Strategic Asset Management at the Port of Melbourne

Teleconference

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Port of Melbourne Corporation

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Port of Melbourne Corporation

Presentation overview

- Australia, Victoria, Melbourne and the port of Melbourne
- Port of Melbourne business profile and drivers
- The Strategic Asset Management journey
- Key Strategic Asset Management principles:
  - Renewals Modelling
  - Risk Management
  - Life Cycle Planning
  - Optimised Renewals Decision Making (ORDM)
- Business processes and data management
- Supporting technologies
- Life extension initiatives
- Questions
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Australia and Victoria

- Smallest mainland state
- Fastest growing population
- Second largest state economy
- Around 25% of Australia’s GDP
- Main industries include:
  - Automotive
  - Food processing
  - Agriculture
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Port of Melbourne

- Approx 2.3 million containers/annum
- Top 5 container ports in Sth H’sphere
- About 36% of national container trade
- Around 3,600 ships a year
- Trade value of $86 billion/annum
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Structure and role

• PoMC is a state owned business enterprise – single shareholder
• Governed by legislation
• Abuts four local government areas with high community expectations
• Total staff of around 230 FTE’s
• Infrastructure maintenance and construction by contractors (100%)
Port of Melbourne Corporation
Swanson dock
Port of Melbourne Corporation

Webb dock
Port of Melbourne Corporation
Victoria / Appleton docks
Port of Melbourne Corporation
South wharf
Port of Melbourne Corporation
Cruise shipping

2010/11
• 50 visits
• 84,000 passengers
• 10 turnarounds

2011/12
• 56 visits - QM2 & QE
• 9 turnarounds
• Daily service to Tasmania
• Security a high priority
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Road / Rail
Australia, Victoria, Melbourne and the port of Melbourne
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Business processes and data management
Supporting technologies
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How significant is poor asset management?
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Infrastructure profile at a glance

- 34 commercial berths
- 7 km wharf length
- 53 km dredged channels
- Over 100,000 Ha of port waters
- Over 510 Ha of land
- 35 major tenants
- 125 buildings
- 24 km road / rail
- 157 Aids to Navigation
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Aids to navigation

- 105 steel beacon piles (channel lateral marks)
- 3 multi-pile water structures with long range lights
- 35 land based lights acting as lateral marks or lead lines
- 4 lighthouses - one for VTS function (not lighthouse)
- 7 PEL (port entry lights) - high intensity sectored lights
- 2 racons (radar beacons)
- 1 fog horn
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Existing asset profile by asset value

- Wharves and Jetties (69.3%)
- Buildings (11.4%)
- Stacking Pavements (5.5%)
- Roads (5.1%)
- Utilities & Fire fighting (3.3%)
- Plant and Equipment (2.1%)
- Navigation Aids & Equip (1.5%)
- Railway (1.0%)
- Land Improvements (0.5%)

- Asset replacement cost: $1.3 billion (modern engineering equivalent)
- Asset renewals, rehab and mtce: $60–65 million (annual average)
- Maintenance dredging: $7 million annualised per annum (inc. capping)
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Key timelines

2003 - Port of Melbourne Corporation (PoMC) created

EARLY FOCUS ON REACTIVE OPERATIONAL MANAGEMENT & REBUILDING

2006 - Comprehensive review of old asset management strategy

SHIFT TO STRATEGIC ASSET MANAGEMENT DEEMED NECESSARY

2007 - Business case approved for restructure and Asset Strategy Dept

2008 - Asset Management Policy and Strategy adopted by the Board

2010 - Updated Policy and Strategy adopted by the Board

2011 - Risk Committee endorsed SAM work to continue

2012 – All ‘building blocks’ and Asset Management Plans complete
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Why SAM and where are we going?

- Increasing portfolio of ageing and expensive assets
- Worsening asset conditions = increased risk
- Understand future renewal expenditures
- Direct funds to assets in greatest need
- Optimise renewals decision making processes
- Develop Asset Management Plans for key assets and asset classes
- Embed asset management as a core business discipline
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Maturity model

Chaos

Pre-Asset Management

Basic Asset Management

Advanced Asset Management

Strategic AM

Now

In 2006

- No asset data
- No formal system/process
- Little accountability

- Some asset data, but in silos
- Ad hoc AM policies or processes
- Lack of corporate co-ordination

- Comprehensive corporate asset register
- Works mgmt & financial reporting
- Recognise LoS, ACR and life cycle data

- Long term renewals planning
- Corporate info and risk strategy
- Reliable condition and life cycle data

- Renewal decisions based on RoI & ACR based risk
- CapEx based on lowest life cycle costs
- Advanced risk and failure prediction
- Corporate wide AMP’s

Long term renewals planning
Corporate info and risk strategy
Reliable condition and life cycle data
Renewal decisions based on RoI & ACR based risk
CapEx based on lowest life cycle costs
Advanced risk and failure prediction
Corporate wide AMP’s
Comprehensive corporate asset register
Works mgmt & financial reporting
Recognise LoS, ACR and life cycle data
Some asset data, but in silos
Ad hoc AM policies or processes
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No formal system/process
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Key strategic asset management principles

- Decision making based on Levels of Service context
- Predict likely asset failures and manage accordingly
- Integrate asset risk profiles into decision making
- Consider multiple renewal options based on Return on Investment
- Infrastructure planning based on “whole of life” costs
- Four key elements:
  - Renewals Modelling
  - Risk Management
  - Life Cycle Planning
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30 year asset renewal profile
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30 year asset renewal profile/investment plan

Funding gap

Ave $6.8m

Ave $21.5m

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Corporation

30 Year Asset Renewal Profile/Investment Plan

2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
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2025
2026
2027
2028
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2033
2034
2035
2036
2037
2038

$100,000
$90,000
$80,000
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0

Capx $100

2009
2010
2011
2012
2013
2014
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2016
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2018
2019
2020
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2022
2023
2024
2025
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2028
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2031
2032
2033
2034
2035
2036
2037
2038

$100,000
$90,000
$80,000
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0

Average $100
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• Questions
- Risk profiles important, particularly for underperforming assets

- Risk vital input into:
  - The ORDM model
  - Renewals planning
  - Prioritising inspection, maintenance and rehabilitation programs

- Asset risk profile is lower than business risk profile

- Annual risk cost = PoF x CoF x Redundancy Factor
### Table 1 - Risk Matrix

<table>
<thead>
<tr>
<th>Consequence (Opportunity)</th>
<th>1 Noticeable</th>
<th>2 Minor</th>
<th>3 Moderate</th>
<th>4 Major</th>
<th>5 Catastrophic (Outstanding)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Almost Certain</td>
<td></td>
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<td>M</td>
<td>H</td>
<td>VH</td>
<td>VH</td>
<td>E</td>
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<tr>
<td>4 Likely</td>
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<tr>
<td></td>
<td>M</td>
<td>M</td>
<td>H</td>
<td>VH</td>
<td>E</td>
</tr>
<tr>
<td>3 Possible</td>
<td></td>
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<td>H</td>
<td>VH</td>
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<tr>
<td>2 Unlikely</td>
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<td>1 Rare</td>
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<td>VL</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>M</td>
</tr>
</tbody>
</table>

### Plotting risks on the Risk Matrix using Tables 2 & 3

1. Determine the Consequence level from Table 2 (see pages 2 - 4).
2. Determine the Likelihood level from Table 3 (see page 5).
3. Use the resulting Consequence & Likelihood levels to plot the risk on the Risk Matrix and determine the risk level.
4. Use Table 1a below to determine the PoMC response to the relevant risk level.

**Example:** Risk of a major shipping accident in the port.
- Consequence level from Table 2 = Catastrophic (5 or more fatalities)
- Likelihood level from Table 3 = Unlikely (Could occur at some time)

**Risk Level from the Matrix and Table 1a = Very High** - Immediate action required at the Executive level including issue specific reports to Board.

### Table 1a - Response Required for Each Risk Level

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>PoMC Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme</td>
<td>Risks requiring urgent action at the highest level including dedicated board meetings. Likely to involve an Emergency Response and/or activation of the crisis management plan immediately. OB</td>
</tr>
<tr>
<td>Very High</td>
<td>Immediate action required at Executive level including issue specific reports to Board</td>
</tr>
<tr>
<td>High</td>
<td>Senior management attention needed</td>
</tr>
<tr>
<td>Medium</td>
<td>Management responsibility must be specified</td>
</tr>
<tr>
<td>Low</td>
<td>Management by routine procedures</td>
</tr>
<tr>
<td>Very Low</td>
<td>Management is discretionary</td>
</tr>
</tbody>
</table>

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**Event** is defined as an incident or situation which occurs in a particular place during a particular time interval.

For risk assessment purposes, the highest ranked consequence for particular event should be selected, taking account of the existing controls.

**Risk** is defined as the chance of something happening that will impact on the Organisation's objectives and goals. It is defined in terms of Consequence and Likelihood and the above risk matrix defines the relationship adopted by Organisation.

**Consequence** is defined as the outcome of an event, expressed either qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event.

**Likelihood** is a qualitative descriptor of probability or frequency of a particular event.

**Significant Risks** are those risks which require senior management attention (i.e. high and above) and are monitored at board level through the quarterly risk report to the Risk Committee.
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Risk profile vs renewals profile
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Questions
• Principally models ‘whole of life costs to compare options

• Used to support business case propositions

• Selections based on;
  – Lowest whole of life costs, and
  – Greatest return on investment
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Life Cycle Planning – case study (piles)

Fairway Zone

- Expense Streams
  - Operations
    - Light servicing
  - Maintenance
    - Buoy Servicing
    - Major repair to buoy
    - Pile inspections
  - Benefit
  - Construction
    - Purchase 40 buoys
    - Purchase 19 Piles
    - Install pile every 5 yrs
    - Purchase & install pile anodes

Scenarios

- Piles
  - NPV: -6,209,150.32
  - IRR: N/A
  - Grand Total: -7,006,510

- Buoys
  - NPV: -3,296,287.73
  - IRR: N/A
  - Grand Total: -7,380,139
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Life Cycle Planning – case study (buoys)

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Cash Flow

-1000000
-2000000
0
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• Used for assets in service that require treatment
• Can be used on an individual asset, asset class or on a network basis
• Treatment options include; do nothing, rehab, renew and replace
• Inputs:
  – maintenance costs and trends
  – operations, revenue and treatment costs
  – expected life extension (yrs)
  – replacement cost
  – annual risk exposure cost
• Outputs:
  – annual return on investment (net benefits) as NPV
  – annual effect on return on investment by deferring treatment
  – graphical comparison of different treatment options’ financial model
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Works management
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Condition monitoring
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Download assets – once or as required to update

Download Inspections if required

Go to assets

Update assigned Action

Send Defect or Action to server
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Mobile computing – defect / condition management
The Asset ID's are of PoMC wharves.

Brown shapes are PoMC owned buildings.

Blue shapes are buildings owned by tenants
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*Primary hydrographic survey vessel*

- 170 hydrographic surveys per annum
- Support dredging operations
- Maintain and calibrate tide network
- Deploy buoys and other environmental monitoring equipment
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GPS and land survey equipment
Port of Melbourne Corporation

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Asset life extension initiatives

- Wrapping of navigation beacons
- Pile repairs and wrapping
- Impressed current cathodic protection project at Swanson Dock
- Embedded anodes cathodic protection
- Sheet piling coated with sprayed concrete
- Road asphalt overlays
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Asset life extension initiatives
Port of Melbourne Corporation

Asset life extension initiatives
Port of Melbourne Corporation

Asset life extension initiatives
Impressed cathodic protection
If steel pile has adequate thickness the steel surface is cleaned and an impervious film is applied.

Pile is wrapped with an impervious film & an outer protective coating is applied.
Questions?