

**Submission to the Independent Panel relating to the Port of Melbourne Corporation
Proposed Channel Deepening - 2007 - Supplementary Environment Effects Statement**

**The Increased Risks and Reduced Safety Margins for Ships Transiting the
Great Ship Channel at Port Phillip Heads.**

by Frank Hart, Former Harbour Master, Ports of Western Port and Hastings

PART A

A.1. Introduction

Port Phillip Heads at the entrance to Port Phillip Bay may rightly lay claim to being one of the most dangerous and difficult stretches of water and harbour entrances world wide. Following my professional involvement in managing ports and harbours I feel obliged to comment and share my knowledge and that of many of my colleagues with those involved in the decision making processes relating to the proposed channel deepening project and with the Victorian people who stand to gain or loose by the success or failure of this project.

We are astonished that the Port of Melbourne Corporation (proponents) have declined to introduce any Port Phillip Pilots as expert witnesses to give supporting evidence as to the safety of the design and the proposed operating parameters of the Great Ship Channel at Port Phillip Heads and in respect to 12.1 to 14 metre draft ships transiting this channel.

It is interesting to conjecture as to the reasons for the absence of the Port Phillip Pilots. Every other type of expert has been presented by the proponent including a variety of accountants, civil engineers, environmental scientists, mathematicians, experts on flora and fauna and public relations specialists; but experts in the discipline that the success or failure of the proposal hinges on, the safety of navigation, have been conspicuously absent.

The absence of any Port Phillip Pilots may be to avoid examination of their advice, as their evidence could disclose major weaknesses in the proponent's proposal. The claimed financial

benefits may be undermined when it becomes obvious that the Great Ship Channel will need to be widened further. The fear of ultimate responsibility when a tragic accident occurs may also weigh heavily over management.

Not to expose the most dangerous part of the project to the most intense examination is an act of negligence. All the evidence points to the likelihood of a major accident occurring if the project proceeds in its current form.

A.2. Application of this Submission.

This submission applies to the safe navigation of 12.1 to 14 metre draft ships through Port Phillip Heads.

This submission finds that the proposed Design and Operating Parameters of the Great Ship Channel as described in the EES and SEES are so dangerous and safety so prejudiced, that it is impossible to believe that the proponents will not apply to widen the Great Ship Channel further at great financial and environmental cost; and change the proposed operating parameters, once the Government has sanctioned the dredging to proceed.

A.3. Proposed Design and Operating Parameters.

The maximum draft for ships transiting the entrance to Port Phillip Bay, through the Great Ship Channel, is presently restricted to 11.6 metre without tidal assistance, and 12.1 metre draft with the assistance of 1.5 metre of tide.

This submission examines:

- i. the proposal to increase the depth of water in the 245 metre wide Great Ship Channel at the Heads from 14 metre to > 17 metre and to extend a small wedge shaped area at the north-western corner of the Rip Bank. The width of the navigable Great Ship Channel (other than this small wedged shaped area) is to remain at 245 metre, and
- ii. the proposed operating parameters set out in the 2007 Supplementary Environment Effects Statement (SEES) and in the 2004 Environment Effects Statement (EES), and

- iii. the likelihood and consequences of a 12.1 to 14 metre draft ship grounding and/or stranding outside the boundaries of the 245 x 17 metre Great Ship Channel.

The proponent advises that the Great Ship Channel has been designed for vessels with drafts up to 14 metre to transit at all stages of the tide.

The proponent advises that the desired financial objectives will not be achieved if the channel is only operational for 12.1 to 14 metre draft ships at slack water when the tide is not running (i.e. for four hours per day).

The proponent advises that the proposed design and operating parameters, set out in the 2007 SEES, have not changed from the design and the operating parameters set out in the 2004 Environment Effects Statement (EES).

Examination of the proposed design and the operating parameters, provides little assurance that the safe navigation of 12.1 to 14 metre draft ships along the Great Ship Channel at all stages of the tide is possible.

A.4. Indisputable facts.

Fact 1.

Entering or leaving Port Phillip Bay, deep draft ships with drafts between 12.1 and 14 metre will not ground and/or strand **if the whole of the ship is navigated within the boundaries** of the proposed 17 metre deep Great Ship Channel.

Fact 2.

Deep draft ships with drafts between 12.1 and 14 metre transiting the Great Ship Channel at any stage of the tide, will inevitably ground and/or strand **if the ship or part of it**, deviates outside the boundaries of the Great Ship Channel into the side channels.

Fact 3.

In all instances the grounding of ships, in Port Phillip Heads, has occurred outside the boundaries of the Great Ship Channel.

Fact 4.

The greatest danger to the safe navigation of ships at Port Phillip Heads is the effect of very strong tidal currents of 7 or 8 knot, that cross the Great Ship Channel simultaneously in opposite directions.

A.5. Ambivalent information relating to commissioning of deepened Great Ship Channel.

Concerns put to the proponent relating to the potential grounding of 12.1 to 14 metre draft ships in the Eastern and Western Ship Channels that run alongside the Great Ship Channel, and the need to restrict transit times to slack water, so these ships are able to safely navigate the Great Ship Channel, are dismissed by the proponent, who advises that this size CONTAINER vessel will not be seen in the Port for many years to come.

The proponent's answer circumvents addressing the most dangerous situation of all, by failing to recognize the proposed transit through Port Phillip Heads of the deeper 12.1 to 14 metre draft, OIL TANKERS and BULK ORE ships. Oil tankers have the greatest potential for spilling large quantities of oil.

In the event of the grounding or stranding of an oil tanker carrying over 100,000 ton of oil, at Port Phillip Heads, and the subsequent loss of large quantities of oil; disastrous environmental, financial and social consequences will affect the waters of Port Phillip Bay, Western Port Bay and Bass Strait. Other types of ship can also carry over 10,000 ton of fuel oil in their double bottom fuel tanks.

Mobil Oil have advised that they wish to use oil tankers with drafts between 12.5m and 14 metre in the Port of Melbourne.

The proponent's answer indirectly accepts that when 12.1 to 14 metre draft ships start to use the Great Ship Channel the danger of grounding will be present, and also suggests that the proponent recognizes that the Great Ship Channel needs to be widened considerably further.

A.6. Misrepresentation of Channel Operating Parameters.

The proponent has received advice from the Port Phillip Pilots, stating that ships with drafts between 12.1 and 14 metre, will be restricted to transiting the Great Ship Channel to the times of slack water; as ships between 12.1 and 14 metre draft are uncontrollable in the Great Ship Channel when the tides are running.

Why has this information not been disclosed in the SEES?

The claim from the proponent that 12.1 to 14 metre draft ships will transit the channels at all stages of the tide, is a clear misrepresentation of the facts.

Statements from the pilots and the proponent are clearly incompatible. There will always be pressures placed on the Pilots to meet commercial exigencies and this appears to be happening even at the design stage of the proposal, almost before a lump of rock has been removed!

The restricted periods of time for the 12.1 to 14 metre draft ships to transit the Heads to the times of slack water, (that is for four hours per day), will stop the desired financial outcomes, claimed by the proponent, from being achieved. (See Part B) of this submission.

A.7. Recent Shipping Incidents.

In 2006 four known vessels with drafts less than 11.6 metre, deviated outside the Great Ship Channel. One and possibly two of these vessels grounded in the entrance to Port Phillip Bay. (See Part B) of this submission.

A.8. Risk Assessment conducted by Royal Haskoning.

Royal Haskoning, the Risk Consultants commissioned by the proponent, were required to assess the likely occurrence of a 12.1 to 14 metre draft ship grounding and/or stranding in the Heads.

A Risk Assessment of the magnitude of the likely consequences of such a grounding and/or stranding was specifically excluded from the Royal Haskoning brief.

The internationally accepted definition of 'Risk' defines 'Risk' to be a function of the likely frequency of an incident and the magnitude of the potential consequences.

Has the assessment of the likely consequences of an accident, been excluded from the EES and the SEES; as the potential consequences are too dreadful to contemplate?

One such accident could put an end to all concerns about the 'bottom line'.

A Risk Assessment is used to make informed decisions, in this instance to design a shipping channel and to determine safe operating parameters. The lack of a Risk Assessment relating to the magnitude of the consequences of an accident, prevents informed decisions from being made and fails to meet the recommendations of (PIANC) - A Guide for the Design of Approach Channels. (See Part B) of this submission.

The Risk Assessment for the Great Ship Channel in Port Phillip Heads is flawed for the following reasons:

- i. The Study is inadequate, incomplete, and lacks objectivity.
- ii. Incomplete and therefore misleading data has been used.
- iii. The historical data used relates to periods prior to the channel deepening, after which there will be a changed set of conditions.
- iv. Inadequate involvement of Port Phillip Pilots.
- v. Failure to examine the magnitude of the likely consequences is a major deficiency.
(see Part B) of this submission.

A.9. Channel Design.

The Channel Design was undertaken for the proponents by Maunsell Partners Australia Pty Ltd.

Maunsell Appendix 8. Part 3.1:

This part states that the design of the channel system for navigation was undertaken in accordance with the design process set out in the PIANC publication “Approach Channels – A Guide for Design 1997”.

Comment.

Adherence to the PIANC Recommendations for both the Risk Assessment and the Channel Design in relation to the Great Ship Channel has not been followed, resulting in a proposal that has reduced safety margins and increased dangers and will likely lead to a grounding and/or stranding of a 12.1 to 14 metre draft ship in the Heads.

The proponents objectives stated in the EES and the SEES will not be achieved.

The consequences will be disastrous.

See Part B of this submission.

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PART B

SUBMISSION

This Part relates to The Proposed Channel Deepening at Port Phillip Heads and the proposed design and operating parameters of the Great Ship Channel.

B.1 Concerns and Consequences.

The proposed parameters set out in the EES and SEES are for larger vessels, (up to length 340 metre, beam 45 metre and draft between 12.1 and 14 metre) to transit the deeper Great Ship Channel (depth 17 metre, width 245 metre) in cross tidal currents, flowing at velocities up to 7 or 8 knots, at all stages of the tide.

Evidence clearly shows that these large ships transiting the dangerous Great Ship Channel with no margin for error, will inevitably deviate from the Great Ship Channel, and ground and/or strand in the Eastern and Western Channels, that run alongside the Great Ship Channel. The consequences of which will likely be environmentally, financially and socially devastating.

The 1989 grounding of the oil tanker ‘Exxon Valdez’ in Prince William Sound, Alaska, with the loss of 35,000 tonnes of crude oil, incurred clean up and compensation costs amounting to approximately US. \$3.5 billion and punitive damages of approximately US \$6.5 billion. Only now, 18 years after the accident, is the environment recovering to an acceptable degree.

B.2. Appointment of Risk Assessors.

Royal Haskoning were commissioned on 18th November 2005 to establish acceptable marine safety criteria for the project; and undertake a Marine Impact Assessment to establish the overall marine risk, comprising risk of collision, grounding, stranding, impact and striking; etc.

The assessment of the magnitude of the likely consequences of a ship grounding or stranding in Port Phillip Heads, was excluded from their brief.

The failure to carry out a full **impact assessment of activities** taken outside a Commonwealth marine area, where those activities are likely to have significant impact on the marine area's environment, contravenes the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. (see B6. below).

Royal Haskoning made a visit to Melbourne between 5th and 16th December 2005 to be briefed and to collect the available data relevant to the assignment.

Following the 1989 grounding of the Exxon Valdez in Prince William Sound, Alaska, a risk assessment was carried out in 1995 by Rensselaer Polytechnic Institute, George Washington University and Det Norske Veritas. The initiators of this Assessment asked the National Research Council to provide a Peer Review of the Prince William Sound Risk Assessment, which was published in 1998.

Both the Prince William Sound - Assessment and the Peer Review are directed towards those persons with a technical background and whose daily business it is to think about, manage or regulate and need to know and understand the risks and hazards.

B.3. Disclosure to the Risk Assessors of accident and incident data.

The Royal Haskoning Risk Assessment is dated 19th November 2006.

Long term historical accident data provided to the Assessors is from 1949 to 2001. The review of accident data for Port Phillip made available by Marine Safety Victoria to the Assessors, was for the period from January 2002 until March 2006. (See Appendix B in Assessors Report).

The use of this data to quantify previous accidents and then project these figures forward to assess a future risk that relates to larger ships grounding in the Heads is flawed. The changed relationship of the deeper ships with 12.1 to 14 metre draft with unchanged depths of water outside the Great Ship Channel is being ignored.

The historical figures relate to groundings are probably only a small proportion of the total number of ship deviations. The figures required to estimate the level of risk are the deviations from the Great Ship Channel, the numbers of which need to include the ships that grounded plus the number of deviations where the ship did not ground.

Electronic monitoring and recording vessels tracks passing through Port Phillip Heads was commenced sometime after the 2004 EES. The Risk Assessors make no reference to having received any electronic data or information relating to deviations of vessels from their proper channels in the Great Ship Channel.

Had the data provided to the Assessors included data obtained from monitoring and recording the tracks of ships through Port Phillip Heads, the conclusions reached forecasting the safe transit of 12.1 to 14 metre draft ships through the Great Ship Channel, at all stages of the tide, would likely have been very different and started alarm bells ringing.

In the context of the comparatively recent start of monitoring and recording ships tracks through the Heads, all records of deviations, particularly those disclosed by monitoring together with anecdotal evidence from Pilots etc. are vital in regard to carrying out the risk assessment. (See Exxon Valdez Risk Analysis).

Three of the four following incidents; that occurred in 2006 relating to ships that failed to navigate within the boundaries of the Great Ship Channel; were not included in information passed to the Risk Assessors.

B.4. Recent ship deviations from the boundaries of the Great Ship Channel.

The following information is accurate to the best of my knowledge.

- i. 06/12/06. 0400 hr. Passenger ship “Statendam”. Inward bound. Point Lonsdale signal station reported the vessel entered the Heads off the navigation leads and so close to Lonsdale Reef that the vessel was suspected of hitting Lonsdale Reef. The pilot had boarded the vessel only 8 minutes before the vessel passed Lonsdale Light House.

The vessel’s port stabilizer fin was unable to be retracted when the vessel was inside Port Phillip Bay and steaming towards her berth. The vessel was subsequently berthed starboard side to the wharf so the port stabilizer fin and the hull could be inspected by divers.

- ii. 19/05/06. early a.m. The container ship. “APL Kobe”. Outward Bound. Vessel was alerted by Point Lonsdale signal station that she was navigating off the navigation leads and outside the boundaries of the Great Ship Channel.
- iii. 05/05/2006 The container ship. “Champion” Outward Bound. Vessel strayed outside the Great Ship Channel, to the western side. The Pilot took remedial action by altering course to port, passing through and across the Great Ship Channel and deviated outside the eastern side of the Great Ship Channel.
- iv. 04/01/06. 0830 hr. Oil tanker. “Desh Rakshak” Inward bound. Draft 11.4 metre. Vessel grounded whilst entering Port Phillip Bay, through Port Phillip Heads, outside the western side boundary of the Great Ship Channel. The tidal prediction was for 4.1 knot of ebb tide. The bottom of the vessel was holed and indented in a number of places.

A transcript from the Australian Transport Safety Bureau of the investigation into the grounding of the Dsh Rackshak is available on their website.

If these ships had drafts between 12.1 and 14 metre, rather than less than 11 metre as they did, they would have all grounded and/or stranded in the Heads, outside the boundaries of the Great Ship Channel.

If small ships deviate from the Great Ship Channel, how many more larger vessels of 12.1 to 14 metre draft ships will deviate.

B.5 Previous Groundings.

Notwithstanding the historic nature of the following three groundings in the Heads, the causes of these groundings and others referred to in the historic data, are important in understanding the problems at the Heads and in assessing the risks, namely:

- i. “Eburna” 16/03/1997, draft 10.5 metre. oil tanker, grounded in Heads, outward bound from Geelong reported to have strayed to the east of the main leads. Vessel holed in fore peak tank.
- ii. “Matru Kripa” 10/09/1994, draft 10.4 metre. bulk cargo vessel, grounded in the Heads. Strong ebb tide and vessel making little headway, entering on the main leads through the Heads. The pilot decided to abort entry. The vessel was turned about in the Heads. The vessel grounded and holed the fore peak tank.
- iii. “Golden Gate Sun” 30/08/1984. Oil tanker inward bound in ballast, grounded at Shortland Bluff, Queenscliffe, Vessel failed to turn to starboard off the leads towards the South Channel.

The causes of these groundings and similar accidents are more important, than simply using the accident to obtain statistical mathematical evidence.

Reports of investigations into accidents giving the causes must be released to enable the

community and in particular professional mariners and channel designers to learn from the information.

Regrettably there is a growing tendency for authorities to hide reports of Accidents and Incidents from the public, so eliminating much vital and valuable information that was historically available to practicing mariners and training new entrants in the industry.

B.6. PIANC requirement for Risk Assessment to include frequency of events and magnitude of consequences.

In all international definitions “*Risk is the product and measure of the prospect of an event occurring and the magnitude of it’s consequences*”. Failure to assess the potential consequences, disqualifies the study being referred to as a ‘risk assessment’, and prevents the Channel Design from meeting the requirements of the Permanent International Association of Navigation Congresses (PIANC) Recommendations ‘Approach Channels – A Guide for Design’.

(See Parts 3.8, 7.1, 7.2 and 7.3 of the PIANC Guide).

Due to relying on incomplete data of ships deviating from channels and applying data obtained from smaller ships grounding, to project and estimate the risk for 12.1 to 14 metre draft ships grounding and/or stranding outside the boundaries of the Great Ship Channel in Port Phillip Heads, the risk assessment is flawed.

The Risk Assessment is required to assist design the channel and set operating parameters. It is further required to determine likely accidents and consequences and provide information on which to make informed decisions, in a situation where safety margins are being drastically reduced and safety is being prejudiced.

The ‘Summary’ of the Royal Haskoning ‘Risk Assessment’ states that, “the assessment was based on backward estimates, using data supplied by Marine Safety Victoria; the forward estimates have not been used”.

This data relates not to what is being proposed, but to what presently and previously existed, and therefore fails to reflect the safety parameters for the bigger, deeper ships that will exist after the channel is deepened.

The *'Summary'* statement, contradicts the following statement made in part 2.6.1 of the Royal Haskoning 'Risk Assessment': *"That making use of historical records to determine frequency of incidents can be misleading, historical incident data cannot be directly used to identify the level of navigational risk that will apply to the current or proposed changes....."*

Comment.

Historical data is useful in demonstrating how many ships grounded and what caused <11.6 metre draft ships to ground outside the Great Ship Channel.

However where historical data is based on different features it must not be mathematically extended to indicate the number of larger, deeper 12.1 to 14 metre ships that will deviate from the deepened Great Ship Channel, or be used as a base for determining how many of the deeper ships will ground and/or strand outside the Great Ship Channel.

All groundings in Port Phillip Heads have taken place outside the Great Ship Channel, when ships have either strayed off course or where ships have failed to navigate on the leads to transit the Great Ship Channel.

It is clear that ships with less draft than 11.6 metre will be at less risk of grounding outside the channel, than those ships with the 12.1 to 14 metre deeper draft, when they deviate off course or stray outside the boundaries of the Great Ship Channel. It is also clear that the strong cross currents are influential as a major cause of ships deviating off course.

B.7. Increase in sideway forces on larger ships in the Great Ship Channel.

The Maritime College has provided information of the estimated change in sideway forces, on different size ships, from an 8 knot tidal stream crossing from 45 degrees on the bow, in different depths of water, for a stationary vessel.

- (i) Ship 170 metre in length, draft 11 metre, depth of water 14.6 metre = 1,900 tonne
- (ii) Ship 320 metre in length, draft 14 metre, depth of water 14.6 metre = 7,000 tonne
- (iii) Ship 320 metre in length, draft 14 metre, depth of water 17.6 metre = 5,700 tonne

When the Great Ship Channel is deepened, the 14 metre draft ship, will be floating in a 17 metre deep narrow trench, with some 13 metre of water in each side channel.

No matter how the above parameters may differ from actuality, the huge difference in the sideway forces on the larger, deeper vessels will be significant and has to be taken into account. The reasons for this huge increase in sideways forces are beyond this text, but relate both to the increase in area of the ship and the reduced space around the larger vessel for the cross currents to dissipate.

B.8. PIANC Recommendations part 3.

The PIANC Recommendations part 3.1.3 '*Risk Alleviation Methods*' state that, "*Once the marine risk has been estimated for the new situation (i.e. for the new channel operation) it must be compared with either the existing situation or agreed international standards*".

Comment

It is clear that the marine risk for the new situation at Port Phillip Heads, (i.e. for the new channel operation) has not been fully examined and estimated. Only the existing risk for the existing environment has been partly assessed.

The relationship of the larger deeper draft ships to the waters outside the Great Ship Channel is very different to the relationship of the existing smaller and shallower draft ships to the waters outside the Great Ship Channel.

B.9. Computer Model

Royal Haskoning has utilized a computer model to help determine the risk of a grounding.

Their Report part 3.3 states:

"Groundings are assessed as a function of the distance travelled where there is a potential risk of grounding due to either tidal constraints or shallow water to either side of the channel. In the case of

PMC, grounding is only likely in the entrance, the south Channel, and the channels north of the Fawkner Beacon; the Port Melbourne Channel, the Williamstown Channel and the Yarra River”.

Comment.

This principle only applies where channels have a degree of uniformity and similarity about them.

The statement lacks credibility in the waters of Port Phillip Bay, where the different channels have no similarity one with the other. The methodology also assumes that the number of future total groundings has been reliably estimated. **This has not been achieved in this Risk Assessment.**

B.10 Width of proposed Great Ship Channel.

Why is the 245 metre width of the Great Ship Channel, (where there is a dangerous and difficult entrance to Port Phillip Bay, where there are extremes of weather, sea, swell, tidal and cross current conditions), considered adequate; when 245 metre width is required in Western Port (for the benign and sheltered waters at the northern end of the Bay), for the same size vessels?

In Hastings in 1970, when extending the 14.7 metre deep, 183 metre wide, ship channel some three miles to a new refinery at the northern end of the Hastings, for the use of 100,000 ton oil tankers accessing the newly built ESSO oil terminal, the Port Phillip Pilots requested that the width of the new channel extension be widened from 183 metre (600 ft.) to 245 metre (800 ft.) as they considered the existing 183 metre wide channel to the BP oil terminal, too narrow.

The tidal current in Hastings flows along the course of the channel, at a maximum rate of 1.5 knot. There are no cross currents, no waves more than 1.0 metre high and no swell. The channel is safe and benign for all ships.

B.11. Uncertainties.

Many of the dangers at Port Phillip Heads are the result of Uncertainties. The weather, tides and currents are unpredictable and variable. Swell and waves can be subject to spikes that significantly increase their size unexpectedly. Currents circulate as large eddies and the times of high and low water may vary beyond predictions. The speed and directions of the surface current may differ to the speed and direction of current flowing over the ground. Rain and fog can unexpectedly and suddenly restrict the visibility of navigation lights and beacons.

These types of problems are Uncertainties. Risks can be managed; Uncertainties Cannot.

B.12. Statements made by different Port Phillip Pilots relating to the navigation of ships along the Great Ship Channel.

Many pilots have commented on the difficulties of keeping ships within the boundaries of the Great Ship Channel. Some of their statements include the following:

“There is not a pilot in the Service who has not been swept outside the Great Ship Channel”, and

“Plenty of pilots have been swept outside the Great Ship Channel”, and

“We were swept 100 metre off the leads”, and

“I don’t like the idea of entering between two rock walls”, and

“The proposed channel design at Port Phillip Heads is an accident waiting to happen”.

The history and causes of accidents and incidents with ships transiting Port Phillip Heads, serve to reinforce and substantiate these statements made by Port Phillip Pilots.

B.13. Statement made by a recently retired Port Phillip Pilot after attending a briefing given by the Proponent, relating to the design and proposed operating parameters of the Great Ship Channel.

On the 28th June 2006, the proponent provided a briefing to a recently retired Port Phillip Pilot and to myself, relating to the proposed design and the proposed operating parameters of the Great Ship Channel, for vessels with drafts up to 14 metre.

Following this briefing, on 2nd July 2006, I wrote to the proponent setting out our continuing concerns relating to the channel deepening proposal and the safety of 12.1 to 14 metre draft ships transiting the Great Ship Channel.

The Port Phillip Pilot in his correspondence with me, following the briefing, stated:

“The most optimistic scenario would be that after operating the port under the new development, and having had a few scares, the operating parameters will be reduced. The worst case scenario is that a disaster will occur”.

Are we destined to try and see if this will happen?

B.14. Experience of Others.

Royal Haskoning in part 2.7 of their report state: *“In the absence of extensive incident data, the opinions of experienced vessel masters who use the port on a regular basis can be a useful gauge of navigational safety in that port channel. Comments from a master who has visited Port Phillip regularly over the past four years are given in Appendix I”.*

Comment.

This inclusion of a statement from the master of a foreign ship suggests that Royal Haskoning considered their risk assessment for the Great Ship Channel was undertaken in the absence of extensive incident data.

Reading Appendix I of the Royal Haskoning Risk Assessment , it is apparent that this master’s total visits to Port Phillip Bay were insignificant over a four year period and certainly insufficient for him to have a detailed and intimate knowledge of Port Phillip Heads and the operational problems associated with the very strong tides that simultaneously cross the Great Ship Channel in two different directions.

However, even with his slight knowledge the master’s statement underlines the deficiencies of the Risk Assessment, rather than endorsing views that the risks are minimal and manageable. The master mentions the problems of difficult navigation, adverse weather and strong currents when transiting the Heads, many of which seem to be dangerously ignored by others.

Rather than quote this ship's master, the risk assessor should have requested the Port Phillip Pilots, who navigate ships through the Heads on a daily basis to provide written evidence, and have their views supplemented by interviews and written evidence from the masters of Australian vessels who also navigate their ships through Port Phillip Heads on a 'frequent basis', rather than just a 'regular basis.

It appears that the risk assessors have spent insufficient time working on site, to establish any close relationship with either the pilots or masters of ships transiting the Heads and barely had time to familiarize themselves with the area, let alone understand the dangers and the problems.

B.15. Comments on the Risk Assessment.

The Royal Haskoning risk assessment, in relation to the design and proposed operating parameters for 12.1 to 14 metre draft ships transiting the Great Ship Channel at Port Phillip Heads, is based on historic, incomplete and largely irrelevant information and data.

The study is flawed from the beginning and the PIANC recommendations have been misinterpreted and ignored.

The real purpose of undertaking the Risk Assessment appears to have been obfuscated. The risk assessment appears to support the project, by suggesting to the uninitiated that the risk will be no different in the future than what it is today, and that it can be managed and even reduced with more efficient navigation aids. Such assessment is incorrect.

Regrettably the risks have not been clearly identified and assessed, the causes and consequences of a grounding and/or stranding have not been assessed and it appears that the limitations of even the most modern navigation aids in the prevailing weather and tidal conditions at Port Phillip Heads have not been properly assessed and understood.

All visible navigation aids, including the PEL lights, on which assertions of safer navigation have been based are useless in heavy rain, hail and fog.

Electronic aids, no matter how accurate, provide historic navigation information, i.e. where the ship is and where it has been.

The pilot constantly adjusts the course to maintain the ships track and counter the strong variable currents crossing the narrow Great Ship Channel. Electronic aids cannot accurately predict required changes to the ships future course.

PEL lights have serious limitations and are normally only used when transit marks or transit lights are unable to be used. Transits show clearly to the pilot the rate of change as the ship moves across a track. With PEL lights this rate of change is not apparent.

The Risk Assessor has shown little appreciation and understanding of the relationship between the 11.6 metre draft ships and the waters in the Eastern and Western Ship Channels, and the relationship between the 12.1 to 14 metre draft ships and the same waters. Similarly the Risk Assessor has shown little understanding the difficulties that the 12.1 to 14 metre draft ships will have keeping on track in all weathers and at all times of the day and night when transiting the Great Ship Channel.

It is apparent that where the PIANC Recommendation 7.1.3, require, *“the marine risks be estimated for the new situation (i.e. for the new channel operation) and then be compared with either the existing situation or agreed international standards”*, this work has not been done.

Rather than taking a cautious and realistic approach, the risk assessment incorrectly and dangerously portrays the risk of a 12.1 to 14 metre ship grounding and/or stranding at the Heads outside the Great Ship Channel, as no different to existing risks and manageable and therefore acceptable.

The Royal Haskoning assessment of the increased ‘risk’ is stated in their Summary:

“The assessment has determined that there will be a small increase in risk up to 2035 but, that there is no area within the port channel that is responsible for or attracts additional risk, based on the following assumptions”;

(i). “That there is no change to the current vessel traffic management, aids to navigation, etc.”

(ii). *“The Port maintains its original commitment to adopting international best practice as set out by IALA, to meet the demands of the increased levels of traffic over the coming years”.*

Comment.

These statements make little sense and have no real bearing on determining the natural causes of ships grounding in the Heads. It is hard to take this Risk Assessment for Port Phillip Heads seriously, it looks as though the assessment is being padded for the uninitiated with incidentals, and the real problems have been glossed over.

The design of the Great Ship Channel, together with the proposed operating parameters are directly responsible for the reduced safety margins and increased risks at Port Phillip Heads.

B.16 Non disclosure of Port Phillip Pilots’ advice.

Why has the proponent failed to disclose advice, provided to them by the Port Phillip Pilots, that the transit of the 12.1 to 14 metre draft ships through the Heads will only be possible at times of slack water, as the 12.1 to 14 metre draft ships are uncontrollable in the Great Ship Channel, when the tide is running?

The advice, provided by the Port Phillip Pilots, contradicts the statements made by the proponents and their consultants in the EES and the SEES, that the design of the Great Ship Channel will allow ships up to 14 metre draft to transit the Great Ship Channel at all stages of the tide.

The Pilots’ advice reflects the PIANC Recommendations Part 3.7 contained in their publication, ‘Approach Channels - A Guide for Design’

PIANC Part 3.7 states:

“Handling a ship in all conditions of tide and weather is not always possible in the confined waters and low speeds associated with port operations. If the underkeel clearance is too low, the waves too high, the current too strong or the wind speed too great, the ship may be endangered. The pilot may not be able to control the vessel safely....

There are certain limits beyond which operations become unsafe and it is important that the designer be able to estimate these limits at the design stage.....”

B.17. Design of Great Ship Channel

The proposed design for the Great Ship Channel was undertaken by Maunsell Australia Pty. Ltd. and is dated 22nd February 2007.

The Maunsell Report - Appendix 8.

Part 3.1 Channel Design Report

States that: *“the design of the channel system for navigation was undertaken in accordance with the design process set out in the Permanent International Association of Navigation Congresses (PIANC) Approach Channels – A Guide for Design PIANC – 1997”.*

“The PIANC Guidelines recommend a two staged process:

- i. The preparation of a concept design in which initial estimates of width, depth and alignment options are made to enable alternative options to be rapidly evaluated, and*
- ii. A detailed design based on experienced judgement and sophisticated computer based analysis and design to develop, validate and refine the concept design. The detailed design is then further checked for acceptability by means of vessel traffic analysis, risk analysis, and cost estimates”.*

Part 3.3 states:

“A preliminary design was prepared by review and adjustment of the Concept Design against the PIANC Guidelines”.

“PIANC sets out empirical rules, developed from a world wide review of existing channels which enable the width and depth of the channel to be approximately and conservatively estimated”.

Comment:

The Maunsell process is not in accord with the PIANC Recommendations.

The proposed design is suggested to reflect these empirical rules.

The facts are that the PIANC empirical rules for cross currents do not apply when cross currents exceed 2.0 knot maximum.

PIANC part 5.2 states: *“The Concept Design method given here, uses information gathered worldwide which is representative of good modern practice. It will be satisfactory for the preliminary design of **most** channels, but it is accepted that some occasions will arise when such a technique will be inappropriate and the more elaborate methods of Detailed Design will have to be employed, even for preliminary design”.*

Comment.

The Concept Design Method that uses empirical rules has to be replaced by the Detailed Design Method for the Great Ship Channel. The Concept Design is satisfactory for the south channel and channels northwards but not for the Great Ship Channel.

The Great Ship Channel has been wrongly categorized as an Inner Channel (See below).

Inner or Outer Channel

Maunsell Appendix 8. Part 7.6 Preliminary Design.

The decision made by the consultants, to classify the Entrance Fairway (Great Ship Channel) as an ‘Inner Channel’, within the meaning of the PIANC Recommendations is incorrect.

Note: If the Designer is not including the Great Ship Channel as being part of the Entrance Fairway, then he has failed to undertake a risk assessment for the Great Ship Channel.

The PIANC recommendations 5.3.6 state:

“Inner and Outer Channel”

“An outer channel is one exposed to wave action which is such as to produce important vessel motions. Usually these will be pitch, heave and roll and will be of a magnitude to reduce underkeel clearance by a significant amount”.

“An inner channel is one which is not subject to wave action of any significance and is generally sheltered”.

PIANC part 3.3 states that: *“the outputs of the Detailed Design may be subject to further checking for acceptability by means of marine traffic analysis, and risk analysis....,”*

Comment:

The Design of the Great Ship Channel fails to meet the PIANC recommendations that require consideration and allowance for local conditions which include the prevailing very strong variable and unpredictable cross currents at the Heads, quartering south-south-westerly swell and seas, at times intensified by strong opposing currents and strong winds causing the ship to pitch and roll and scend in the Great Ship Channel.

The currents that cross the great ship channel simultaneously in two different directions with velocities up to 7-8 knots, will have a cross-current magnitude > than 4 knots, and even with a velocities of 4-5 knots the cross currents will have a magnitude > 2 knots

The proposed design does not take into account these very strong cross currents that cross the Great Ship Channel simultaneously in two different directions, greatly in excess of 2 knots.

The ‘risk analysis’ carried out by Royal Haskoning, does not meet the specifications determined by PIANC.

The Great Ship Channel is extremely complicated, difficult and dangerous and the techniques outlined in the more elaborate Detailed Design method, set out in the PIANC Recommendations Part 6 must be followed.

The studies carried out and the application of the information obtained by the Consultant has not produced a channel design that can be regarded as having the necessary margin of safety to avoid the grounding and stranding of a 12.1 to 14 metre draft ship outside the boundaries of the Great Ship Channel.

Classification of the Great Ship Channel (Entrance Fairway) as an ‘inner channel’ by the consultant blatantly conflicts with the PIANC Recommendations. The effects of the heavy seas and swells from Bass Strait on ships transiting the Great Ship Channel and crossing the Rip Bank, either entering or leaving the port, are clearly evident. Ships transiting the Great Ship

Channel where it crosses the Rip Bank are greatly influenced by those factors experienced in an Outer Channel, and not by an Inner Channel.

PIANC 5.3.5 Defines an 'inner channel' as one which is not subject to wave action of any significance and is generally sheltered. The Great Ship Channel obviously does not meet this definition. (See investigation reports into the grounding of 'Desh Rakshak', 'Eburna' and 'Matru Kriper').

As shown above with reference to the flawed Risk Analysis, the critical information derived from monitoring and recording the tracks of ships that have deviated outside the boundaries of the Great Ship Channel, together with the indicative number of deviations of vessels outside the boundaries of the Great Ship Channel, from the Port Phillip Pilots, has not been considered as an integral part of the Channel Design study.

Maunsell Appendix 10. Channel Design – Simulation Report.

Part 3.0 describes four sets of ship simulation trials that were carried out, two in 2003, one in 2005 and one in 2006.

These trials were intended to test the proposed design, operating parameters and navigation aids.

Part 3.4 *“Conclusions of the First Three Simulations”*

“It was concluded that the channel alignment and width proposed will provide a sound basis for the development of acceptable channel operating rules and guidelines”.

Comment:

In the first two ship simulation trials, there were a total of 186 runs, from which 10 were familiarisation runs, 126 were successful and 50 runs were reported as either going aground or experiencing adverse results.

In the third set of simulation trials the individual results were not detailed and disclosed.

The results of these sets of simulation trials instil little confidence with regard to the adequacy of the design and the proposed operating parameters.

The Conclusions of the first three sets of simulations trials, in 3.4 above, do little to assuage the fears of inadequate safety margins and increased dangers.

The Conclusions of the first three sets of simulations, in 3.4 above, cannot be regarded as a ringing endorsement for the design and the operating parameters for 12.1 to 14 metre ships to safely transit the Great Ship Channel at all stages of the tide.

The most glaring anomaly of the simulation trials, is that whilst the trials were being classified as a success by the consultant and the proponent, four known vessels in 2006 deviated outside the Great Ship Channel whilst transiting Port Phillip Heads. One and possibly two of these ships grounded in the Heads.

There are many knowledgeable mariners, aware of the simulation trials, who for a different reason also call them a success, i.e. because they have at last revealed, how difficult and precarious keeping a deep draft ship of between 12.1 and 14 metre, within the boundaries of the Great Ship Channel at Port Phillip Heads will be.

The proposed operating parameters as portrayed by the proponent for ships with drafts up to 14 metre to transit the Great Ship Channel at all stages of the tide, remain in a state of uncertainty and dissent. They are a worry to many.

Are we proposing to assess the success or failure of the Great Ship Channel design by trial and error?

The proposed Great Ship Channel design is clearly too narrow for the safety of 12.1 to 14 metre draft vessels, entering and leaving the port, and fails to meet the PIANC Recommendations.

B.18 Responsibility for the flawed design and unsafe operating parameters in the

Great Ship Channel leading to a major disaster and legal responsibility and liability.

In the event of a deep draft ship grounding and/or stranding outside the boundaries of the Great Ship Channel in Port Phillip Heads, which results in major pollution, financial loss and social trauma; the failure of all information being made available to interested parties during the design and assessment stages of the project, the failure to obtain and/or disclose written advice from the Port Phillip Pilot Service and the failure to conduct a risk assessment of the magnitude of the consequences of a 12.1 to 14 metre draft ship grounding or stranding in the Heads, may result in significant claims for damages.

B.19 Frank Hart Submission to EES Panel dated 24th September 2004 and Presentation Paper dated 16th November 2004.

The information I submitted to the 2004 Panel, including my 'Submission' dated September 2004 and 'Presentation Paper' dated November 2004, remain relevant.

The 2004 Panel Report suggests that the proponents method of responding to this material was unsatisfactory, and stated that it remains largely unaddressed and unanswered.

The proponent has again failed in the 2007 SEES to properly address large bodies of the original material. My submission dated September 2004 is attached to this submission.

B.20. General Comments.

There is danger in allowing this proposal to be approved, knowing that the Great Ship Channel is too narrow and the proponents will likely be seeking Government approval, after the dredging has commenced, to widen the entrance channel even further, on the grounds that they need to reduce the level of risk.

This could be seen as a way of not presenting the full proposal to the community, and avoiding having the full proposal scrutinized and assessed. The proponents may believe that once the work has commenced the total critical mass and momentum will require the project to be properly finished.

Should these circumstances prevail; the financial costs and benefits and the environmental outcomes will not be properly examined.

Mr Lindsay Fox in an article in the Age newspaper on 21 August 2006 criticized the channel deepening proposal. He stated that, *“The big ships of today carrying containers can’t get into Port Phillip Heads. Even when it is dredged, they will still not get in”*. He further stated that the proposal will lead to inefficiencies and be a waste of money

Mr. Fox is correct except that not only container ships will be very restricted in their transit times through the Great Ship Channel, oil tankers and bulk carriers will be even further restricted due to their inherent poor manoeuvrability and lower power to weight ratio. These vessels present an even greater risk and Mr. Fox’s ‘inefficiencies’ may surface as ‘disasters’.

Widening the Great Ship Channel further will not eliminate the heightened risk of a 12.1 to 14 metre draft ship grounding outside the Great Ship Channel.

The PMC have failed to prove that this project will not cause irreparable damage. Their assertion that if we wait 20 years all visible damage will disappear is doubtful.

Those who believe that the benefits for Victorians to come out of this project will outweigh the disadvantages are living in a fools’ paradise.

We call on the Panel to recognize the increased dangers and reduced safety margins that will eventuate with the proposed navigation of 12.1 to 14 metre draft vessels through Port Phillip Heads. The inevitability of the grounding and/or stranding of a large vessel outside the Great Ship Channel at Port Phillip Heads, with the catastrophic consequences that follow, is not acceptable.

B.21 Conclusion.

The following points are drawn to the attention of the Panel:

- i. The reduced safety margins and the increased dangers that will eventuate from the proposed navigation of the 12.1 to 14 metre draft vessels through Port Phillip Heads at all stages of the tide, cannot be mitigated without significantly widening the Great Ship Channel.**
- ii. The inevitable grounding and/or stranding of a 12.1 to 14 metre draft vessel outside the boundaries of the Great Ship Channel at Port Phillip Heads will have disastrous consequences if this project proceeds as planned.**
- iii. The catastrophic consequences that will follow will lead to environmental, financial and social disaster for Victoria, if not beyond.**
- iv. The desired financial outcomes will not eventuate due to severe restrictions imposed on the times of transit of the deeper ships.**
- v. If this project proceeds, in order to provide a greater margin of safety, the proponent will likely require the 17 metre Great Ship Channel to be widened to the outside edges of the Eastern and Western Channels, virtually widening the Great Ship Channel from 245 metre to 500 metre. This work will probably be requested whilst the dredging contractor is on site and the environmental consequences and the costs of the increased dredging will sky rocket, without eliminating the navigation dangers.**

We call on the Panel to declare that the environmental, financial and social risks, if these deep draft vessels transit the Great Ship Channel, are too great for the project to proceed.

B.22 Community Concern and Fairness.

The time allowed for assessing this SEES has been far too short. With more time this submission could have addressed in more detail the lack of substance and critical information, contained in the various Appendices relating to the Channel Design, the Navigation Aids and the proposed Operating Parameters.

The omission of any risk assessment of the likely magnitude of the consequences of a large vessel grounding in the Heads is a major concern. The criticisms of the Risk Assessment of the likely frequency of groundings and strandings, the deficient design of the Great Ship Channel, the omission of accurate and complete information relating to the courses of ships that have strayed whilst transiting Port Phillip Heads, are all matters of concern that justify the proposal being rejected.

The preclusion of submitters from questioning the proponent's 'expert witnesses' is undemocratic and avoids proper scrutiny of evidence.

We ask the Panel to look carefully at all these concerns when assessing the SEES.

Frank Hart.

Retd. Harbour Master.

Ports of Western Port and Hastings. 06/05/2007.