The Portfolio Committee on Public Works

Public hearings on

Government Immovable Assets Management Bill [B1-2006]

Tuesday 6 March 2007

Submission by

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Presented by

Dr Johann Mc Duling Pr Eng

- Built Care
  - Consultancy specialising in research, development and implementation of immovable asset maintenance and management technology
  - Key technology partner to CSIR (Built Environment)
  - Responsible for maintenance technology used in PREMIS system developed in close collaboration with CSIR (Built Environment) and used by several provincial government departments
    - Ability to calculate prioritised condition-based maintenance budgets from condition assessments
  - Offices on CSIR campus
  - 50% BBBEE compliance

CSIR

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- Dr Johann Mc Duling Pr Eng
  - B.Eng.(Civil Eng), B.Eng.(Hons)(Structural Eng), M.Eng.(Structural Eng), PhD(Civil Eng)
  - 25 years experience in immovable asset maintenance and management
  - Extra-ordinary lecturer in facilities and maintenance management at universities of Pretoria, Cape Town and Free State
  - Presented several papers at international conferences in Europe, Australia and South Africa
  - PhD thesis on Service Life prediction for buildings and infrastructure: Developed method to quantify change in condition over time

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Format of Presentation

- Condition assessment intervals
  - GIAMA
  - International best practice
  - Alignment with other current government processes
  - Sustainable job creation
- Call for Standardisation

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Government Immovable Assets Management Bill [B1-2006]

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Functions of accounting officer of custodian

13. (1) The accounting officer of a custodian must, for all immovable assets for which that custodian is responsible—

(d) ensure that all activities that are associated with common law ownership are executed, including—

(iii) assessing the condition of the immovable asset at least every fifth year;

The condition assessment interval / cycle should be **THREE YEARS**

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International Best Practice

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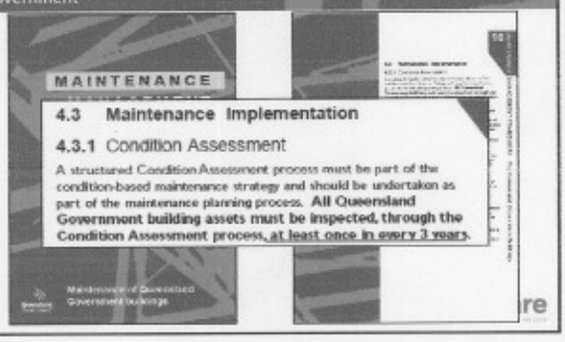
Maintenance of Queensland Government buildings

Queensland Government



National Aeronautics and Space Administration

NASA facilities organization, develop a rapid, low-cost, consistent facilities condition system that "levels the playing field by eliminating any biased installation reporting, and reduces the number of detailed cost estimates that are prepared and never used."

This assessment method is now used to assess the condition of NASA facilities worldwide. Each year since 2002, 5,300 NASA facilities around the world have received annual on-site condition assessments during a 60 day period.

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National Aeronautics and Space Administration

In an effort to reduce assessment costs, many organizations have increased the time between conducting facility inspections up to as much as five years. Stretching the inspection intervals has mismatched the timelines for comparing facilities and installations within a large portfolio.

The ***NASA Method*** provides an appraisal of the general condition of all facilities and an estimate of deferred maintenance (DM) (or recapitalization) costs using a parametric estimating method that has cost NASA $0.02 per SF for each inspection cycle. This is four times less expensive than the next recognized assessment method in widespread use.

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National Aeronautics and Space Administration

builtcare CSIR

- 5 point condition rating – 5 best, 1 worst & 0 no element
- Cost model – Deferred Maintenance
  - Condition 4: 5% of CRV
  - Condition 3: 15 – 20% of CRV
- Cost of assessments
  - R1.61/m² ± ($0.02/sqr ft) (own staff)

- 5 point condition rating – 5 best, 1 worst & 0 no element
- Cost model – Deferred Maintenance
  - Condition 4: 2 - 6% of CRV
  - Condition 3: 10 – 30% of CRV
- Cost of assessments
  - R2.35/m² ± ($0.03/sqr ft)
  - R1.87/m² ± ($0.024/sqr ft) (outsourced)

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Federal Facilities Council

Federal Accounting Standards Advisory Board Standard Number 6, as Amended (2001), Federal Facilities Council (FFC)

- ". … condition assessment survey data should be available for all facilities in an agency's inventory and that such data should be updated annually."
- In practice, the availability of condition assessment data varies from agency to agency.
- Data collection procedures also vary; typically, those agencies that have instituted comprehensive condition assessment survey programs reinspect facilities on a cycle of every 3 to 5 years or longer."

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U.S. Department of Transportation Federal Highway Administration

- *The National Bridge Inventory (NBI) database contains Federal Highway Administration (FHWA) required data reported by states every year on over 550,000 bridges in the USA. All federally supported bridges have been inspected every 2 years beginning in 1978.*
- *According to the federal requirements, the inspection period is* ***every two years****.*

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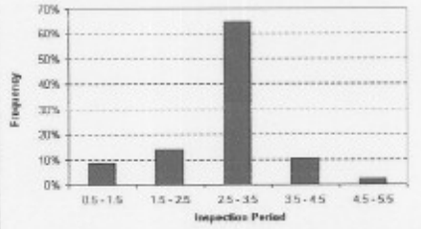
NRC·CNRC

Life-cycle assessment of highway bridges

G. Morcous, Z. Lounis, and M. S. Mirza. NRCC-45395, Proceedings of the 2002 Taiwan-Canada Workshop on Bridges. April 8-9, 2002, pp. 61-82



Ministère de Transport du Québec (MTQ): decks were inspected every 2.8 years on average during the period from 1993 to 2000

Figure 7: Distribution of inspection periods in MTQ data

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Types of Maintenance

- Planned Maintenance:-
  - Preventative maintenance (incl. Statutory maintenance)
  - Condition-based maintenance
  - Backlog Maintenance
    - Repairs
    - Rehabilitation
    - Replacement
- Unplanned Maintenance:-
  - Emergency repairs due to
    - Breakdowns
    - Incidents

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Condition Assessment

RATING	CONDITION	MAINTENANCE TYPE	
5	Very Good	Preventative Maintenance	Normal Maintenance (Planned & unplanned)
4	Good	Condition-based Maintenance	
3	Fair	Repairs	Backlog Maintenance
2	Bad	Rehabilitation	
1	Very Bad	Replacement	

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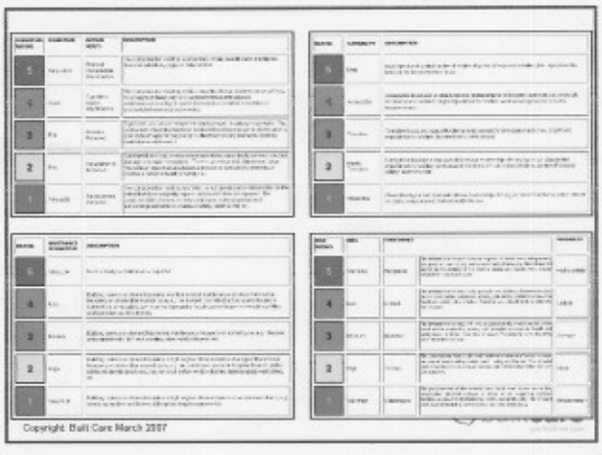

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RISK *Assessment*

- What are the consequences if maintenance is not done? (What will happen if no maintenance is done?)
- How serious are the consequences?
- How likely is it that it will happen? (What is the probability?)

RATING	Seriousness of consequence if no maintenance is done	Probability of consequence if no maintenance is done
5	Negligable	Highly unlikely
4	Limited	Unlikely
3	Moderate	Average
2	Serious	Likely
1	Catastrophic	Almost certain

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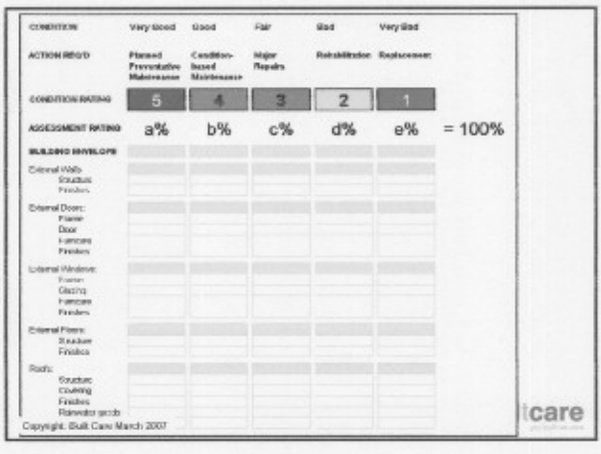

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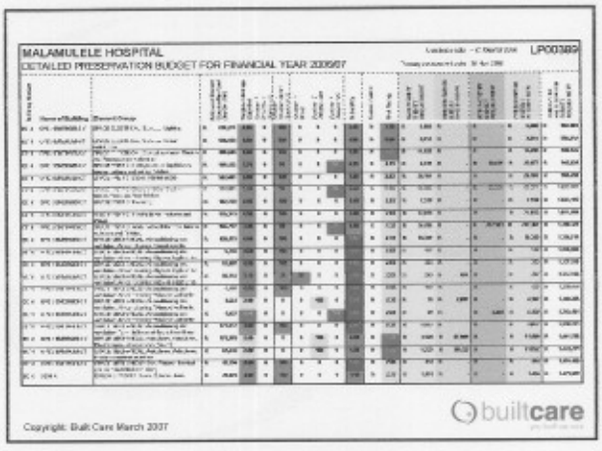
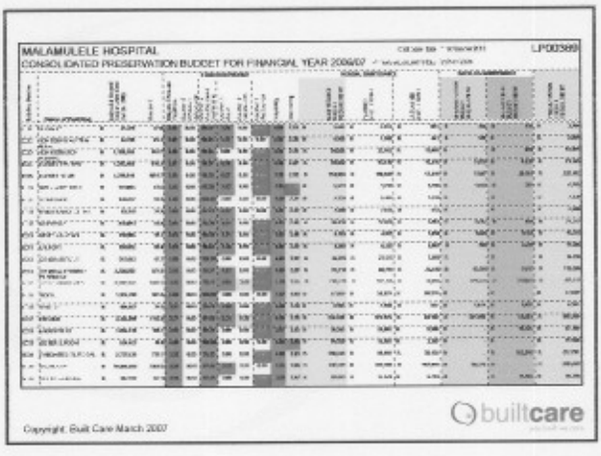
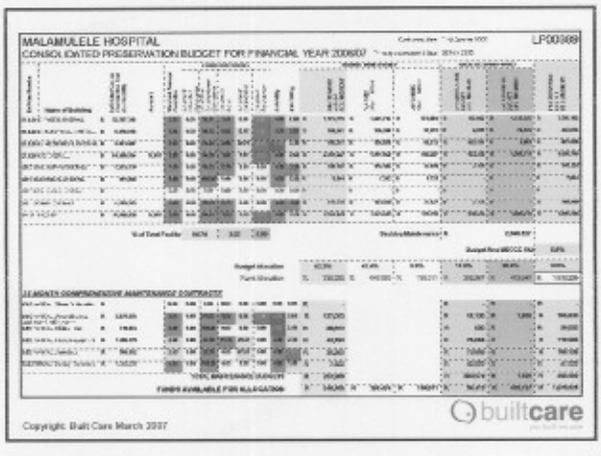
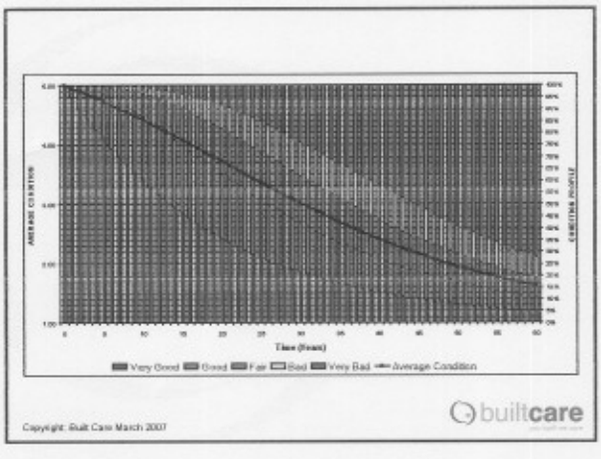
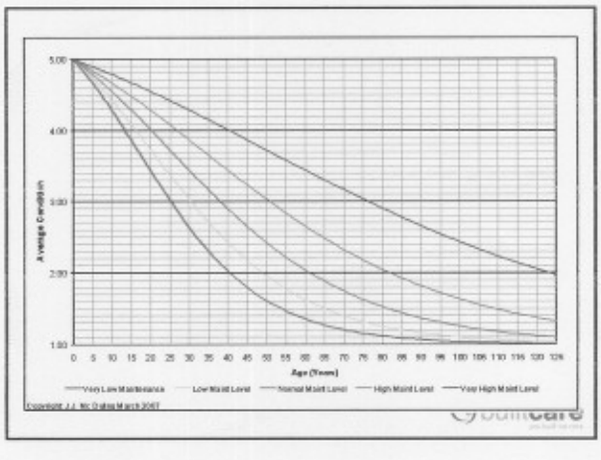
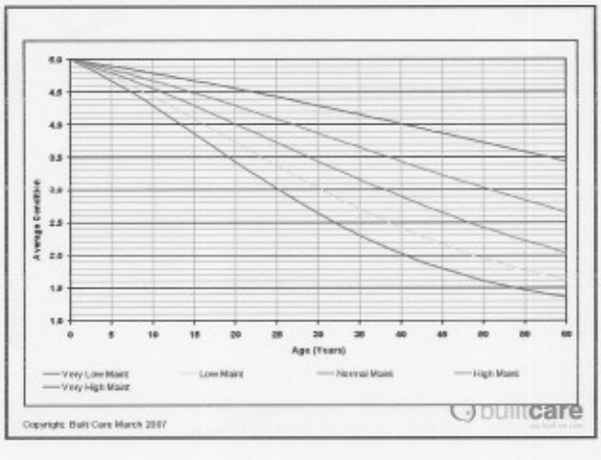






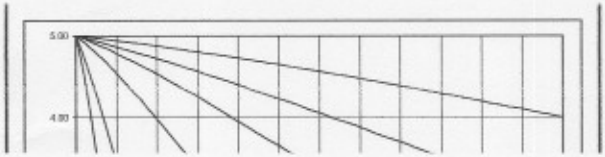


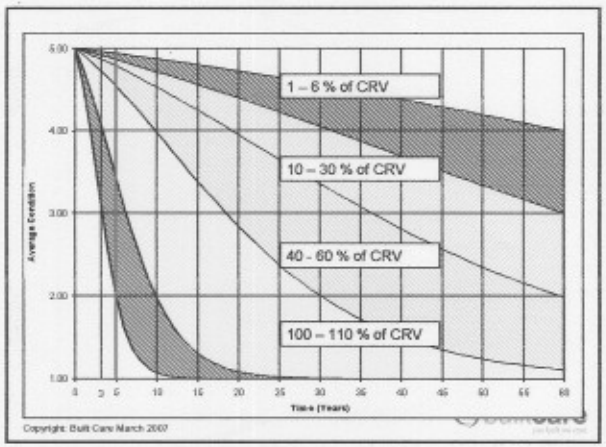




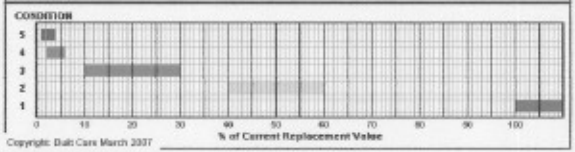
International Best Practice

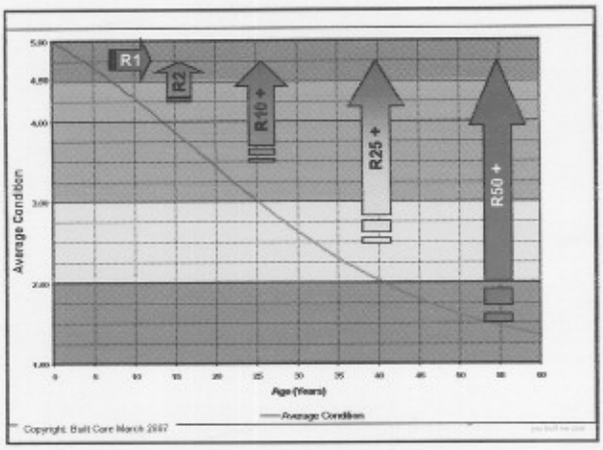
- A building structure may be designed using materials, components and technology that may last for about **100 years or more** depending upon the quality and standards expected from users





Condition	Preservation Type Required	Budget Req'd as % of CRV	Provision for Unplanned Maintenance if Maintenance is delayed
Very Good	Preventative Maintenance	1 - 3%	1% ±
Good	Condition-based Maintenance	4 - 6%	2% ±
Fair	Repairs	10 - 30%	4% ±
Bad	Rehabilitation	40 - 60%	8% ±
Very Bad	Replacement	100 - 110%	15% ±




R1
R2
R10 +
R25 +
R50 +
Average Condition
Age (Years)
Average Condition
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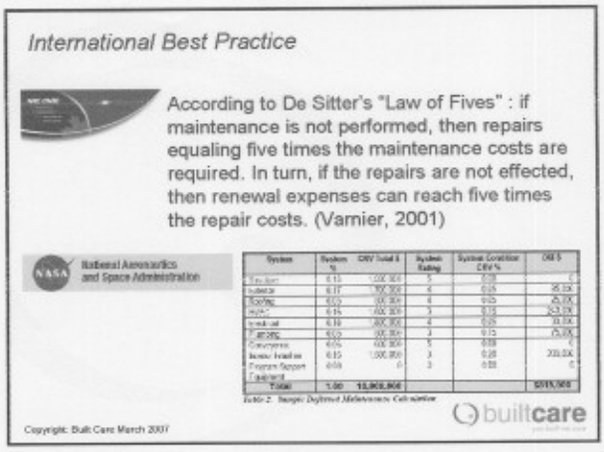
International Best Practice
According to De Sitter's "Law of Fives" : if maintenance is not performed, then repairs equaling five times the maintenance costs are required. In turn, if the repairs are not effected, then renewal expenses can reach five times the repair costs. (Varnier, 2001)
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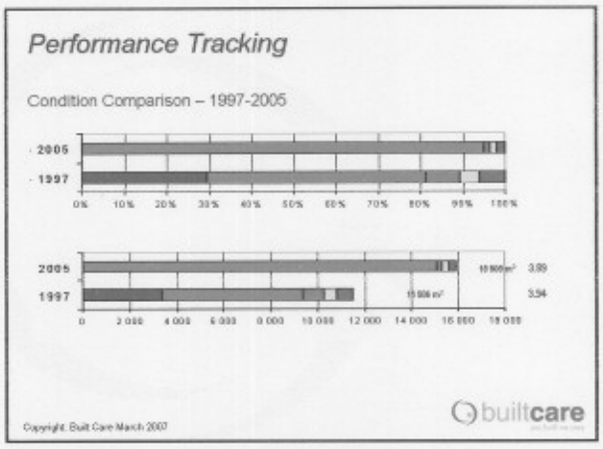
Performance Tracking
Condition Comparison – 1997-2005
2005
1997
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
2005
1997
3.89
3.94
0
2 000
4 000
6 000
8 000
10 000
12 000
14 000
16 000
18 000
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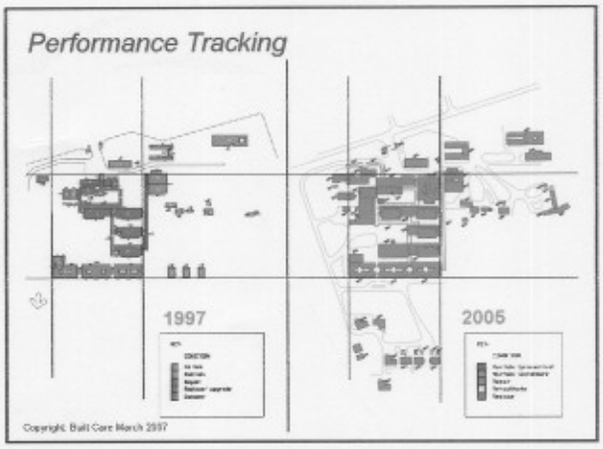
Performance Tracking
1997
2005
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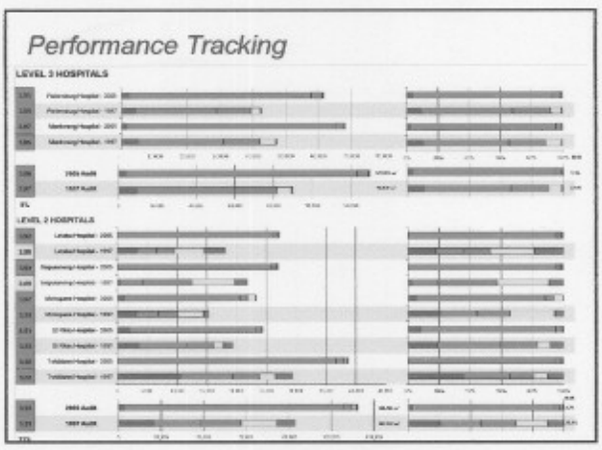
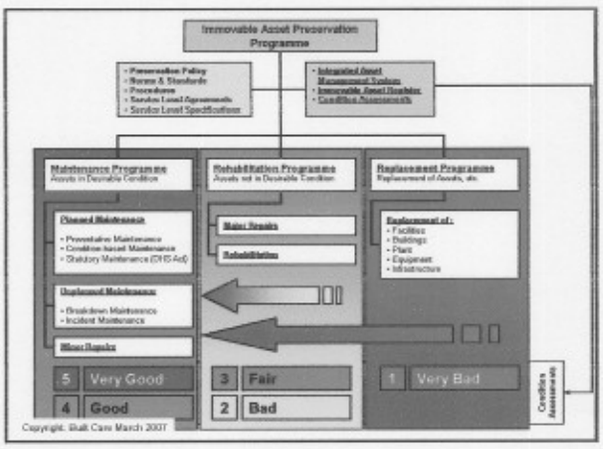

Performance Tracking
LEVEL 3 HOSPITALS
LEVEL 2 HOSPITALS


Immovable Asset Preservation Programme
Maintenance Programme
Rehabilitation Programme
Replacement Programme
Major Repairs
Rehabilitation
5 Very Good
4 Good
3 Fair
2 Bad
1 Very Bad
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