18 – Hire and Drive.

The presentation of requirements in separate documents without a graded risk approach inhibits a proper comprehension of the function and grading of requirements. For example, intermediate rails for passenger vessel guardrails in Section 5E are spaced at 230 mm while intermediate rails on hire and drive vessels in Section 18 are spaced at 250 mm, each without reference to the other criteria or explanation for the change.

3. OBJECTIVES

The objective of an arrangement, accommodation and personal safety standard is to control risks to persons on a vessel by highlighting key aspects relevant to the arrangement of a vessel that are best identified in the early stages of a vessel's design.

The objective of the review of the existing standard for arrangement, accommodation and personal safety – the USL Code – and the development of the NSCV Part C Section 1, is to address the problems outlined in Chapter 2 by:

- Reviewing the USL Code requirements in light of learnings from commercial vessel incidents over the past thirty years;
- Creating an environment for persons on board a vessel that reflects current community expectations for safety;
- Providing a consistent and auditable benchmark for determining initial and ongoing compliance of a vessel to the standard;
- Providing a performance based framework that supports innovation through equivalence;
- Reflecting advances in technology and scientific understanding;
- Providing a standard that can easily be implemented by marine authorities on a consistent basis;
- Maintaining a level of compatibility with the existing provisions in the USL Code so as to avoid unnecessary conflicts;
- Better taking into account the particular nature and area of operations of each individual vessel;
- Creating greater alignment with international standards and implementing international obligations;
- Alerting vessel designers, builders, owners and operators to their obligations under OHS and the disability discrimination law;
- Removing flaws in the standard that created ambiguities or unacceptably high risks; and
- Addressing changes in the size and shape of the population.

4. STATEMENT OF OPTIONS

4.1. Overview

The proposed standard is the National Standard for Commercial Vessels (NSCV) Part C Design and Construction Section 1 Arrangement, Accommodation and Personal Safety. It was prepared as part of the review of the Uniform Shipping Laws (USL) Code. The proposed standard replaces portions of Subsections 5E 5F and Sections 6, 7, 13 and 18 of the USL Code.

A number of options are considered in this RIS for the maintenance of commercial vessel safety through a standard on arrangement, accommodation and personal safety. These options are:

- Option 1 - Status Quo (USL Code Sections 5E, 5F, 6, 7, 13 and 18);
- Option 2 - Adopt External Standards; and
- Option 3 - The Proposed Standard, the NSCV Part C Section 1.

4.2. Option 1: Status Quo based on the USL Code

This option would see the retention of the requirements of the USL Code for arrangement, accommodation and personal safety.

Under this option, nothing is done to effect changes to the USL Code regarding requirements to arrangement, accommodation and personal safety of commercial vessels in Australia.

4.3. Option 2 - Adopt External Standards

Option 2 means Australia would adopt one or more of the various standards currently in use internationally or in other countries for their domestic usage.

There are numerous national and international standards that are relevant to the content of the proposed standard, including:

- **SOLAS:** Chapter V of SOLAS is meant to apply to all vessels, and thus could provide a basis for arrangement, accommodation and personal safety requirements in Australia. However, Chapter V provides relaxations on vessels operating in coastal areas and vessels less than 55 metres. These provisions rely on Authority and Surveyor discretion and so there is effectively no stated deemed-to-satisfy requirement. As a result, Chapter V does not provide quantitative criteria for compliance for the vast majority of domestic commercial vessels.
- **American Boat and Yacht Council standards:** ABYC standards for recreational vessels cover the smaller end of the fleet. However, these standards conflict with those of SOLAS in certain respects; for example

SOLAS requires visibility forward of minimum 2 vessel lengths while ABYC requires minimum of 4.

- **MLC 2006:** The MLC provides a standard for accommodation on seagoing vessels of greater than 200GT. As such, it does not provide solutions for sheltered water vessels, fishing vessels or for the numerous small seagoing vessels. Nor does MLC cover passenger accommodation.
- **International Standards Organisation:** ISO small craft standards also pertain to the smaller fleet and cover vessel arrangement. However, there are concerns with applying the ISO standards to the commercial fleet, in particular regarding the requirements for minimum size of an escape.
- **Australian standards:** Various Australian standards specify different requirements for stairs, ladders and gradients, as well as personal safety.
- **UK Marine and Coastguard Agency Code for Small Commercial vessels and Pilot vessels:** MGN280 provides personal safety standards for smaller ships, but is limited to non-passenger vessels and vessels less than 24 metres in length.

As illustrated above, none of the international standards covering accommodation, arrangement and personal safety provide a comprehensive standard for the entire Australian domestic commercial vessel fleet.

Question to elicit specific public comment #1:

Public comment is sought on whether there might be an existing comprehensive standard that would provide a viable alternative to the draft standard.

4.4. Option 3 - The proposed standard, NSCV Part C Section 1

4.4.1. Overview

The proposed standard was developed through a review of the arrangement, accommodation and personal safety sections of the USL Code.

It draws upon the content of many of the relevant national and international standards specified in Option 2, but contains a unified comprehensive set of requirements. The proposed standard, like the USL Code, has been developed to apply specifically to the Australian domestic commercial vessel fleet, and contains a range of requirements that are suited to all the different vessel types.

The content of the draft standard is illustrated by the list of Chapters:

Chapter 1 Preliminary

Chapter 2 Operating stations

Chapter 3 Arrangements for provision of navigation signals

Chapter 4 Accommodation spaces

Chapter 5 Access, escapes and evacuation

Chapter 6 Personal safety

Annex A Excerpt from the COLREGS – International regulations for preventing collisions at sea, 1972

Annex B Methodology for determining the minimum required aggregate width of doors, stairways, corridors and ramps serving a space

Annex C Guidance on the safety of plant located on deck of a vessel

The following sections highlight the more significant aspects of the draft standard. The differences between the proposed standard, the NSCV Part C Section 1, and the USL Code, are detailed in Annex A to this RIS.

4.4.2. Required outcomes

As discussed above, a performance-based framework is utilised in the proposed standard. Under this framework, required outcomes are listed in each chapter that establish the safety outcomes for arrangement, accommodation and personal safety on the vessel.

The proposed required outcomes are:

Operating Stations

PERCEPTION AND SITUATIONAL AWARENESS

A vessel must be arranged to ensure that the person operating the vessel has sufficient information to identify navigational hazards, assess the risks and take appropriate measures to control those risks in both normal and abnormal conditions of operation.

COMPLIANCE WITH COLLISION REGULATIONS

A vessel must be arranged to facilitate the person operating the vessel being able to comply at all times with their obligations under the Collision Rules.

HUMAN FACTORS

A vessel must be arranged to minimise the risk of operator error or fatigue arising due to the design and arrangement of the operating station.

Arrangements for Provision of Navigation Signals

COLLISION AVOIDANCE

A vessel must be provided with means to inform other vessels of its location, nature, size, course and status so as to facilitate avoidance of collision or contact.

Accommodation Spaces

MINIMUM CLEAR HEIGHT BETWEEN DECKS

Protection of persons from head and neck injury

The space between deck and deck head on a vessel must be sufficient for persons to avoid head or neck injury rising from unexpected physical contact with the deckhead, deck beams or other items that project below the deckhead.

Facilitation of rapid movement

The space between deck and deck head on a vessel must be sufficient to facilitate the rapid movement of persons along escape and evacuation routes in the event of an emergency.

PASSENGER ACCOMMODATION

Protection from excessive motions

A vessel must be arranged to reduce the risks to persons of excessive vessel motions.

EXAMPLES of excessive motions: Rolling and pitching in large seas, large accelerations from extreme manoeuvres.

Prevention of fatigue

A vessel must be arranged to avoid the risks associated with fatigue of passengers.

EXAMPLES of risks of fatigue: Passengers becoming unstable after standing for extended periods, passengers sitting on bulwark rails as a place to rest

Crew access

Spaces containing passengers must be provided with sufficient space to allow rapid access by crew members to any location within the space, as might be required for safety purposes.

Escape from hazards within a space

Sufficient free space must be provided to allow passengers to quickly move away from the immediate vicinity of hazards that might develop within the space.

Safe movement of persons

Sufficient free space must be provided to allow the movement of passengers without undue physical contact with others in the space.

BERTHED ACCOMMODATION

Prevention of fatigue

A vessel must be arranged to provide an environment that facilitates the rest and sleep of crew members so as to prevent the build-up of fatigue.

Disease and other risks to health

Accommodation on a vessel must be arranged to prevent the spread of disease and to minimize other risks to health.

Avoidance of conflict

Sufficient free space must be provided in sleeping accommodation to avoid interference that would compromise the harmony between persons on board the vessel.

Promotion of social harmony

Where crew are expected to live on board for extended periods, accommodation must be arranged to promote and enhance social harmony on board.

NOTES:

1. A significant proportion of crew fatalities on vessels arise from suicide, homicide and drug abuse.

2. Social harmony is enhanced by mutual respect, fairness, privacy, a sense of community, rest, recreation and absence of discomfort.

SANITARY ARRANGEMENTS

Protection of persons from hazardous behaviour

A vessel must be provided with appropriate and sufficient toilet facilities so that persons on board can respond to urgent calls of nature without engaging in hazardous behaviour (e.g. such as leaning over rails and bulwarks, or being exposed to the force of the sea)

Promotion of hygenic behaviour

Sufficient and appropriate toilet and washing facilities must be provided on board a vessel to promote and facilitate hygienic behaviour.

Sanitary arrangements must be arranged to protect the privacy of individuals using them, to the extent necessary to promote their use.

Prevention of growth and transmission of micro-organisms

Human wastes on board a vessel must be collected, transported and disposed in a manner that protects the health of persons and prevents the transmission of disease.

Sanitary arrangements must be arranged to facilitate regular and effective cleaning to avoid the build up of unsanitary substances and promote sanitary device use.

Access, Escapes and Evacuation

ESCAPE FROM HAZARDS WITHIN SPACES ON THE VESSEL

Enclosed spaces on a vessel must be provided with escape routes of sufficient number and size to effectively eliminate or reduce to acceptable levels the consequences of persons on board of the vessel being exposed to hazards such as fire, smoke, and flooding.

REDUNDANCY IN ESCAPES

Alternative escape routes must be provided to control the risks of entrapment arising from the blocking of a single escape having regard to the magnitude of risks that would arise should the escape route be blocked; i.e., the likelihood and consequences of exposure to hazards.

FACILITATE MOVEMENT FOR EVACUATION

The vessel shall be designed and constructed to facilitate in times of emergency the orderly and timely movement of persons to places of assembly and to disembarkation points for evacuation into survival craft

FACILITATE MOVEMENT BETWEEN DECKS

Means of access between different deck levels on the vessel must be designed and constructed to facilitate the rapid movement of persons in an emergency and to avoid tripping hazards.

ACCOMMODATE THE NEEDS OF A LARGE PROPORTION OF THE POPULATION

Means of escape must be designed to accommodate not less than 95 percentile range of potential users, assuming users are wearing a lifejacket of the type required to be provided on board the vessel.

NOTES:

1. For ferries and other vessels engaged in operations for the general public, this may require characteristics capable of accommodating the disabled, including persons in wheel chairs.

2. For manual inflatable lifejackets, the assumption may be limited to taking account the wearing of such life jackets in their uninflated state.

Personal Safety

PROTECTION OF PERSONS FROM THE ELEMENTS

Protection from the sea

A vessel must be arranged to protect persons from being physically injured due to exposure to seas that might come onto the deck of the vessel.

Protection from the weather

A vessel must be arranged to prevent the adverse health and fatigue effects on persons that arise from being exposed for extended periods to extremes of weather.

NOTE: Extremes of weather include rain, spray, wind, heat, cold and sunshine.

BULWARKS AND GUARD RAILS

Prevention of persons falling overboard including falling over a bulwark or guard rail

A vessel must be provided with arrangements that prevent persons from falling overboard taking into account the competence and physical characteristics of the persons.

Prevention of persons falling from heights on a vessel including falling over a bulwark or guard rail

A vessel must be provided with arrangements that prevent persons from falling from elevated locations on the vessel taking into account the competence and physical characteristics of the persons.

Prevention of persons falling by passing through a bulwark or guard rail

The arrangements must be capable of retaining a person lying on the deck from falling (either overboard or from elevated locations) due to seas on deck, excessive deck angles or excessive accelerations.

Protection from machinery

Means must be provided to eliminate or reduce to acceptable levels the risks to persons from hazards arising from machinery operating on the vessel.

NOTES:

Hazards include contact with or exposure to high or low temperatures, contact with moving parts or energized electrical components, exposure to high sound levels, exposure to spaces containing low levels of oxygen or unacceptable levels of toxic substances.

Specific requirements relevant to a number of these hazards are contained in NSCV Part C Section 5—Engineering.

Protection from slip and fall hazards

A vessel must be provided with measures to eliminate or reduce to acceptable levels the risks associated with fall and slip hazards.

SAFE ACCESS TO AND FROM THE VESSEL

Access between a vessel and wharf, pier or landing

Safe means must be provided for persons boarding or disembarking from the vessel to a wharf (or other intended shoreside location) taking into account variations in wharf height, tidal range and movement of the vessel due to waves, wind or current, and the nature of the surfaces onto which persons are likely to require access.

Access between a vessel and another vessel

Where transfer of persons from one vessel to another vessel is likely or envisaged, safe means for affecting such transfer must be provided.

NOTE: Such operations may include embarking and disembarking a pilot, or transfer of persons to tender vessels.

Means of access to be appropriate

The means of access must be safe taking into account the needs of not less than 95 percent of the range of physical dimensions and capabilities of persons likely to use the vessel.

Recovery of persons that fall overboard

A vessel must be provided with means to enable a person who has fallen overboard to be recovered on board without being exposed to additional risks that would be unacceptable.

NOTE: Unacceptable risks include close proximity to propellers, rescuers falling off the vessel while attempting recovery, rescuers having to jump into the water to effect recovery and injury due to lifting while undertaking recovery.

4.4.3. Deemed to satisfy solutions

The required outcomes establish the overall framework for the application of deemed to satisfy solutions. A graded approach is used to match the specified requirements against the vessel's level of risk. The key risk parameters used to establish relative risks are operational and the use of the vessel (for example different requirements apply to passenger vessels as opposed to non-passenger vessels).

In developing the deemed to satisfy solutions, standard draws on a large range of diverse national and international standards; the following list provides an overview of how existing international standards have been drawn on and incorporated into the proposed standard.

- **MLC 2006**: MLC increased the requirements for crew and passenger accommodation. Australia ratified the MLC 2006 on the basis of the *Maritime Labour Convention Regulation Impact Statement*[25] which stated that Australian ratification would ensure decent working and living conditions for seafarers on both Australian and foreign vessels; reinforce Australia's reputation as a respected port state; and maintain the competitiveness of Australian-flagged ships. The provisions of the MLC have been applied to certain vessels as required by the MLC. Where the application of the MLC is discretionary under the MLC standard, its requirements have been considered as part of the development of appropriate requirements in the proposed standard.
- **IMO standards**: IMO standards for ladders, marking of escape and evacuation routes, minimum height of bulwarks and guard rails, protection from hazardous plant, stairway construction, guardrails, and special purpose / working decks have been incorporated into the proposed standard as deemed to satisfy requirements for certain vessels.
- **SOLAS Chapter V**: Chapter V requirements for field of vision from the operating compartment have been incorporated into the proposed standard as deemed to satisfy requirements for certain vessels.
- **Collision regulations**: The IMO COLREGS requirements for navigation lights have been incorporated in the standard as deemed to satisfy requirements for certain vessels.
- **American Boat and Yacht Council standards**: ABYC standards for operating stations, guardrails and special purpose / working decks, have been incorporated in the proposal standard as deemed to satisfy requirements for certain vessels.

[25] Prepared by the Commonwealth Department of Education, Employment and Workplace Relations

- **International Sailing Federation standards**: ISAF specifications for special purpose decks and special working decks have been incorporated in the proposed standard as deemed to satisfy requirements for certain vessels.
- **Building Council of Australia**: BCA specifications for special purpose decks and special working decks, and bulwarks and guard rails, have been incorporated into the proposed standard as deemed to satisfy requirements for certain vessels.
- **International Code of Safety for High-Speed Craft**: HSC Code requirements for assembly stations and bulwarks and guard rails, have been incorporated into the proposed standard as deemed to satisfy requirements for certain vessels.
- **US Code of Federal Regulations**: US Code requirements for guardrails have been incorporated into the proposed standard as deemed to satisfy requirements for certain vessels.
- **Marine Orders**: Marine Order standards for access to and from the vessel, gangways and cargo access ramps have been incorporated into the proposed standard as deemed to satisfy requirements for certain vessels.
- **Australian Standards**: referenced Australian standards include *AS 1657—Fixed platforms, walkways, stairways and ladders — Design, construction and installation*; *AS/NZS 2080—Safety Glass for Land Vehicles*; *AS 2227—Yachting harnesses and lines – conventional lines*; *HB 197:1999 An Introductory Guide to the Slip Resistance of Pedestrian Surface Materials.*
- **American Bureau Of Shipping**: includes reference to G*uidance Notes for the Application of Ergonomics to Marine Systems* and *Guidance Notes on Ergonomic Design of Navigation Bridges (Publication #119)*.
- **Commonwealth Disability Standards for Accessible Public Transport**: Formulated under the Disability Discrimination Act 1992, the Transport Standard has guided the proposed requirements for doorways, stairs, seating, sanitary facilities and accommodation for large passenger vessels.
- **Fire Safety Systems Code**: The FSSC has influenced the proposed requirements.
- **International Standards Organization**: ISO standards, including *ISO 15085 — Small craft — Man-overboard prevention and recovery*, have been applied or incorporated into the proposed standard.
- **National Occupational Health & Safety Commission**: the *National Standard for Plant* has been incorporated into the proposed standard.

Many of these standards (such as the ISO standards on stairways) are incorporated into the NSCV, while others are cross referenced.

There is a tension between direct reference to standards and incorporation of elements of standards. Direct reference has the advantage that it does not become out of date when the source standard is revised. However, it has the disadvantage of being cumbersome and also not necessarily being fully comprehensive or appropriate across the range of commercial vessels.

The NSCV (including the proposed standard) makes direct reference in certain circumstances where appropriate, such as MLC or SOLAS Chapter V. NSCV Part B Clause 1.6 provides that any documented referenced in the NSCV should be considered as the latest revision of the document, including amendments. Hence amendments and revisions are automatically picked up where a standard is directly referenced keeping the provisions up to date. Where it would be more convenient or effective, the NSCV incorporates portions of a standard.

5. IMPACT ANALYSIS

5.1. Scope of vessels impacted

The NMSC estimates that up to 1,300 commercial vessels each year in Australia may be impacted by the proposed standard, including newly constructed vessels that require survey, vessels upgrading in survey, and vessels entering survey for the first time for various reasons.

These are distributed over all vessel classes and areas of operation and include fast craft. This estimate is at the higher side and considered a maximum, based on information supplied by marine authorities of the various jurisdictions to the NMSC.

5.2. Impacts of Option 1 – Status Quo

5.2.1. Benefits of the Status Quo

The Status Quo is the easiest option to be adopted as it is already in force. The continuation of this option means no changes in the existing requirements and no additional compliance costs will be incurred.

The major benefit of Option 1 is its familiarity. The current standards have largely been reasonably effective in terms of safety outcomes, even if the administration has not been the most efficient. The ad-hoc systems to cope with the deficiencies of the current standards are already in place and a significant advantage of the option is that it avoids the need for change with the short-term disruptions that brings. However, in relative terms, the benefits to be derived from Option 1 are comparatively lower than those of Options 2 and 3.

5.2.2. Costs of the Status Quo

As already stated in Chapter 2 of this draft RIS, the present requirements of the USL Code have some deficiencies and if they remain there will be cost implications to the society in the long run.

Considering the main benefits and costs of the status quo, retaining the USL Code in its existing form is not a preferred option.

5.3. Impacts of Option 2 – Adopt External Standards

While there are a range of external standards that could be adopted, in place of the USL Code, there is no single, comprehensive standard that could be applied to the Australian domestic fleet.

Attempting to cover the field by adopting a “patchwork quilt” approach, applying elements of the various relevant international and national standards, is fraught with difficulties, as:

- The standards often conflict with one another. For example, many of the standards contain different requirements for the slope and geometry of stairs, and arrangements permitted by some standards are prohibited by others. Such ambiguities can result in uncertainty as to the appropriate performance benchmark. The means by which these conflicts are resolved would have to be placed in a document that would itself be a standard;
- The cost of obtaining the various standards would be excessive;
- Understanding and applying multiple standards would make application of requirements cumbersome;
- Gaps would remain in requirements that are not covered by the various standards and that would need to be filled by additional standards. For example, standards for emergency escapes through bulkheads are not addressed by any of these international options; and
- The standards have been developed for a particular purpose and do not provide for the special challenges encountered on board smaller domestic vessels.

In addition, a number of the international standards conflict with current practice under the USL Code. A change in criterion in maximum allowable angle of stairway may have significant impact on existing designs, resulting in far greater costs than the proposed standard.

Finally, the majority of national and international standards are not framed to facilitate a performance-based approach. Required outcomes and the elements that form deemed-to-satisfy solutions would therefore not be clearly defined, and would have to be superimposed by the NMSC.

Although these international standards provide a valuable reference to acceptable solutions for the vessels they cover, direct adoption of the external standards is not the preferred option.

5.4. Impacts of Option 3 – The Proposed Standard

A detailed review of the differences between the proposed standard and the USL Code is contained in Annex A. This section of the RIS contains a discussion of the overall expected benefits and costs of Option 3.

5.4.1. Benefits of Option 3 – Qualitative Analysis

Much of the content of the proposal has been derived from existing standards. These standards have come from a wide variety of sources. They have been developed by practitioners from around the globe. Each standard effectively represents the outcome of a process utilising a mixture of quantitative analysis, qualitative assessment and expert judgement. The major purpose of this draft standard has not been so much to invent new standards, but to adapt and grade

standards from relevant sources to provide a single comprehensive and coherent unified standard to meet the needs of the domestic commercial vessel industry in a manner consistent with the performance-based structure.

Option 3 should deliver the following benefits:

A. Improvements to safety (reduced cost of fatalities, injuries and lost vessels);

B. Increased flexibility of design choices (through the performance based nature of the standard);

C. Requirements that are better matched to the specific needs of the vessels, resulting in a focus of the risk control measures on the areas of highest risk;

D. Social benefits (improvements in living conditions for crew, reducing health impacts and vessel incidents, and improved access to public transport);

E. More efficient administration (due to improved clarity); and

F. Alignment with other relevant national and international standards already or soon to be embedded in Australian law.

Each of these expected benefits is discussed in more detail in the following sections.

A. Safety benefits

Following are a few of the changes that are expected to have significant safety benefits.

Field of vision from the operating station

As outlined in Chapter 2, collisions with other vessels and with fixed objects are the most frequently recorded commercial vessel incident over the years 2005 to 2008 representing 40% of total reported vessel incidents. While visibility from the operating station may be just one factor in a chain of events, there is clearly a large potential benefit to be achieved by reducing the likelihood (and perhaps also the consequences) of collision by facilitating the observation of potentially hazardous situations.

The proposed standard represents a significant change from the USL Code by introducing quantifiable criteria for vision from the operating station.

Aligning standards for fishing vessels

Measures contained in the proposed standard align the fishing sector with the non-passenger sector to achieve a consistent performance-based structure in the standard. The standard brings safety requirements in fishing vessels up to a benchmark that is parallel to those required on other commercial vessels therefore reducing the probability of fatality on fishing vessels to that which is equal to other commercial vessels. The standard still incorporates sufficient flexibility to accommodate special needs of fishing vessels and other workboats

by proactively specifying measures that would in any case be likely to comply with occupational health and safety obligations.

The principle of equal treatment for equal risk lies at the core of the performance-based approach. These measures are likely to contribute to reducing the disproportionately high fatalities associated with the fishing sector indicated by Table 5 in Chapter 2.

Reducing the impact of an incident

Other requirements contained in the standard will prevent an incident becoming an accident and an accident resulting in a catastrophe. Vessel accidents are rarely investigated to the depth necessary to pinpoint the exact chain of events, let alone identify quantitatively the impact of subtle changes in the factors that lead to each event. However, a qualitative approach can be taken on the basis that improvements in escape routes will be a factor that can help all passengers and crew evacuate within a short period reducing the likelihood of drowning. With changes to the physical dimensions and mobility of persons, some of the changes are needed just to keep par with previous safety outcomes; for example, height between decks, width of corridors in passenger vessels. Such improvements, targeted to vessels of higher risk, have a reasonable likelihood of providing a significant if not measurable benefit.

Indirect cost savings associated with improved safety

As a result of the safety improvements outlined above, cost savings can be expected arising from:

- Avoiding and/or reductions in the cost of search and rescue;
- Reduced risk of fatalities;
- Reduced risk of serious injuries;
- Reduced property losses;
- Avoiding the cost of investigating marine incidents; and
- Reduced interruption to business arising from accidents.

Question to elicit specific public comment #2:

Do you believe that draft standard would likely have a positive impact on the safety of the vessels affected?

B. Increased flexibility of design choices

The arrangement, accommodation and personal safety standard is expected to result in relatively lower costs in the long term because the design of the vessel

will be more efficient due to the performance based structure of the deemed to satisfy requirements.

The standard has flexibility that gives the designer a measure of control to choose the parameters that will allow the most appropriate deemed-to-satisfy solution. This option is expected to result in better solutions to achieve outcomes, with subsequent savings of time and money.

For example, a vessel that has stairs designed to a recognised overseas standard that does not meet the deemed-to-satisfy requirement would likely be accepted as an equivalent solution provided that standard is appropriate to the application.

The new options are expected to result in increased competition between suppliers of vessels and equipment. There may be increased competition by suppliers to meet quality assurance requirements and testing certification. There may be increased competition to demonstrate that new designs and equipment comply with the proposed standard.

C. Requirements better matched to the specific needs of the vessels

The draft standard contains performance based requirements that take into account various factors that affect the inherent risks of a vessel. As the requirements are more scaled, the costs become more proportionate to the risk involved.

As a result, in a number of areas the requirements are proposed to be relaxed in the proposed standard as compared to the USL Code. These include:

- Evacuation paths. For vessels with assembly stations, reduction in the required width of passageways as compared to the USL Code.
- Minimum width of passageways other than corridors. Reduction in current requirements where the passageway is not a thoroughfare for escape or evacuation (380 – 700 mm rather than 600 - 750 mm).
- Passageways that serve only as a means for occasional access. Passageways for the purposes of inspection or maintenance may be less in width than other passageways.
- Step dimensions. Differentiation in requirements for steps on stairs for high capacity escapes and those for low capacity escapes. The latter would have increased flexibility.
- Stairways—Handrails. Relaxation of handrail requirements – the USL code requires intermediate handrails for stairways exceeding 1500 mm; under the proposed standard, this is increased to 1800 mm, decreasing construction costs.
- Gangways. New gangway requirements that are better suited to smaller passenger vessels.

- Gangplank. For vessels where full gangways may be impractical, gangplanks would be accepted in limited circumstances. This increases flexibility and reduces construction costs.

D. Social benefits

The proposed standard will provide a diverse range of health and well-being benefits, with consequential safety benefits, not only to crew but also for passengers.

Crew

A large number of measures within the standard will improve conditions for the crew. Examples of such measures include:

- Increases in the amount of headroom. This will maintain parity with previous requirements to a similar proportion of persons for which the accommodation is fit for habitation. Sufficient headroom is important to mitigate the likelihood of head, neck and back injuries;
- New criteria for ventilation, temperature control and noise in accommodation for voyages greater than 36 hours. These will reduce the likelihood of crew fatigue and hence reduce the likelihood of crew error;
- Changes to maximum number of occupants in sleeping accommodation will reduce the likelihood of fatigue. It also will mitigate against social impacts that may on longer voyages lead to substance abuse, suicide or homicide;
- A specified minimum quantity of potable water required on vessels for journeys over 36 hours provides a deemed-to-satisfy benchmark that does not require interpretation. It reduces health risks associated either with lack of water or consumption of non-drinking water;
- Increases in floor area required per person in crew accommodation will moderate potential social risks associated with high density living; and
- Provision of facilities for the sick or sicks bays (depending on size of vessel) on journeys over 72 hours, will also support the health of the crew.

These provisions have been proposed to apply in a graded approach to remove any unnecessary burden on vessels for which the journey is such that the benefit would not to warrant the cost of specific measures.

Passengers

- Increases in the amount of required headroom to redress the loss of headroom arising from changes in demographic. Not only is this important for avoiding head, neck and back injury, but also facilitates rapid escape and evacuation; and

- Provisions that accommodate community expectations for persons with reduced mobility, including accessible berths and sanitary facilities, doorways and corridors suitable for wheelchair access and priority seating.

E. More efficient administration

At present there is a lack of clarity and omissions which can lead to inconsistencies and different interpretation and application of the USL Code requirements. A lack of clarity leads to ad hoc interpretation, negotiation and the need to exercise discretion to avoid having to apply the current standards where they might be considered inappropriate or technologically superseded. A revised standard that accommodates latest thinking should avoid what can be a time-consuming and frustrating process. Furthermore, it will avoid variations in the exercise of discretion that cause variations and provide barriers to mutual recognition.

A clearer set of requirements should contribute to lower costs by increased transparency for compliance and reducing the need for extensive interpretation by naval architects, builders and surveyors. This should reduce the frequency of error and avoid the need to rework solutions to comply. Reduced costs which are savings constitute the benefits to be derived.

Greater efficiency also is expected to result from faster training of staff at marine authorities and vessel crews because the standard will be easier to interpret and understand. These efficiencies can be measured in terms of cost savings which constitute benefits to the community.

F. Alignment with other requirements

Alignment with OHS and anti-discrimination laws and the MLC 2006 alerts vessel designers, builders, owners and operators to their obligations under these laws. This reduces compliance costs, as these requirements are factored into vessel design and construction from the outset.

Question to elicit specific public comment #3:

Do you agree that the proposed standard will reduce the overall cost of applying and administering the standard?

Question to elicit specific public comment #4:

Can you give an idea of where you think the costs and benefits for administration might lie and/or what their magnitude might be?

5.4.2. Costs of Option 3 – Qualitative Analysis

The cost impact of the proposed standard is extremely difficult to identify. It is a technical standard which gives guidance and directives on design and

construction of commercial vessels in Australia. The requirements may have indirect effects, such as altering the aesthetic appearance of a vessel, or changing the utility of a deck space for a given activity that may have a broader impact on the vessel.

NEW VESSELS

For the vast majority of vessels to which the standard would apply (new vessels), the impact occurs at the design stage, with vessel designs altered to accommodate the new requirements. Whether or not the costs of the construction and subsequent operation increase as a result of the proposed standard will depend on the individual vessel and design.

In addition, greater emphasis on performance outcomes in the proposed standards, rather than the prescriptive solutions of the status quo, should provide designers with the opportunity to better optimise their designs for their intended functions while still maintaining required levels of safety. The flexibility incorporated into the approach should enable designers to maximise the benefits in ways that may not be immediately apparent at this stage. This is one of the objectives of incorporating a more performance based approach into the standard.

Option 3 may impose additional or increased costs in the following areas:

A. Vessel design and construction;

B. Survey;

C. Preparing the standard;

D. Transition.

Each of these areas is considered below.

A. Impacts on vessel design and construction

The most important impacts on vessel design and construction of the proposed standard are highlighted below, together with the other costs of the standard in terms of development and implementation. A complete overview of the differences between the proposed standard and the USL Code is contained in Annex A.

Crew accommodation

MLC 2006 significantly increases requirements for crew accommodation on passenger and cargo vessels. The NSCV applies the MLC 2006 to vessels to which the MLC must apply under the terms of the MLC, and revises the crew accommodation requirements for other vessels in light of the MLC standard (without actually applying the MLC to these vessels).

Key proposed changes to crew accommodation include:

- Increased minimum headroom required.
    - For vessels 35 m or over, minimum required headroom increases from 1.9 m (USL Code) to 1.98 m in accordance with ILO C133. This is less than MLC 2006 requirement of 2.03 metres.
    - For vessels < 35 m, 1.9 m requirement is maintained.
- Increased minimum floor area per person.
    - For vessels on journeys over 36 hours, increase in floor area required of 10 – 20% per person (vessels up to 35m) and 50% for vessels over 35m.
- Increased minimum size of sleeping berths.
    - For vessels up to 35m on journeys 12 – 72 hours, minimum size of sleeping berths is increased from 1900 x 680 to 1900 x 700.
    - For vessels up to 35m on journeys over 72 hours, minimum size of sleeping berths is increased from 1900 x 680 to 1980 x 800.
    - For vessels 35 m and over on journeys 12 – 36 hours minimum size of sleeping berths is increased from 1900 x 680 to 1900 x 700.
    - For vessels 35 m and over on journeys over 36 hours minimum size of sleeping berths is increased from 1900 x 680 to 1980 x 800.

There are indirect effects that can arise from these changes. They could adversely impact characteristics such as stability, deck area, vessel configuration, bollard pull on tugs, cargo capacity, and so on. However, as they impact the vessel at the design stage, it is impossible to identify the cost of the requirements across the fleet, as the cost will be vessel-specific and will depend on how the designer addresses the requirements.

The key principle behind the draft standard is to limit the impacts to vessels for which the benefits will likely be manifest. The graded approach based on length of voyage provides a quantifiable threshold for application that supplements the discretionary clauses in the MLC 2006 applicable to vessels less than 3000GT. In reality the grading also tends to eliminate those vessels for which application of the requirements would present the greatest burden (i.e., smaller vessels and vessels carrying large numbers crew to service day passengers).

Access for persons of reduced mobility

It is proposed that Class 1 vessels carrying 32 passengers or more would be required to provide access for persons with a disability. This includes:

- Increased width for doorways and corridors;
- Priority seating;
- Allocated spaces for wheelchairs;

- Accessible sleeping berths;
- Accessible sanitary facilities; and
- Sick bay facilities for vessels on journeys over 72 hours, including a dedicated sick bay area for class A vessels over 35m.

Construction costs may increase as a result of these requirements.

Question to elicit specific public comment #5:

Stakeholders are requested to provide estimates of the costs for class 1 vessels associated with greater access for persons of reduced mobility.

Protection from the elements

Open decks accommodating persons for extended periods on sea going vessels are proposed to be specifically required to provide some protection from the elements, which may increase construction costs. Previously, requirements were applied administratively, differing between individual jurisdictions. There was no consistent policy and no transparency of requirement. The proposal attempts to reflect a middle ground between existing administrative requirements.

Increased height of bulwarks and guard rails

In addition, there is proposed to be a minimum standard height requirement of 1000 mm for bulwarks and guard rails on some vessels that could previously adopt a lower guard-rail height to reflect modern OHS obligations. This may increase construction costs. However, the proposal provides increased flexibility to accommodate a wide variety of vessel functions and operator needs from game fishing to paraflying, pilotage to line fishing. Reduced bulwark and guard rail height is available as an option subject to additional safety measures. The additional safety measure arguably should already be provided to meet OHS obligations.

Changes to requirements for field of vision from the operating station

Wheelhouses may be required to be raised in height potentially impacting the stability and thereby the earning capacity of the vessel.

In addition, the proposed standard suggests a means by which sailing vessels could meet their obligations under the Collision Regulations - by maintaining a lookout when the view from the operating station is obstructed by the sail.

This proposal, that minimum standards should be applied to sailing vessels when proceeding under power may preclude current production yachts from being deemed-to-satisfy, particularly some sailing catamarans and yachts with large coach house structures over their deck saloon.

Control spaces

Requires provision of alternative escapes for control spaces which are likely to be occupied in an emergency. As a result, at least one operating compartment window may have to be openable or breakable for escape with some sort of route to safety.

Prohibition on escapes leading into the same high fire risk space

New limits on the location of escapes to ensure that they achieve safety outcomes. This limits the location of escapes and may require provision of protected escape tunnels. However, it will largely affect only vessels having ro-ro decks above the machinery space.

B. Survey costs

The marine authorities are likely to incur some costs in the course of approving equivalent solutions under the proposed standard. These costs are most likely to be offset to some extent by:

- the reduction of costs of administering a standard that currently needs to be frequently interpreted and adapted to specific vessels; and
- relatively lower costs for ship builders since equivalent solutions gain mutual recognition on a national basis and the greater certainty in requirements which will help in planning.

C. Cost of preparing the standard

There are costs incurred on developing the standard. These costs include the direct cost of the NMSC preparing the standard and in-kind contributions by professionals from industry groups and jurisdictions who are voluntarily involved in developing the standard. The direct costs to be incurred are the costs involved in drafting the standard, promoting the standard to engender public comment, and organising reference group meetings to discuss the submissions from the public. However, these are one-off costs which are offset by the benefits that flow from having an up-to-date performance based standard applicable to vessels over the forthcoming decade and more. These costs are very small in proportion to the overall cost of each vessel and negligible when compared to the potential benefits of the proposed standard. The standard when completed will be electronically published and no significant printing cost will be associated with it.

D. Transition costs

The transition costs associated with introducing the proposed standard are almost zero as many of the requirements in the standard are the same or similar as those in the present USL Code or are already being applied by industry.

Application of the proposed standard would be facilitated by the development of computer design tools such as the standards assistants developed for some

other NSCV standards. At a one-off cost to the jurisdictions of $10,000 to develop the "Standards Assistant", the Standards Assistant would facilitate accurate and rapid application of the standard to a design by both applicants and assessors. Such a tool would reduce the cost of design considerably compared to current methods.

Stakeholders are very knowledgeable about the present USL Code. However, the performance-based structure of the draft mirrors that contained in other sections of the NSCV currently being applied to commercial vessels. Furthermore, a number of stakeholders will have already been exposed to the proposed standard through having contributed to its development over several years in the Reference Group. These stakeholders include marine authorities, vessel designers, builders and operators, equipment suppliers, and ship owners.

This standard will be used primarily by vessel designers, vessel builders, equipment manufacturers, equipment suppliers and marine authorities.

Question to elicit specific public comment #5:

Suggestions are welcome from stakeholders on any other costs that have not been identified above and which are likely to be incurred by complying with the proposed standard.

EXISTING VESSELS

The standard also applies to existing vessels being surveyed for the first time, and vessels upgrading survey. The number of such vessels is extremely difficult to estimate. For existing vessels, the costs associated with complying to any standard to which they were not built may be significant, be it the current standard (the USL Code) or the proposed standard. Whether to acquire an existing vessel at a reduced price and upgrade it to meet relevant standards or build a new vessel is a business decision that is largely driven by the cost of the new vessel. Hence, the total cost of a new vessel is still the relevant benchmark even for existing vessels entering survey for the first time or upgrading survey.

If the proposed standard were not introduced, existing vessels entering survey for the first time would still be required to meet the relevant requirements of the prevailing standard – the USL Code. Upgrading a vessel that was never built to a commercial vessel standard (and may not have been built to any recognised standard) to meet the requirements of the USL Code may indeed be a prohibitive cost. That is the idea of imposing a standard, to eliminate substandard vessels.

The impact of the proposed standard on these vessels is only an incremental impact – the difference between upgrading to the requirements of the USL Code and upgrading to the proposed standard. However, as with new vessels,

the greater emphasis on performance outcomes in the proposed standard, rather than the prescriptive solutions of the USL Code, may reduce costs for existing vessels being surveyed for the first time, or upgrading in survey.

The exact nature of the incremental impact is impossible to identify, as it will be on a vessel by vessel basis. Some existing vessels entering survey for the first time may have been in commercial service overseas. These may already be subject to standards higher than the current USL Code, and are likely to be similar to those in the draft standard. For these vessels, the cost relative to a new vessel may reduce.

A decision of whether to upgrade an existing vessel or to place an existing vessel into survey for the first time will be based on cost. Where it is more cost effective, a new vessel will be built. Where savings are to be made, an existing vessel will be considered.

Question to elicit specific public comment #6:

Suggestions are welcome from stakeholders on costs associated with existing vessels entering survey for the first time, or being upgraded, being required to meet the proposed standard rather than the USL Code.

5.5. Option 3 - Benefit-Cost Assessment

5.5.1. Objective of the BCA

The objective of a Benefit-Cost-Assessment (BCA) is to supplement the qualitative information on the impact of a proposed standard with economic data (monetised benefits and costs) where available to further support decision-making. The BCA compares the situation of no regulatory change (i.e. Option 1 – the USL Code) with the implementation of the proposed standard (i.e. Option 3 – the proposed standard).

However, the major benefits and costs of the proposed standard are extremely difficult to monetise. As the standard is addressed at the design phase, vessel designs will be altered to accommodate the new requirements. Whether or not the costs of the construction and subsequent operation increase as a result of the proposed standard will depend on the individual vessel and design. Potential impacts of the proposed standard on the aesthetic appearance of a vessel, or its deck space, may be circumvented by changes to the design of the vessel.

In addition, while the standard may impose some increased costs associated with vessel design and construction, these may be offset by cost reductions associated with greater flexibility.

Similarly, the other benefits of the proposed standard are difficult to quantify. For example, the impact of increased flexibility of design choices is impossible to identify as it can pre-empt what innovations will be achieved under a performance based regime, let alone identify the cost savings and productivity improvements.

Given the constraints due to these difficulties, a benefit-cost-ratio (BCR) could only be produced on cost estimates that may not in any way reflect the actual implications of the proposed standard. To avoid misleading decision-makers and the public, we have elected not to produce a BCR for the proposed standard.

However, this BCA does consider the *potential benefits* of the proposed standard derived from *scenarios of reduction in risks of vessel incidents*. Using this information, the BCA then considers the degree of cost increases that would still result in positive benefits. It has not attempted to quantify the other social benefits, the impact of increased flexibility in design choices, or efficiency improvements in administration.

5.5.2. Cost savings associated with reduced risks

Limitations

A major benefit to be derived from the proposed standard is that its requirements are specified to mitigate the likelihood of a vessel colliding, to reduce the impact or consequence of an incident, and to align the standard for fishing vessels with that of other non-passenger commercial vessels. This will lower the risk of incidents, serious injuries, fatalities, vessel loss and damage, as well as result in cost savings from avoiding and/or reductions in the cost of search and rescue and avoiding the cost of investigating marine incidents.

However, the actual degree of reduction in risk is difficult to identify.

- As outlined in Section 2.2 above, there are many reasons an incident occurs – generally not one specific cause can be identified, or there is insufficient information, capacity and time to pin point and include in data collected the sequence of events that led to the incident. The majority of incidents go uninvestigated and the results of investigations may not be publicly available, depending upon the investigating body and the purpose of the investigation. As such, estimating the impact the proposed standard will have on the risk of an incident in the future can be a broad estimate at best.
- Section 2.2 also discussed the partial picture painted by the incident data collected by the NMSC. Although this is the best national dataset covering domestic commercial vessel incidents, it remains a limited picture of *reported* incidents. Jurisdictions have different reporting requirements – hence an incident type reported in one jurisdiction may not be reported in another. As a result, the data provides only a partial picture of the level and type of marine incidents. In addition, the data may not include small commercial vessels of

less than 10 metres, and is likely to be a conservative estimate of the number of vessels lost each year.

- In addition, many of the impacts of the proposed standard will relate to 'social factors', which may not be reflected in the figures. For example, overdose, homicide or suicide on a vessel will not have been captured in the data, but the proposed standard may have a positive impact on these 'incidents'.
- Finally, the incident data is skewed by the very nature of marine incidents. One accident involving a large passenger vessel could see an enormous spike in fatality and injury rates, which is not reflective of the nature of the risk. Conversely, the lack of passenger vessel incidents could produce low fatality and personal injury figures that are equally problematic. While marine incidents are expected to occur, their extent in terms of fatalities, serious injuries, vessel loss and damages are very difficult to predict. As such, even identifying the real risk of a future incident based on quantitative methods is an almost impossible task. In their absence, qualitative assessment and expert judgement have to be relied upon.

Methodology

The range of potential savings due to safety improvements has been estimated using the following steps:

1. Identifying the major categories of savings arising from the reduction in risk of an incident: fatalities, serious injuries, non-serious injuries, and vessel (or hull) losses.
2. Calculating the resulting changes in lives saved, injuries avoided and ship losses over a 30-year period, or when the fleet becomes fully compliant (whichever is the shorter period, i.e. assuming 1,300 conforming vessels per year) using scenarios of high, medium and low estimates of reduction in risk. As outlined below in the Assumptions, only those incidents that are directly relevant to the standard have been considered. According to the vessel incident data outlined in Chapter 2 of this RIS, 54.6% of vessels lost, fatality incidents and serious injury incidents were caused by factors relevant to the standard (such as visibility). Due to the direct relevance of the standard to these incidents (the standard was developed to address the factors that contributed to the incidents), the BCA considers the impact of reducing the number of these incidents by 25%, 50% and 75%.
3. Monetising these impacts. To this end, the Office of Best Practice Regulation 2007 figures for value of life, and Austroads project evaluation guidelines figures for the value and degrees of injuries have been used. Regarding the value of hull losses, the ship's purchase price was selected as default value, due to the difficulty of estimating the age and matching residual value of ships written off after accident.

4. Generating a present value of the benefits. All costs are in 2012 monetary values with a 2.5% per year escalation factor used for all pre-2012 cost values. Neither benefits nor costs after 2012 have been inflated (i.e. are not in nominal terms). As a result, the discount rate used is the "real economic discount rate" (a base rate of 7% has been used with discounting also using rates of 4% and 10%).

Assumptions

In order to conduct the BCA, a number of assumptions have been made, as follows.

- **Fleet assumptions**

To calculate the impact on incident levels per vessel class, the breakdown of vessel use (class) as reported by NMSC was applied to the 1,300 per year of newbuild vessels affected by the regulations.

In addition, the BCA considers the cumulative total of the new vessels each year. The benefits are based on the growing number of complying vessels as the years go by. The BCA refers to this as the *impacted portion of the fleet*. Given the assumption of 1,300 vessels per year, it takes 21 years for the fleet to be fully impacted assuming no additional growth in the fleet – this forms the time, fleet and benefit basis of the BCA.

- **Cost assumptions**

One of the key variables of the cost structure is the purchase or newbuild price of ships, per category of vessel. The BCA makes assumptions regarding the average newbuild cost of vessels based on broad and high-level newbuild market analysis, i.e. the prices assumed are indicative only.

- **Incident assumptions**

The NMSC data on vessel incidents was evaluated to determine estimates of *relevant* potential incidents and mitigation effects (reductions) of the proposed standard.

Assumptions regarding the impact of the accommodation, arrangement and personal safety aspects of a vessel on vessel incidents were made based on the NMSC's Commercial Vessel Incidents in Australia 2005-2008 report, November 2009 (see Table 11 in particular). As shown in Table 6 below, the BCA assumes that 54.6% of vessels lost, fatality incidents, and serious injury incidents were caused by factors relevant to accommodation, arrangement and personal safety on the vessel. These are the *relevant domestic commercial vessel incidents*.

The NMSC data on total vessel losses used is set out in Table 3 in Section 2.2 of this RIS. Given that a relatively short period of data is available, and that it is a period during which there were no incidents involving high numbers of loss of life and serious injury (i.e. not involving a large passenger vessel), a contingency factor of 50% for numbers of fatalities has been applied. This contingency factor also accounts for some of the limitations of the data, including the fact that it may not include commercial vessels of less than 10 metres. The same contingency factor has not been applied to vessel losses or serious injury.

- **Impact assumptions**

Considering the wide-ranging aspects of some of the proposed regulations, it is difficult to estimate the likely intensity of their impacts on safety and vessel losses. Therefore, the BCA comprises a set of three impact scenarios - high, medium and low - corresponding with reductions of deaths, injuries and vessel losses of respectively 75%, 50% and 25%. This is the percentage reduction in the number of incidents that are directly relevant to the standard. The high, medium and low scenarios have been chosen to reflect the direct impact the standard should have on the incidents considered.

Question to elicit specific public comment #7:

Comments are welcome from stakeholders on the assumptions regarding the impact of the standard on safety outcomes.

The relevant number of incidents used in the BCA is taken as just over 50% of the historic number adjusted to reflect the size of the cumulative conforming fleet each year which grows with the assumption of 1,300 new vessels each year.

- **Value of life assumptions**

The parameter values are sourced from the 2007 OBPR Guidelines and the 2009 AustRoads guidelines.

Parameter values

The key parameters used for this study are summarised in the tables below.

Table 6 — Key parameter values

Note: $=A$

General:	Value1	Value2	Value3	Source/Comment
Resource cost of fatality	$3,500,000	-	-	OPDR (2007 value)
Resource cost of serious injury	$492,083	-	-	AusRoads, average national (2008)
Resource cost of minor/unclassified injury	$19,525	-	-	AusRoads, average national (2008)
Average newbuild cost - Passenger (class 1)	$2,000,000	-	-	Assumed by consultant (2011)
Average newbuild cost - NonPassenger (class 2)	$340,000	-	-	Assumed by consultant (2011)
Average newbuild cost - Fishing (class 3)	$1,000,000	-	-	Assumed by consultant (2011)
Contingency factor for number of fatalities	50%	-	-	Assumed by consultant (2011)
Average annual cost escalation	2.5%	-	-	Assumed to adjust pre-2012 cost data to 2012
Real economic discount rates	4.0%	7.0%	10.0%	Assumed according to ATC/IA Guidelines
Regulatory impact - reduction scenarios (assumed)	25%	50%	75%	Assumed reductions in relevant incidents & vessel losses
Assumed annual growth in commercial fleet	2%	-	-	Assumed to grow fleet 2009-2012
New vessels added to commercial fleet per year	1,300	-	-	NMSC Draft RIS National Standard* (Aug. 2010)

(*) for Commercial Vessels

Marine Incidents & Fleet:	2005-2008	Annual	2009	Source/Comment
Actual Number of fatalities (all causes)	47	12	-	NMSC Commercial Vessel Incidents (Nov.2009)
Actual Number of serious injuries (all causes)	173	43	-	NMSC Commercial Vessel Incidents (Nov.2009)
Actual No. of minor/unclassified injuries (all causes)	610	153	-	NMSC Commercial Vessel Incidents (Nov.2009)
Number of vessels lost in incidents (deemed insurance total loss)	-	7	-	Register of Australian and New Zealand Ships and Boats compiled by Mori Flapan & NMSC
Assumed % Incidents - Passenger (1)	13%	-	-	Based on % share of fleet for vessel class
Assumed % Incidents - NonPassenger (2)	46%	-	-	Based on % share of fleet for vessel class
Assumed % Incidents - Fishing (3)	32%	-	-	Based on % share of fleet for vessel class
Assumed relevant vessels lost - Passenger (1)	-	1	-	Based on number of relevant vessels lost and % share of fleet for vessel class
Assumed relevant vessels lost - NonPassenger (2)	-	3	-	Based on number of relevant vessels lost and % share of fleet for vessel class
Assumed relevant vessels lost - Fishing (3)	-	2	-	Based on number of relevant vessels lost and % share of fleet for vessel class
% Fatality incidents relevant to regulatory change	54.6%	-	-	Based on NMSC Incidents report, table 11 (human factors and lack of visibility excl. lack of fuel & overloading)
% Injury incidents relevant to regulatory change	54.6%	-	-	Based on NMSC Incidents report, table 11 (human factors and lack of visibility excl. lack of fuel & overloading)
% Vessels lost relevant to regulatory change	54.6%	-	-	Based on NMSC Incidents report, table 11 (human factors and lack of visibility excl. lack of fuel & overloading)
Number of commercial vessels (fleet)	-	-	28,346	NMSC Commercial Vessel Incidents (Nov.2009)
Number of commercial vessels, excl. Victoria	-	-	24,827	NMSC Commercial Vessel Incidents (Nov.2009)
Fleet by vessel use (class) - Passenger (1)	-	-	13%	NMSC Commercial Vessel Incidents (Nov.2009)**
Fleet by vessel use (class) - NonPassenger (2)	-	-	46%	NMSC Commercial Vessel Incidents
Fleet by vessel use (class) - Fishing (3)	-	-	32%	NMSC Commercial Vessel Incidents
Fleet Average Length (m) - Passenger (class 1)	-	-	17	NMSC Commercial Vessel Incidents
Fleet Average Length (m) - NonPassenger (class 2)	-	-	8	NMSC Commercial Vessel Incidents
Fleet Average Length (m) - Fishing (class 3)	-	-	11	NMSC Commercial Vessel Incidents
Assumed 2012 Fleet - Passenger (class 1)	-	-	3,911	Non-Victorian fleet use % applied to total fleet
Assumed 2012 Fleet - NonPassenger (class 2)	-	-	13,837	Non-Victorian fleet use % applied to total fleet
Assumed 2012 Fleet - Fishing (class 3)	-	-	9,626	Non-Victorian fleet use % applied to total fleet

(**) For Non-Victorian fleet.

Table 7 shows the estimated cost of *relevant domestic commercial vessel incidents* associated with the *impacted portion of the fleet* over the evaluation period.

Table 7 — Cost of incidents, base case scenario

Base Case - No Regulatory Change:			**Total**
Cumulative fleet replacement over 21 years: 27,374			**(30 years)**
Estimated Relevant Marine Incidents for New Additions:			
Human Fatalities (incl. contingency)		Number	111.2
Human Serious Injuries		Number	273.0
Human Minor & Unclassified Injuries		Number	962.5
Vessel Losses - Passenger (Class 1)		Number	5.5
Vessel Losses - NonPassenger (Class 2)		Number	19.3
Vessel Losses - Fishing (Class 3)		Number	13.4
Costs of Marine Incidents for New Additions:			
	Cost/incident		
Fatalities	$3,863,345		$429,769,006
Serious Injuries	$543,168		$148,273,110
Minor Injuries	$21,552		$20,744,301
Class 1 Losses	$2,050,000		$11,188,490
Class 2 Losses	$348,500		$6,730,307
Class 3 Losses	$1,025,000		$13,770,449
Total costs			$630,475,664
Present Value	@ Real Discount Rate	4.0%	$358,328,542
	@ Real Discount Rate	7.0%	$244,948,788
	@ Real Discount Rate	10.0%	$173,454,235

Table 8 shows the estimated cost of *relevant domestic commercial vessel incidents* associated with the *impacted portion of the fleet* over the evaluation period, assuming that the standard decreases the chance of incidents of *relevant domestic commercial vessel* by 25%.

Table 8 — Cost of incidents, low impact scenario

Project Case - Low Regulatory Impact:		**-25%**	**Total (30 years)**
Estimated Relevant Marine Incidents for New Additions:			
Human Fatalities (incl. contingency)		Number	$83
Human Serious Injuries		Number	$205
Human Minor & Unclassified Injuries		Number	$722
Vessel Losses - Passenger (Class 1)		Number	$4
Vessel Losses - NonPassenger (Class 2)		Number	$14
Vessel Losses - Fishing (Class 3)		Number	$10
Costs of Marine Incidents for New Additions:			
	Cost/incident		
Fatalities	$3,863,345		$322,326,755
Serious Injuries	$543,168		$111,204,832
Minor Injuries	$21,552		$15,558,226
Class 1 Losses	$2,050,000		$8,391,368
Class 2 Losses	$348,500		$5,047,730
Class 3 Losses	$1,025,000		$10,327,837
Total costs			$472,856,748
Present Value	@ Real Discount Rate	4.0%	$268,746,406
	@ Real Discount Rate	7.0%	$183,711,591
	@ Real Discount Rate	10.0%	$130,090,676

Table 9 shows the estimated cost of *relevant domestic commercial vessel incidents* associated with the *impacted portion of the fleet* over the evaluation period, assuming that the standard decreases the chance of relevant incidents by 50%, and Table 10 shows the estimated cost of relevant incidents assuming the standard decreases the chance of relevant incidents by 75%.

Table 9 — Cost of incidents, medium impact scenario

Project Case - Medium Regulatory Impact:		**-50%**	**Total (30 years)**
Estimated Relevant Marine Incidents for New Additions:			
Human Fatalities (incl. contingency)		Number	55.6
Human Serious Injuries		Number	136.5
Human Minor & Unclassified Injuries		Number	481.3
Vessel Losses - Passenger (Class 1)		Number	2.7
Vessel Losses - NonPassenger (Class 2)		Number	9.7
Vessel Losses - Fishing (Class 3)		Number	6.7
Costs of Marine Incidents for New Additions:			
	Cost/incident		
Fatalities	$3,863,345		$214,884,503
Serious Injuries	$543,168		$74,136,555
Minor Injuries	$21,552		$10,372,151
Class 1 Losses	$2,050,000		$5,594,245
Class 2 Losses	$348,500		$3,365,154
Class 3 Losses	$1,025,000		$6,885,225
Total costs			$315,237,832
Present Value	@ Real Discount Rate	4.0%	$179,164,271
	@ Real Discount Rate	7.0%	$122,474,394
	@ Real Discount Rate	10.0%	$86,727,117

Table 10 — Cost of incidents, high impact scenario

Project Case - High Regulatory Impact:		**-75%**	**Total (30 years)**
Estimated Relevant Marine Incidents for New Additions:			
Human Fatalities (incl. contingency)		Number	27.8
Human Serious Injuries		Number	68.2
Human Minor & Unclassified Injuries		Number	240.6
Vessel Losses - Passenger (Class 1)		Number	1.4
Vessel Losses - NonPassenger (Class 2)		Number	4.8
Vessel Losses - Fishing (Class 3)		Number	3.4
Costs of Marine Incidents for New Additions:			
	Cost/incident		
Fatalities	$3,863,345		$107,442,252
Serious Injuries	$543,168		$37,068,277
Minor Injuries	$21,552		$5,186,075
Class 1 Losses	$2,050,000		$2,797,123
Class 2 Losses	$348,500		$1,682,577
Class 3 Losses	$1,025,000		$3,442,612
Total costs			$157,618,916
Present Value	@ Real Discount Rate	4.0%	$89,582,135
	@ Real Discount Rate	7.0%	$61,237,197
	@ Real Discount Rate	10.0%	$43,363,559

The benefit (the present value of the cost reduction over the evaluation period) is the differential between the base case and the respective risk reduction scenarios. As can be seen in Tables 7 – 10, based on the data available, if the likelihood of collision and other relevant incidents is reduced, as a result of the standard, by 25% – 75%, the benefit ranges from $61 to $182 million (based on a 7% discount rate).

5.5.3. An allowance for increased design and construction costs

Given the benefits associated with the reduced risk of an incident, the standard returns a positive BCR even if vessel design and construction costs increase by:

- up to 1.7% on average as a result of the standard, under the high regulatory impact scenario (75% reduction in relevant incidents), assuming a 7% real discount rate;

- up to 1.2% on average as a result of the standard, under the medium regulatory impact scenario 50% reduction in relevant incidents), assuming a 7% real discount rate; and
- up to 0.5% on average as a result of the standard, under the low regulatory impact scenario (25% reduction in relevant incidents), assuming a 7% real discount rate.

A 1% increase in costs for a class 1 vessel amounts to around $20,500 on average. If the increase in cost is equated to a change in overall weight or size of the vessel, that would equate to a 1% increase in displacement or a increase of dimensions of 0.3%. Given that the proposed standard increases certain minimum parameters such as deck height, required deck area and length of berths on certain vessels engaged in voyages that exceed 36 hours, this may well be indicative of the effect on some larger vessels engaged in longer operations.

For other vessels, the standard would be unlikely to increase either total weight or total size of the vessel by more than 1%, and so it appears likely that costs would not increase by more than 1%. Indeed, in time the potential cost impact could be somewhat ameliorated as the requirements of the standard can be better factored into the design to optimise outcomes. The performance-based structure and option of equivalent solutions that are a feature of the new standard will also facilitate the development of innovative solutions.

The purpose of this analysis is not to suggest that the proposed standard would result in no net costs to society. Rather, it is to indicate that based on the best estimates of the impact of the standard on the risk of vessel incidents, cost increases of up to 1.7% could still result in a positive net benefit to society.

Annex B contains a breakdown of these figures for illustrative purposes, using the 1% cost increase as an example.

5.6. Overall assessment of impacts

All the options were considered in terms of their potential costs and benefits and their possibility of meeting the intended objectives of the proposal.

Based on the impact analysis contained in the RIS, neither Option 1, maintaining the status quo, or Option 2, adopting external standards, will effectively meet the objectives of the proposal.

The proposed standard is the only option that addresses the problems with the current arrangements. It is expected to generate maximum benefits, incur minimum costs and meet all the objectives of the proposal better.

Question to elicit specific public comment #8:

Comment is sought from Stakeholders on which option is likely to generate greatest benefits and best meet the objectives of the proposal and why?

6. COMPETITION ASSESSMENT

6.1. COAG Principles

The COAG National Competition Principles Agreement states that regulations with significant net costs or benefits to the community should be assessed to determine that a proposal is the most effective form of government intervention to achieve a desired objective.

The impact of the standard on competition should be considered as part of an evaluation of the effectiveness of the proposal relative to the alternatives. The policy also requires that the benefits of any proposed legislation should outweigh implementation costs and that any restrictions on competition imposed by the legislation should be no more limiting than is necessary to achieve the objective.

Uniform national adoption of the standard for arrangement, accommodation and personal safety will ensure the minimum required safety standards are applied consistently and fairly to all stakeholders. This will ensure competitive neutrality between these businesses. Although these businesses will continue to incur the routine costs associated with design and construction, these ongoing costs are unlikely to be significantly higher than at present or to restrict market competition, market entry or product and service innovation.

The standard will have little effect on the overall cost structure of individual organisations involved with implementing the requirements for arrangement, accommodation and personal safety in most situations.

For the majority of smaller vessels, costs will be expected to remain relatively neutral as increases due to a greater focus in one area (say field of vision from the helm) will be offset by increased flexibility regarding other measures (say rail heights, fitting of toilets, gangplanks, etc). Larger vessels carrying many persons or engaged in voyages of longer duration are more likely to be impacted by the reforms already adopted nationally and internationally by standards such as MLC 2006, SOLAS Chapter V and Transport Standards for Persons with Disabilities. However, for many of these vessels the costs will be minimised by the standard effectively pre-empting the application of discretion provided for in these requirements. Design and build cost of all vessels should in the long term benefit from the availability of a comprehensive deemed to satisfy solutions, the improved performance-based focus of the requirements and the large increase in options available. Taken over the fleet as a whole, the overall impact of the changes in terms of cost should be near neutral. It is highly unlikely that the requirements will be unsustainable for existing small businesses or act as a barrier for businesses planning to expand or to enter the maritime industry.

The proposed standard will bring innovation and increase competition as businesses, designers, builders and operating vessels are likely to take advantage of the much wider options contained within the deemed-to-satisfy

solutions and also available via equivalent solutions. There may be increased competition to demonstrate that new designs comply with the proposed standard. The new options to meet the requirements are expected to result in increased competition by suppliers.

6.2. Small Business

The regulatory assessment guidelines for national standards require that the likely impacts on small business be identified, especially where regulatory compliance costs could have a disproportionate impact on small business.

Small business is not expected to be unfairly disadvantaged by the proposed standard because it is an improved version of the present requirements. There is improvement in safety, risks associated with incidents are lowered and small business will benefit.

It is very difficult to determine accurately the exact portion of the new commercial vessels fleet that are likely to be operated by small businesses as there is no reliable information available. However, 95.1 per cent of the new vessels constructed each year on average are 24 metres or less in length. The greater proportion of these are operated by small businesses though there are also some large businesses that operate fleets of small vessels (e.g. in the pearl farm and aquaculture industries).

About 4.9 per cent of new vessels are greater than 24 metres in length and are more likely to be owned or operated by large organisations. These large vessels are quite expensive and are built for larger scale operations.

In terms of designing new vessels, the great majority of vessel design businesses would most likely have less than twenty employees and should be considered as small businesses. These small businesses are likely to benefit from the proposed standard, especially in terms of its performance basis and availability of equivalent solutions.

In terms of manufacturing new vessels, both small businesses and large businesses will participate. The 2 categories of businesses would both enjoy the previously identified benefits.

Because of its more graded approach to risk, the proposed standard is on its face more complex to apply than the current USL Code. There are more options and more issues considered. However, the USL Code is not an easy document for the novice and its application only becomes ‘simple’ because of familiarity. Furthermore, the shortcoming of a simplistic risk model within a standard is that the complex matters needed to optimise outcomes tend to be resolved outside the standard on a vessel by vessel basis for consideration as an exemption or an equivalent. The proposed standard attempts to bring these discussions within the scope of the standard in a manner that is transparent, consistent and efficient.

The proposed standard will be beneficial to small businesses because its requirements are much more likely to better meet modern technological and operational needs of the industry, and will require less interpretation and reworking in order to achieve acceptance by the marine authority. Small businesses can be disadvantaged by having a more limited network, influence, corporate knowledge and resources to effectively propose and pursue the adaptation of old standards to modern vessels. An improved standard that is more applicable and transparent is likely to provide improved equity in the market place for small business at all levels: designers, builders and operators.

7. CONSULTATION

7.1. Public consultation

7.1.1. Notice to have your say

In March 2009 an NMSC "Have Your Say" notice was issued to relevant stakeholders and the public on the NMSC national database, including marine authorities, seeking comment on the Issues Paper for Arrangement, Accommodation and Personal Safety for commercial vessels in Australia. Copies of the Issues Paper were available from the NMSC web site or could be collected by ringing the NMSC's Secretariat.

All public comments received were referred to the Reference Group for Arrangement, Accommodation and Personal safety for consideration in developing the draft Standard.

7.1.2. Media release for issues paper

A Media Release was issued on 18th March 2009 advising the public that the NMSC has released the Issues Paper on Arrangement, Accommodation and Personal Safety for public comment. The comment period started on the 17th March 2009 and ended on the 1st June 2009.

The Media Release was released to marine industry newsletters, web sites and magazines. Coverage was gained on the Boating Oz web site. It was also published by the NMSC Safety Lines, the Australian Naval Architect and Aus Marine magazine.

There were most likely mentions of the Issues Paper in other publications and the newsletters of state and territory marine safety agencies and marine associations. The Issues Paper was not advertised in the metro press because this publicity normally happens when the subsequent draft standard is released for public comment.

7.1.3. Public comments on issues paper

The NMSC received about 680 comments from 8 organisations on the Issues paper. The comments were in large part dealing with technical details associated with the application of the ILO Convention, bulwarks and guardrails, escape and evacuation routes and minimum deck height and area.

The organisations included:

- Quicksilver Connections Ltd
- Peninsula Searoad Transport
- WA Department for Planning and Infrastructure
- Marine Safety Victoria
- One2three Naval Architects
- Aluminium Boats Australia
- Aurora Marine Design
- Tasmanian Seafood Industry Council

The public comment on the issues paper formed the basis for the first draft of the standard that was then further developed by the reference group (discussed below). As a result of the comprehensive nature of the issues paper, the public comment received was sufficient to give the reference group a good insight into the industry's views.

One major area of dissent was in regards to the adoption of MLC 2006. The feedback from the issues paper was that the NSCV should not incorporate provisions from MLC 2006. However, the draft was formulated to implement subsequent government policy on the adoption of MLC 2006. The draft standard proposed a compromise – suitable modification of the application of MLC 2006 to limit the negative impact on the smaller end of the industry.

Another area of dissent was in the application of standards for access by persons with disabilities. Some comments indicated that the legislation should be referenced but that the standard need not be consistent with the legislation. Others, however, were concerned that the NSCV would be specifying requirements inconsistent with the relevant legislation. A compromise was reached with input from the Australian Human Rights Commission and this is reflected in the proposal.

7.2. Reference group consultation

The NMSC set up a Reference Group to assist with the development of the standard, including consideration of the public comments received on the Issues Paper, draft Standard, and (once comments have been received) on this draft RIS. The Reference Group is made up of people experienced in the design and operation of commercial vessels built to the USL Code, or who have experience with other standards that address arrangement, accommodation and personal safety.

The Reference Group met twice by teleconference in August 2009 to consider the 680 comments received from the public and make recommendations regarding preparation of the draft Standard and draft RIS.Table 11 shows the Reference Group representatives and organisations.

Table 11 — Reference Group Representatives and Organisations

Representative	Organisation
Eddie Seymour	Australian Maritime Union
Adam Brancher	SA Dept of Transport, Energy & Infrastructure
Gwyn Alway	Marine and Safety Tasmania
James Mallows	Australian Institute of Marine & Power Engineers
Terry Hewitt	MG Kailis Group
Tony Armstrong	Australian Shipbuilders Association
Warwick Fairweather	Commercial Vessels Association of NSW
Graham Taylor	Taylortech
Mark McLellan	Marine Safety Victoria
Glen Seeley	Australian Maritime Safety Authority

The first draft Standard was emailed to the members of the Reference Group on 23 June 2010 with a request that members:

1. Confirm whether they believed it to be a fair interpretation of their understanding of the outcome of the meeting.
2. Indicate whether there were any major issues that should prevent the draft being released for public comment in its current form;
3. Comment on the content, either to make corrections or improvements, or suggestions for questions to be raised within the draft that is released for public comment for stakeholders to answer; and
4. Bring up their views on some new issues identified by the NMSC Project Manager.

A meeting was held with the Reference Group on 22 July 2010 to consider and respond to the new issues identified by the NMSC Secretariat Project Manager. All the issues the reference group responded to were dealing with technical details associated with the application of MLC 2006 to arrangement, accommodation and personal safety on the vessel and performance criteria. The proposed standard was revised to reflect recommendations of the reference group.

The names and organisations of the updated Reference Group are listed in Table 12.

Table 12 — Reference Group Representatives and Organisations

Representative	Organisation
Terry Hewitt	MG Kailis Group
Adam Brancher	Dept. of Transport, Energy & Infrastructure – SA
Ben Burns	SVITZER Australia Pty Ltd
Tommy Ericson	Maritime Safety Queensland
Warwick Fairweather	Commercial Vessels Association of NSW
Peter Keyes	Marine and Safety Tasmania (MAST)
Paul MacGillivary	Australian Maritime safety Authority
James Mallows	Australian Institute of Marine & Power Engineers
Shankar Ramanathan	NSW Maritime
Glen Seeley	Australian Maritime safety Authority
Rob Tulk	One2Three Naval Architects
Tony Armstrong	Australian Shipbuilders Association
Paul Garrett	Maritime Union of Australia
Graham Taylor	Taylortech
Mark McLellan	Marine Safety Victoria

Representative	Organisation
Prue Mooney [observer]	Department of Education, Employment and Workplace Relations

The NMSC Secretariat Project Manager had additional extensive consultation while preparing the draft Standard (via phone and email) with various members of the Reference Group between 24 June 2010 and 15 February 2011.

The input from the reference group, both at the standard development stage and on the draft standard, resulted in many changes, including the incorporation of provisions for lighting, temperature control, noise and vibration in accommodation spaces, and requirements for console layout in the operating compartment. Where there were dissenting views or concerns, specific questions are highlighted for public comment in the proposed standards. This process of consultation was used to resolve all issues and to revise the draft Standard so it could be released for public comment.

8. EVALUATION AND CONCLUSIONS

The conclusions drawn from the draft RIS are that the proposed standard is expected to:

- Further the NMSC's objectives specified in the National Marine Safety Strategy;
- Provide a set of required outcomes consistent with the performance framework established in the NSCV Part B: General Requirements which was approved by ATC in 2002;
- Reduce system costs by employing a more flexible and efficient requirement regime that results in a more appropriate and better tailored set of requirements;
- Have a positive impact on competition because the performance-based approach supports innovative solutions provided safety is maintained;
- Provide an efficient and effective bridge that satisfies obligations imposed by a number of relevant National and International Standards while minimising the burden on the industry.
- Have cost impacts that are outweighed by safety and social benefits; and
- Have benefits that are likely to be greater than the alternatives and best meet the objectives of the proposal.

The issues discussed in this RIS and the results of the impact analysis suggest that Option 3 is likely to be the preferred option. Option 3 is preferred to the alternatives. While Options 1 and 2 may offer some benefits and meet the objectives of the proposal to some extent, Option 3 appears to offer greater benefits and best meet the objectives of this proposal.

Furthermore, Option 3 is likely to address all the deficiencies currently encountered in complying with the requirements in the USL Code. The conclusions reached by stakeholders and industry representatives at the Reference Group Meeting in July 2010, through teleconference, telephone conversations and emails were all in support of the proposed standard.

Question to elicit specific public comment #9:

Stakeholder comment is sought on any other option which could be used as an alternative to the proposed standard, which option is preferred and why?

9. IMPLEMENTATION AND REVIEW

9.1. Public consultation

The proposed standard for Arrangement, Accommodation and Personal Safety and this draft RIS will be subject to public consultation. The final documents will be published on the web site of the NMSC and the website of the Office of Best Practice Regulation. The public and other stakeholders will be notified by various means of communications in marine publications and other media regarding the implementation of the standard.

9.2. Approval

Following consultation, if appropriate in light of the results of the consultation, the draft standard will be amended as appropriate and submitted to the NMSC for endorsement. Once endorsed, the proposed standard will be submitted to the ATC for approval in accordance with the National Framework for Marine Safety.

9.3. Legislation

This RIS covers the regulatory proposal and the legal instrument which gives effect to it.

The Arrangement, Accommodation and Personal Safety section of the NSCV may be made mandatory after amendments have been made to the present USL Code. These amendments replace existing USL Code sections with the equivalent new parts of the NSCV. Where the USL Code presently is applied in state and territory legislation, new vessels, vessels which undergo an initial survey, and vessels which are upgraded are supposed to comply with a combined USL/NSCV. This process allows the NSCV to be introduced progressively across Australia as soon as possible after the parts are approved by the ATC.

Some jurisdictions may also implement the standard through regulation or amendment to the present marine safety legislation in force. Alternatively, the Commonwealth may implement the standard via Commonwealth legislation.

9.4. Review

The NMSC has committed to review the NMSC standards at five-yearly intervals.

Because of the anticipated changes in the administration of domestic commercial vessel safety, there is uncertainty as to what the exact arrangements will be available in the new environment. However, based on current arrangements, the success of the proposed standard would be monitored by:

1. Feedback provided by users and surveyors applying the standard through correspondence, the Commercial Vessel Survey Forum and the Australian Commercial Marine Compliance Professionals Forum.
2. Monitoring of exemptions and equivalent solutions through the NMSC's exemptions database.
3. The holding of Peer Advisory Network meetings to review applications for Generic Equivalent Solutions.
4. Monitoring and acting on proposals for modifications to the standard received via the jurisdictions to the NMSC secretariat.
5. Ongoing collection and analysis of incident and accident data over time.

Question to elicit specific public comment #10:

Stakeholders are welcome to bring out any issues which they think the draft RIS has not addressed/ fully addressed and suggestions on how best to respond to the impacts the proposed standard may have on the community.

ANNEX A SUMMARY OF CHANGES AND THEIR IMPACTS

Cost Impact	New or changed Requirement	Costs	Benefits
Impact Unidentifiable	**2.10 (Operating stations, visibility and steering) Visibility from the operating station**		
	Limits on the arrangement of obstructions to vision from the operating station including raised fore decks on vessels Wheelhouse may be required to be raised in height potentially impacting the stability and thereby the earning capacity of the vessel.	Difficult to quantify costs as the impact of rearranging the design to meet the criteria may have no impact or may require a totally different design concept in some cases, with cost increases potential offset by construction methods and materials. May preclude some current production yachts from being deemed-to-satisfy, particularly some sailing catamarans and yachts with large coach house structures over their deck saloon.	Alignment with international requirements. Since the USL Code was first published, there have been significant reforms at an international level. Safety benefit through reduced likelihood of collision with other vessels and with fixed objects are the most frequently recorded commercial vessel incident over the years 2005 to 2009 representing 29% of total reported vessel incidents. While visibility from the operating station may be just one factor in a chain of events, there is clearly a large potential benefit to be achieved by reducing the likelihood (and perhaps also the consequences) of collision by facilitating the observation of potentially hazardous situations.
	4.8 (Accommodation) Crew accommodation, Maximum number of persons per sleeping room		
	Application of MLC 2006 to Class 1A, 1B, 2A, 2B vessels of length 35 m or more. Requirements increased for vessels on journeys over 72 hours from a maximum 6 to a maximum of 4 crew per sleeping room.	Minimal impact anticipated. Impact difficult to quantify as applies at design stage	Social risks (suicide, homicide and drug and alcohol abuse) addressed by MLC 2006 for voyages over 72 hours may account for as much as 50% of total fatalities at sea.

Cost Impact	New or changed Requirement	Costs	Benefits
	5.10B (Access, Escapes and Evacuation) Control Spaces		
	Requires provision of alternative escapes for control spaces which are likely to be occupied in an emergency	Although a new requirement as compared to the USL Code, it is currently applied administratively to vessels. As such, the impact should be minimal. Where vessels do not currently have to comply with this, the impact is difficult to quantify as it affects the design of the vessel. On some vessels, at least one operating compartment window may have to be arranged to be opening or breakable for escape.	Improved safety outcomes through the provision of alternative escapes for spaces likely to be occupied in an emergency, as it ensures that the spaces don't have to be abandoned prematurely
	5.10C (Access, Escapes and Evacuation) Prohibition on escapes leading into the same high fire risk space		
	New limits on the location of escapes to ensure that they achieve safety outcomes	Largely applicable to vessels having ro-ro decks above the machinery space, but may also apply in other circumstances. Limits location of escapes and may require provision of protected escape tunnels.	Improved levels of safety Aligns with international standards
Reduced Cost Impact	**5. 11(Access, Escapes and Evacuation) Evacuation paths**		
	For vessels with assembly stations, reduction in the required width of passageways	None	Greater flexibility and reduced construction costs
	5. 13A (Access, Escapes and Evacuation) Minimum width of passageways other than corridors		
	Reduction in current requirements where the passageway is not a thoroughfare for escape or evacuation (380 – 700mm rather than 600 - 750	None	Greater flexibility and reduced construction costs

Cost Impact	New or changed Requirement	Costs	Benefits
	mm).		
	5.13B (Access, Escapes and Evacuation) Passageways that serve only as a means for occasional access		
	Passageways for the purposes of inspection or maintenance may be less in width than other passageways.	None	Greater flexibility and reduced construction costs
	5.15A (Access, Escapes and Evacuation) Step dimensions		
	Differentiation in requirements for steps on stairs for high capacity escapes and those for low capacity escapes. The latter have increased flexibility.	None	Increased safety by highlighting preferred dimensions beyond minimum requirements Increased flexibility Better correlation with what is actually being accepted
	5. 15B (Access, Escapes and Evacuation) Stairways—Handrails		
	Relaxation of handrail requirements. USL code requires intermediate handrails for stairways exceeding 1500mm – this is increased to 1800mm	None	Decrease in construction costs
	6.13A (Personal Safety) Gangways		
	New gangway requirements suited to smaller passenger vessels	None, reflects current practice in most jurisdictions	Requirements are proposed to be better suited to domestic vessels

Cost Impact	New or changed Requirement	Costs	Benefits
	6.13B (Access, Escapes and Evacuation) Gangplank		
	For vessels where full gangways may be impractical, gangplanks are accepted in limited circumstances	None	Increased flexibility
	6.13B (Access, Escapes and Evacuation) Pilot transfer arrangements		
	Limits application of existing requirements to vessels 50 m or more engaged in Operational Areas A, B and in some cases C.	Reduced cost for some vessels	Greater flexibility
No Cost Impact	**3. Arrangements for the provision of Navigation Signals**		
	COLREGS requirements apply	None	Stakeholders are alerted early to key aspects of arrangement that will need to comply with COLREGS, potentially reducing costs and improving levels of compliance
	4.10C (Accommodation) Seating for passengers		
	Relaxes rules for vessels carrying divers.	None	Permits greater flexibility in the type of vessel that can engage in dive operations.
	4.10E (Accommodation) Sleeping accommodation for passengers		
	Less prescriptive requirements for vessels on journeys over 36 hours	None	More flexibility in approach to accommodation type.

Cost Impact	New or changed Requirement	Costs	Benefits
	4.16 (Accommodation) Potable water		
	Specifies a minimum quantity of potable water per person, for vessels on journeys over 36 hours.	The USL Code required potable water to be provided (without specifying an amount). Assuming that the quantity is appropriate, there should be no cost impact.	Safety benefits through avoiding errors in ascertaining a sufficient quantity of potable water
	5.11B (Access, Escapes and Evacuation) Embarkation stations		
	Number and arrangement of embarkation stations must be sufficient to ensure that all survival craft can be launched with their full complement of persons on board within a period not exceeding 30 minutes	Aligns with the criterion that is already in NSCV Part C Subsection 7A Clause 3.10.2. As such, there should therefore be no additional cost.	Safety benefits
	6.9 (Personal Safety) Protection from the weather		
	This clause codifies current administrative policy applied by a number of the jurisdictions. Applicable only to seagoing vessels that operate more than 12 hours.	None	Clarifies existing requirements, increasing certainty and consistency
	6.10A (Personal safety) Maximum size of clear openings—Guardrails		
	Relaxation of guardrail spacing requirements	None	Greater flexibility and reduced construction costs
Minor Increased Cost Impact	**2.13 (Operating stations, visibility and steering) Operating station layout, design and arrangement of navigational systems and equipment**		
	Increased restrictions on layout of	Minor design and construction cost	Aligns with current technology for indicators and

Cost Impact	New or changed Requirement	Costs	Benefits
	operating station, including for control console layout, New requirement to disengage remote steering positions which are located in spaces accessible to passengers	increases possible	controls on consoles Improves layout of the operating station in order to improve safety outcomes. Problems in the layout have been a factor in a number of vessel incidents Reduced distractions through separation of operating stations and public spaces playing loud music, using flashing lights and other distractions that would prevent proper attention to sound signals Aligns with Coroner's findings regarding N'gluka, where the second set of steering controls may have been tampered with.
	2.9 (Operating stations, visibility and steering) Separation of operating and passenger spaces		
	New requirement to separate operating station from passenger spaces for passenger vessels > 24m	Majority of passenger vessels are arranged in this way so the impact on the fleet is likely to be small.	Reduced distractions through separation of operating stations and passenger spaces.
	4.7 (Accommodation) Ventilation, Temperature Control, Noise Criteria		
	Mechanical ventilation, temperature control and quantifiable noise criteria required for vessels on voyages > 36 hours, in accordance with WIFC 2007.	New requirement, but in line with standard practice so the cost impact should be limited Impact of noise criteria unknown	Improved standard of crew accommodation Reduced likelihood of error from fatigue
	4.10D (Accommodation) Minimum space between rows of seats		
	For rows of seats exceeding 3.5 m to an aisle, 500 mm space is required.	Long rows of seats are not common, so the 500 mm criterion will have little impact	Facilitates rapid escape by a larger number of persons and to discourage long rows of seating that could hinder escape. Safety benefit

Cost Impact	New or changed Requirement	Costs	Benefits
	5.10 (Access, Escapes and Evacuation) High capacity escapes		
	New concept of high capacity escapes and low capacity escapes. Creates greater flexibility in design while maintaining escape redundancy.	Minimal impact due to flexibility.	Aligns with international standards while still allowing flexibility to apply current (USL Code) requirements in certain circumstances.
	5.10A (Access, Escapes and Evacuation) Spaces on decks above the bulkhead deck		
	Alternative escapes must lead to routes that connect with evacuation paths, except in certain limited circumstances.	Limits flexibility of design and décor.	Alignment with international standards
	5.11A (Access, Escapes and Evacuation) Assembly stations		
	Assembly stations proposed to be only required on vessels carrying more than 36 passengers and vessels of measured length 35 m or more. (USL code requires for vessels greater than 25 m except class 2D + E and 3D + E Assembly stations proposed to be required to be a minimum of 0.35 m2 per person. Clarification of requirement compared to USL code	New size specification, but minimal cost impact.	Reduced construction costs for certain vessels Improved transparency of requirements through the removal of ambiguities.
	5. 12B (Access, Escapes and Evacuation) Securing of escape and evacuation routes when the vessel is unmanned		
	New requirement to address escape and evacuation routes that are secured when vessel is unmanned	Minimal impact as will be addressed at the design phase	Aligns with findings of investigation into an incident on a fishing vessel in WA. Safety benefits as the consequences of a serious incident will be reduced

Cost Impact	New or changed Requirement	Costs	Benefits
	5.14 (Access, Escapes and Evacuation) Handrails		
	Applies to seagoing vessels carrying 36 or more day passengers or 12 or more berthed passengers Requires handrails or other handhold along the entire evacuation route in accordance with international standards. New requirements for strength of handrail.	Cost may be occurred in that handrails that may have been accepted previously may not apply under the proposed standard.	Increased levels of safety Aligns to international standards
	5.15 (Access, Escapes and Evacuation) Details of ladders including step ladders		
	Updated requirements	For most vessels there should be no impact	Align with international standard Greater flexibility for smaller vessels regarding slope of vertical ladders
	5.15A (Access, Escapes and Evacuation) Spiral Stairways		
	Most spiral stairways no longer acceptable for high capacity escape because of the risk of persons tripping and being injured or blocking the stairway.	Costs may increase due to reduced flexibility	Increased levels of safety
	5.15B (Access, Escapes and Evacuation) Stairways—Construction		
	Minimum structural standard for stairways. Not previously stated in the USL code.	Increased costs associated with higher construction specifications	Clarification of minimum structural loading for stairways. Unification of standards across all vessels

Cost Impact	New or changed Requirement	Costs	Benefits
			Aligns with international standards
	5.16 (Access, Escapes and Evacuation) Instructions for safe escape		
	Requires marking of escape routes and assembly stations for vessels carrying 12 or more berthed persons or greater than 36 passengers	Minimal impact. A similar notice is specified under USL Clause 5E.5.1, applicable to all passenger accommodation but giving the Authority discretion to waive requirements where it is unnecessary on small vessels.	Clarifies the requirement Allows flexibility in regards to specific vessels
	5.16 (Access, Escapes and Evacuation) Marking of escape and evacuation routes		
	Formalises requirements applied administratively for exit signs in passenger spaces of vessels.	Cost impact associated with signage requirements	Removal of requirement to fit textured surfaces on doors will reduce costs and increase flexibility Safety benefit: addresses concerns that certain substantial vessels are not required to be fitted with emergency lighting. Aligns with international standards
	6.9B (Personal Safety) Protection of persons moving about the vessel		
	Increased protection required for individuals moving on exposed decks of certain vessels by providing for underdeck passages, raised gangways, harnesses, guardrails, life links. Applicable only to seagoing vessels.	Some cost may be incurred by some catamarans where access to anchoring arrangements is via open fore decks where the great breadth of the vessel sometimes precludes relying on side rails or bulwarks for access.	Increased safety benefits
	6.10 (Personal Safety) Strength of guardrails		

Cost Impact	New or changed Requirement	Costs	Benefits
	Specific criteria regarding strength of guardrails.	Majority of vessels should already comply	Clarifies existing requirements
	6.10B (Personal Safety) Additional protection on certain passenger vessels		
	Must have wire mesh or other arrangements to limit the size of openings to 125 mm diameter sphere maximum.	Minor cost impact	Increased safety for small children but considerably less onerous than specified for swimming pool requirements
	6.11 (Personal Safety) Protection from hazardous plant (machinery)		
	Requires arrangements to protect persons from exposure to hazardous elements of plant	Limited costs associated with these clauses because it aligns with broad OH & S obligations	Safety benefits
	6.12 (Personal Safety) Safe movement of persons on the vessel		
	Clarifies requirements for access ways not forming part of escape or evacuation routes.	Aligns with existing administrative requirements; majority of vessels should already comply	Provides additional flexibility in plant (machinery) spaces by adding reference to AS 1657 Clarifies requirements
	6.13 (Access, Escapes and Evacuation) Access to and from the vessel		
	Clarifies requirements for access and egress from the vessel	Minimal cost impact due to majority of vessels complying with current acceptable practice	Clarifies requirements
Potentially Significant Cost Impact	**4 (Accommodation) Crew accommodation - overview**		
	MLC 2006 applies in full to passenger and cargo vessels over or equal to 3000 GT	MLC 2006 significantly increases requirements for crew accommodation on passenger and cargo vessels	Does not specify fishing vessels need to meet same standards as MLC 2006. Specifies Class 1 and Class 2 crew

Cost Impact	New or changed Requirement	Costs	Benefits
	MLC 2006 applies in part to passenger and cargo vessels < 3000GT MLC 2006 applies in part of passenger and cargo vessels < 35 m Work in Fishing convention (WIFC 2007) applies to all other vessels engaged in longer voyages that are not subject to MLC 2006	MLC 2006 changes could well adversely impact characteristics such as stability, deck area, vessel configuration, bollard pull on tugs, cargo capacity, etc. on smaller vessels Increased/improved crew accommodation on commercial vessels – negative impact on smaller commercial vessels, through stability & cargo capacity, mostly. Main implications are for vessels on voyages longer than 72 hours. Cost impacts could be large, due to potential complete redesign of vessels	accommodation if not MLC should be the same as Class 3 which has been derived from WIFC 2007. Same standard of safety applied to all seafarers – including fisherman. Social risks (suicide, homicide and drug and alcohol abuse) addressed by MLC 2006 for voyages over 72 hours may account for as much as 50% of total fatalities at sea. Safety, health, amenity benefits. As with minimum headroom, the changing demographics of persons means that the berth size specified in the 1970s not longer provides the same outcomes in 2010. Persons are getting taller and wider.
	4.7 (Accommodation) Head room		
	For vessels 35 m or over, minimum required headroom increases from 1.9 m (USL Code) to 1.98 m in accordance with ILO C133 This is less than MLC 2006 requirement of 2.03 metres. For vessels < 35 m, 1.9 m requirement is maintained.	For vessels of measured length 35 m and over, there is likely to be a cost increase	Conservatively reflects changing demographic increase in the average height of males has been 0.74 cm per decade. Over 61 years[26], this amounts to 4.5 cm. Greater alignment with international standard

[26] Tomkinson, G., Clark, A and Blanchonette, Peter. Body Size Changes of Royal Australian Air Force Aircrew: 1971 – 2005. Defence Science and Technology Organisation. University of South Australia. DSTO-TR-2339. p.19

Cost Impact	New or changed Requirement	Costs	Benefits
	4.9 (Accommodation) Crew accommodation - Sleeping berths		
	For vessels up to 35m on journeys over 12 hours, minimum size of sleeping berths is increased from 1900 x 680 (1949 ILO dimensions) to 1900 x 700 For vessels up to 35m on journeys up to 36 hours, minimum size of sleeping berths is increased from 1900 x 680 (1949 ILO dimensions) to 1980 x 700 For vessels on journeys over 36 hours, and vessels over 35m on journeys over 12 hours, minimum size of sleeping berths is increased from 1900 x 680 (1949 ILO dimensions) to 1980 x 760 These limitations do not apply to passenger berths where market forces are permitted to operate.	Cost impacts could be large, due to potential complete redesign of vessels	Same standard of safety applied to all seafarers – including fisherman. Risks of fatigue reduced. Social risks (suicide, homicide and drug and alcohol abuse) addressed by MLC 2006 for voyages over 72 hours may account for as much as 50% of total fatalities at sea. Safety, health, amenity benefits. Changing demographics of persons means that the berth size specified in the 1970s not longer provides the same outcomes in 2010. Persons are getting taller and wider.
	4.9A (Accommodation) Crew accommodation, Floor Area		
	For vessels on journeys over 36 hours, increase in floor area required of 10 – 20% per person (vessels up to 35m) and 50% for vessels over 35m	Cost impacts could be large, due to potential complete redesign of vessels This may have significant impact due to the disparity between the old and new standards, and passenger, cargo and fishing vessels	Same standard of safety applied to all seafarers – including fisherman. Social risks (suicide, homicide and drug and alcohol abuse) addressed by MLC 2006 for voyages over 72 hours may account for as much as 50% of total fatalities at sea. Safety, health, amenity benefits. As with minimum headroom, the changing

Cost Impact	New or changed Requirement	Costs	Benefits
			demographics of persons means that the berth size specified in the 1970s not longer provides the same outcomes in 2010. Persons are getting taller and wider.
	4.10 (Accommodation) Access		
	Applies to Class 1 vessels carrying 32 passengers or more Access for persons with a disability including width for doorways, corridors and passengers, priority seating, allocated spaces for wheelchairs, assessable sleeping births and suitable sanitary facilities	Potential cost involved in vessel modification	Health benefits
	4.11 (Accommodation) Facilities for sick and injured persons		
	Sick bay facilities required for vessels on journeys over 72 hours Dedicated sick bay area required for class A vessels over 35m.	Construction costs may increase	Aligns with international standards
	5.9 (Access, Escapes and Evacuation) Obstructions to be avoided		
	Restrictions regarding arrangements of furniture and floor coverings that could block escape or evacuation routes should the vessel heel.	Limits flexibility of design and décor	Safety benefit - address factors that contributed to deaths resulting from incidents (in particular the Marchioness tragedy on the Thames in 1989 where 51 people died). Aligns with international standards
	5.12B (Access, Escapes and Evacuation) Securing of escape and evacuation routes when the vessel is unmanned		

Cost Impact	New or changed Requirement	Costs	Benefits
	Requires release devices on large doors that are normally latched	Likely to only impact larger passenger vessels.	Increased levels of safety
	5. 15 (Access, Escapes and Evacuation) Alignment of stairways		
	Increased requirements for stairways on seagoing vessels over 90 persons	Reduced flexibility of design	Safety benefits
	6.9A (Personal Safety) Instructions for safe escape— Protection of persons from the elements		
	Open decks accommodating persons for extended periods are required to provide some protection from the elements Applicable only to sea going vessels	Potential increased construction costs for sea going vessels	Safety benefits
	6.10 (Access, Escapes and Evacuation) Minimum height of bulwarks and guard rails		
	Minimum height requirement of 1000 mm on vessels of between 10 m and 24 m in length..	Possible increased construction costs Possible interference with the vessel's function (though overcome by provisions for special purpose decks and special working decks)	Increased levels of safety Aligns with international standards More flexible arrangements for decks used for special purposes

ANNEX B BENEFIT / COST IMPACT ANALYSIS (BASED ON COST INCREASE OF 1%)

PARAMETERS

Note: $=A$

General:	Value1	Value2	Value3	Source/Comment
Resource cost of fatality	$3,500,000	-	-	OPDR (2007 value)
Resource cost of serious injury	$492,083	-	-	AusRoads, average national (2008)
Resource cost of minor/unclassified injury	$19,525	-	-	AusRoads, average national (2008)
Average newbuild cost - Passenger (class 1)	$2,000,000	-	-	Assumed by consultant (2011)
Average newbuild cost - NonPassenger (class 2)	$340,000	-	-	Assumed by consultant (2011)
Average newbuild cost - Fishing (class 3)	$1,000,000	-	-	Assumed by consultant (2011)
Contingency factor for number of fatalities	50%	-	-	Assumed by consultant (2011)
Average annual cost escalation	2.5%	-	-	Assumed to adjust pre-2012 cost data to 2012
Real economic discount rates	4.0%	7.0%	10.0%	Assumed according to ATC/IA Guidelines
Regulatory impact - reduction scenarios (assumed)	25%	50%	75%	Assumed reductions in relevant incidents & vessel losses
Assumed annual growth in commercial fleet	2%	-	-	Assumed to grow fleet 2009-2012
New vessels added to commercial fleet per year	1,300	-	-	NMSC Draft RIS National Standard* (Aug. 2010)

(*) for Commercial Vessels

Marine Incidents & Fleet:	2005-2008	Annual	2009	Source/Comment
Actual Number of fatalities (all causes)	47	11.75	-	NMSC Commercial Vessel Incidents (Nov.2009)
Actual Number of serious injuries (all causes)	173	43.25	-	NMSC Commercial Vessel Incidents (Nov.2009)
Actual No. of minor/unclassified injuries (all causes)	610	152.5	-	NMSC Commercial Vessel Incidents (Nov.2009)
Number of vessels lost in incidents (deemed insurance total loss)	-	7	-	Register of Australian and New Zealand Ships and Boats compiled by Mori Flapan & NMSC
Assumed % Incidents - Passenger (1)	13%	-	-	Based on % share of fleet for vessel class
Assumed % Incidents - NonPassenger (2)	46%	-	-	Based on % share of fleet for vessel class
Assumed % Incidents - Fishing (3)	32%	-	-	Based on % share of fleet for vessel class
Assumed relevant vessels lost - Passenger (1)	-	1	-	Based on number of relevant vessels lost and % share of fleet for vessel class
Assumed relevant vessels lost - NonPassenger (2)	-	3	-	Based on number of relevant vessels lost and % share of fleet for vessel class
Assumed relevant vessels lost - Fishing (3)	-	2	-	Based on number of relevant vessels lost and % share of fleet for vessel class
% Fatality incidents relevant to regulatory change	54.6%	-	-	Based on NMSC Incidents report, table 11 (human factors and lack of visibility excl. lack of fuel & overloading)
% Injury incidents relevant to regulatory change	54.6%	-	-	Based on NMSC Incidents report, table 11 (human factors and lack of visibility excl. lack of fuel & overloading)
% Vessels lost relevant to regulatory change	54.6%	-	-	Based on NMSC Incidents report, table 11 (human factors and lack of visibility excl. lack of fuel & overloading)
Number of commercial vessels (fleet)	-	-	28,346	NMSC Commercial Vessel Incidents (Nov.2009)
Number of commercial vessels, excl. Victoria	-	-	24,827	NMSC Commercial Vessel Incidents (Nov.2009)
Fleet by vessel use (class) - Passenger (1)	-	-	13%	NMSC Commercial Vessel Incidents
Fleet by vessel use (class) - NonPassenger (2)	-	-	46%	NMSC Commercial Vessel Incidents
Fleet by vessel use (class) - Fishing (3)	-	-	32%	NMSC Commercial Vessel Incidents
Fleet Average Length (m) - Passenger (class 1)	-	-	17	NMSC Commercial Vessel Incidents
Fleet Average Length (m) - NonPassenger (class 2)	-	-	8	NMSC Commercial Vessel Incidents
Fleet Average Length (m) - Fishing (class 3)	-	-	11	NMSC Commercial Vessel Incidents
Assumed 2012 Fleet - Passenger (class 1)	-	-	3,911	Non-Victorian fleet use % applied to total fleet
Assumed 2012 Fleet - NonPassenger (class 2)	-	-	13,837	Non-Victorian fleet use % applied to total fleet
Assumed 2012 Fleet - Fishing (class 3)	-	-	9,626	Non-Victorian fleet use % applied to total fleet

(**) For Non-Victorian fleet.

Cost of Regulatory Compliance (assumed):	Value1	Value2	Value3	Source/Comment
% Increase in Newbuild cost - Passenger (class 1)	1.0%	-	-	Assumed by consultant (2011)
% Increase in Newbuild cost - NonPassenger (class 2)	1.0%	-	-	Assumed by consultant (2011)
% Increase in Newbuild cost - Fishing (class 3)	1.0%	-	-	Assumed by consultant (2011)

Base Case - No Regulatory Change:			**Total**
Cumulative fleet replacement over 21 years: 27,374			**(30 years)**
Estimated Relevant Marine Incidents for New Additions:			
Human Fatalities (incl. contingency)		Number	111.2
Human Serious Injuries		Number	273.0
Human Minor & Unclassified Injuries		Number	962.5
Vessel Losses - Passenger (Class 1)		Number	5.5
Vessel Losses - NonPassenger (Class 2)		Number	19.3
Vessel Losses - Fishing (Class 3)		Number	13.4
Costs of Marine Incidents for New Additions:			
	Cost/incident		
Fatalities	$3,863,345		$429,769,006
Serious Injuries	$543,168		$148,273,110
Minor Injuries	$21,552		$20,744,301
Class 1 Losses	$2,050,000		$11,188,490
Class 2 Losses	$348,500		$6,730,307
Class 3 Losses	$1,025,000		$13,770,449
Total costs			$630,475,664
Present Value	@ Real Discount Rate	4.0%	$358,328,542
	@ Real Discount Rate	7.0%	$244,948,788
	@ Real Discount Rate	10.0%	$173,454,235

Project Case - Low Regulatory Impact:		**-25%**	**Total (30 years)**
Estimated Relevant Marine Incidents for New Additions:			
Human Fatalities (incl. contingency)		Number	$83
Human Serious Injuries		Number	$205
Human Minor & Unclassified Injuries		Number	$722
Vessel Losses - Passenger (Class 1)		Number	$4
Vessel Losses - NonPassenger (Class 2)		Number	$14
Vessel Losses - Fishing (Class 3)		Number	$10
Costs of Marine Incidents for New Additions:			
	Cost/incident		
Fatalities	$3,863,345		$322,326,755
Serious Injuries	$543,168		$111,204,832
Minor Injuries	$21,552		$15,558,226
Class 1 Losses	$2,050,000		$8,391,368
Class 2 Losses	$348,500		$5,047,730
Class 3 Losses	$1,025,000		$10,327,837
Total costs			$472,856,748
Present Value	@ Real Discount Rate	4.0%	$268,746,406
	@ Real Discount Rate	7.0%	$183,711,591
	@ Real Discount Rate	10.0%	$130,090,676
Regulatory Compliance Cost for New Additions (assumed):			
	Cost/vessel		
Class 1 Vessels	$20,500		$72,950,942
Class 2 Vessels	$3,485		$43,882,797
Class 3 Vessels	$10,250		$89,785,775
Total costs			$206,619,514
Present Value	@ Real Discount Rate	4.0%	$137,896,322
	@ Real Discount Rate	7.0%	$106,449,520
	@ Real Discount Rate	10.0%	$84,933,922
Benefits (= cost reduction)	Undiscounted		$157,618,916
	@ Real Discount Rate	4.0%	$89,582,135
	@ Real Discount Rate	7.0%	$61,237,197
	@ Real Discount Rate	10.0%	$43,363,559

Project Case - Medium Regulatory Impact:		**-50%**	**Total (30 years)**
Estimated Relevant Marine Incidents for New Additions:			
Human Fatalities (incl. contingency)		Number	55.6
Human Serious Injuries		Number	136.5
Human Minor & Unclassified Injuries		Number	481.3
Vessel Losses - Passenger (Class 1)		Number	2.7
Vessel Losses - NonPassenger (Class 2)		Number	9.7
Vessel Losses - Fishing (Class 3)		Number	6.7
Costs of Marine Incidents for New Additions:			
	Cost/incident		
Fatalities	$3,863,345		$214,884,503
Serious Injuries	$543,168		$74,136,555
Minor Injuries	$21,552		$10,372,151
Class 1 Losses	$2,050,000		$5,594,245
Class 2 Losses	$348,500		$3,365,154
Class 3 Losses	$1,025,000		$6,885,225
Total costs			$315,237,832
Present Value	@ Real Discount Rate	4.0%	$179,164,271
	@ Real Discount Rate	7.0%	$122,474,394
	@ Real Discount Rate	10.0%	$86,727,117
Regulatory Compliance Cost for New Additions (assumed):			
	Cost/vessel		
Class 1 Vessels	$20,500		$72,950,942
Class 2 Vessels	$3,485		$43,882,797
Class 3 Vessels	$10,250		$89,785,775
Total costs			$206,619,514
Present Value	@ Real Discount Rate	4.0%	$137,896,322
	@ Real Discount Rate	7.0%	$106,449,520
	@ Real Discount Rate	10.0%	$84,933,922
Benefits (= cost reduction)	Undiscounted		$315,237,832
	@ Real Discount Rate	4.0%	$179,164,271
	@ Real Discount Rate	7.0%	$122,474,394
	@ Real Discount Rate	10.0%	$86,727,117

Project Case - High Regulatory Impact:		**-75%**	**Total (30 years)**
Estimated Relevant Marine Incidents for New Additions:			
Human Fatalities (incl. contingency)		Number	27.8
Human Serious Injuries		Number	68.2
Human Minor & Unclassified Injuries		Number	240.6
Vessel Losses - Passenger (Class 1)		Number	1.4
Vessel Losses - NonPassenger (Class 2)		Number	4.8
Vessel Losses - Fishing (Class 3)		Number	3.4
Costs of Marine Incidents for New Additions:			
	Cost/incident		
Fatalities	$3,863,345		$107,442,252
Serious Injuries	$543,168		$37,068,277
Minor Injuries	$21,552		$5,186,075
Class 1 Losses	$2,050,000		$2,797,123
Class 2 Losses	$348,500		$1,682,577
Class 3 Losses	$1,025,000		$3,442,612
Total costs			$157,618,916
Present Value	@ Real Discount Rate	4.0%	$89,582,135
	@ Real Discount Rate	7.0%	$61,237,197
	@ Real Discount Rate	10.0%	$43,363,559
Regulatory Compliance Cost for New Additions (assumed):			
	Cost/vessel		
Class 1 Vessels	$20,500		$72,950,942
Class 2 Vessels	$3,485		$43,882,797
Class 3 Vessels	$10,250		$89,785,775
Total costs			$206,619,514
Present Value	@ Real Discount Rate	4.0%	$137,896,322
	@ Real Discount Rate	7.0%	$106,449,520
	@ Real Discount Rate	10.0%	$84,933,922
Benefits (= cost reduction)	Undiscounted		$472,856,748
	@ Real Discount Rate	4.0%	$268,746,406
	@ Real Discount Rate	7.0%	$183,711,591
	@ Real Discount Rate	10.0%	$130,090,676

Results Summary			
Project Low Regulatory Impact:			
NPV (mln.)	**-$48**	@ Real Discount Rate	4.0%
	-$45	@ Real Discount Rate	7.0%
	-$42	@ Real Discount Rate	10.0%
BCR	**0.6**	@ Real Discount Rate	4.0%
	0.6	@ Real Discount Rate	7.0%
	0.5	@ Real Discount Rate	10.0%
Project Medium Regulatory Impact:			
NPV (mln.)	**$41**	@ Real Discount Rate	4.0%
	$16	@ Real Discount Rate	7.0%
	$2	@ Real Discount Rate	10.0%
BCR	**1.3**	@ Real Discount Rate	4.0%
	1.2	@ Real Discount Rate	7.0%
	1.0	@ Real Discount Rate	10.0%
Project High Regulatory Impact:			
NPV (mln.)	**$131**	@ Real Discount Rate	4.0%
	$77	@ Real Discount Rate	7.0%
	$45	@ Real Discount Rate	10.0%
BCR	**1.9**	@ Real Discount Rate	4.0%
	1.7	@ Real Discount Rate	7.0%
	1.5	@ Real Discount Rate	10.0%

Note: NPV = Net Present Value; BCR = Benefit-Cost-Ratio.