MAINTENANCE FUNDING FOR PUBLIC PROPERTY: BEST PRACTICES

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Background

This study was initiated by members of the National Executive Forum on Public Property in 2003, with the purpose of identifying the relationship between maintenance practices and funding levels. The study was conducted under the supervision of Professor Hok-Lin Leung of Queen's University, with the collaboration of Professor Tsur Somerville of the University of British Columbia. Two graduate students, Wesley Hayward and Daniel Langman, carried out the research.

Work began in April, 2003, with an interim report presented at the Forum Retreat in November 2003. A "final" draft of the study, incorporating Forum members' input at the November Retreat and further data collection and analysis, was presented at the Forum Conference in May, 2004. This revised final report incorporates the comments at the conference as well as revisions by some Forum members on their numbers.

Purpose of the Study

Maintenance (see definition in section on 'key definitions and concepts') is an important part of property management in that it ensures the physical condition of the property is in good working order and protects the value of the asset from deterioration. However, funding for public property management has been eroding in recent years on account of fiscal restraint in the public sector. At the same time a host of new environmental, health and safety, heritage and other policies have increased the cost of maintenance. Also, renewed political emphasis on accountability and transparency has increased the level of oversight. The result is that managers have to do more and more with less and less.

Many Forum members felt that for years funding levels have fallen short of that which are needed for proper maintenance. The cumulative result of decades of under-funding means a huge backlog of deferred maintenance, which has eroded both the value and integrity of the asset.

There are two purposes to the study: 1. To develop convincing arguments for higher and more stable maintenance funding, and 2. To identify possible relationships between maintenance practices and funding levels required.

Method

There are different ways to argue for better funding. One can argue from basic principles such as life-cycle costs, or from expediencies such as health and safety liabilities. For our sponsors it seems that 'comparisons' make strong political cases. After all, it is their political masters who have to be convinced before there is any hope for increased funding.

The most straightforward comparisons are comparisons of funding levels among similar jurisdictions. The basic argument is that if most other jurisdictions are getting higher levels of funding, yours should be increased to a comparable level. Of course, there is no 'proof' that the funding levels of the majority are indeed adequate and yet not too much. However, it is still useful to get a sense of the 'norm' so that one can determine one's relative position, and then to develop a strategy to either enhance or protect one's funding level.

Then there is the assumption that funding can somehow be related to maintenance practices. There are two aspects to this: 1. Different maintenance practices have different cost implications, and 2. Some practices are better, in the sense of maintaining the value and integrity of the asset, than others. The logic here is that the use of better practices, which may or may not be more costly, makes a better argument for better funding.

Given the limited resources for this study we opted for a comparison of funding levels and maintenance practices among Forum members, with a view to establish funding norms and common practices. Then we made a leap of faith in suggesting that the practices used by those with 'normal' funding levels perhaps represented 'best' practices. Our 'norms' were established in two ways: the 'industrial' norm (BOMA) of 2-4% asset replacement cost, and the 'statistical' norm based on the data gathered in the study.

The following procedure was used for data collection and analysis.

1. Survey (Appendix 1) of all Forum members, asking them to describe their stock characteristics, maintenance expenditures, and methods to do maintenance, determine priorities, allocate funds, determine budgets and allocate space.
2. Follow-up telephone interviews to identify their institutional and organizational contexts as well as special issues and specific concerns.
3. Profile development of each respondent (organisation).
4. Comparison of funding levels to establish the range and norm.
5. Matching of stock characteristics and maintenance practices to funding levels, in order to identify possible relationships.
6. Identification of the defining characteristics of archetypes: high, medium and low expenditure organisations.
7. Exploration of best practices.

Key Definitions and Concepts

1. Maintenance

    A 'working' definition was adopted: It includes all maintenance work on structural, architectural, and electric/mechanical components as well as day-to-day operations (for definition please refer also to Supporting Documents (c) Further Clarifications). However, it excludes replacements and upgrades that raise the quality of the property.

2. Maintenance Funding (Expenditure Indices)

    Our intention was to capture the real and actual expenditures, regardless of the distinction between operating and capital budgets (not withstanding the practical difficulty in trying to obtain the data).

    There are two indices: expenditure per square foot and expenditure as a percentage of asset replacement cost. We used both, but would recommend the percentage index.

3. Maintenance Methods

    i.   Reactive: A corrective approach where no maintenance is performed until a breakdown has occurred, or damage or decay has impacted on the safety and usability of the property.

    ii.   Preventative: A cyclical approach, with maintenance performed at regular intervals, regardless of condition.

    iii. Proactive: A condition-based approach in which the property is inspected regularly. Observed problems are corrected immediately. Potential problems are noted and logged, pending action decision.

    iv.   Predictive: An approach based on modelling of property conditions and prediction on the timing and scope of maintenance.

    v.   Reliability-centred: A variation of the predictive method, relying on knowledge about the probability of failure of a property to determine the timing and scope of maintenance.

4. Priorities Determination Methods

    i. Life-Cycle Costing: A process approach that seeks to determine maintenance priorities at the building construction stage so that maintenance can be scheduled to ensure the property will remain fully functional throughout its life span.

    ii. Manager Judgment: Individual judgment by a manager or group of managers.

    iii. Technical Survey: Detailed survey by technical inspectors to determine maintenance priority and timing.

    iv. Visual Inspection: Visual survey to determine maintenance priority and timing.

    v. Health and Safety Crisis: Priority determined by health and safety concerns which can be driven by policy or liability.

5. Decision-Maker Types

These are agents who determine maintenance priorities. They may be staff, management, political body, contractors, or users.

6. Expenditure Allocation Methods

    i. Priority-based: Priority rating assigned to maintenance needs, with funds allocated according to priority rating until all funds are used up.

    ii. Across-the-board Allocation: Funds distributed evenly regardless of nature of maintenance needs.

    iii. Political Expediency: Funds allocated according to the political profile of the maintenance need.

    iv. Maintenance Plan: A detailed plan of maintenance needs of different properties, but often without assigned priorities.

7.	Budget Determination Methods

   i.	Historical: Based on previous budget, with or without adjustment for inflation, and with no relationship to current needs.

   ii.	Maintenance Plan: Forecast of maintenance costs based on current priorities and future projects.

   iii.	Assessment Program: Periodic assessment of stock to determine maintenance needs and corresponding requirements.

   iv.	Competition: Internal competition among the different branches and functions of an organisation.

8.	Space Allocation Method

They include requests from users, decision by senior management, decision by the political body, 'purchase' by users (often through account transfer), and established policy.

<u>Caveats</u>

There were some fundamental theoretical and practical difficulties in the design and execution of the study. They affect the interpretation of the data, the robustness of the findings, and the generalisability of the recommendations.

1.	Expenditure versus Funding Needs

What were reported by our respondents were actual (best guesses) expenditures. There is no relationship between these figures and their real maintenance needs (in fact, a basic assumption of this study is that there has been little or no relationship, hence the need for the study). Therefore the use of these expenditure figures is limited. They certainly do not reflect, by themselves, good or bad maintenance practices. To tackle this difficulty we compared these expenditure figures to the industrial norm of 2-4% of replacement cost, and made the assumption that those organisations that were spending between 2-4% were 'probably' following good maintenance practices.

2.   The Dilemma of Averages

We used a lot of averages in the study. There are at least two problems.

i.   Averaging assumes that the 'rate of change' is always stable. For instance, an average building age of 30 years suggests implicitly that the maintenance needs (and consequently maintenance expenditures) of two buildings, one 50 years old and the other 10 years old, are no different from that of two other buildings, both 30 years old. The truth is that quantitative changes often lead to qualitative changes.

ii.   Averaging often lumps together incomparable variables. For instance, two organisations with entirely different portfolios and maintenance practices may have comparable average expenditures. But they are entirely different cases. Averaging of averages were always avoided.

3.   Other Factors the Might Have Mattered

There are a host of factors identified in the literature, that can have significant influences on maintenance needs and costs, but were not included in this study because there was not enough time to gather and analyse the data, or that the data simply did not exist. The most salient ones are: building heights, historical maintenance practices, quality of original construction, building uses, availability of maintenance and support facilities, regional cost differences, differences in utility uses, and climactic/natural factors.

4.   Sampling and Sample Size

We limited our survey to Forum members. This is a self-select group of 18. Only ten responses were completed, and from those only six could be used (compatible definition of maintenance). On the other hand, this select group provided very detailed information which could yield important insights. Also, the respondents were quite evenly distributed among the three levels of government, thus providing useful cross jurisdictional comparisons. As long as the findings are treated as clues rather than definitive answers, and used judiciously, they should serve the purpose of the study, which is to strengthen the argument for appropriate maintenance funding levels by developing some credible funding 'norms', and identifying some 'best practices' to ensure funds are used efficiently.

5.   Snapshot versus Trend

      Much of the data were drawn from the 2002 budget cycle. This snapshot
      does not show any historical precedent, let alone trends and directions
      that can be extrapolated for the future. Also, snapshot data could not
      reveal the nature and scale of deferred maintenance and its impact on
      past spending practices and future needs. However, our follow-up
      telephone interviews did not alert us to dramatic shifts, in both policy and
      practice, in the recent past or immediate future. As such, the findings can
      still be useful benchmarks.

6.   Common versus Best

      The survey data show current practices, from which common practices
      can be identified. But what is 'common' is not necessarily what is 'best'.
      In fact, within the current situation of under funding and deferred
      maintenance common practices can actually be viewed as compromises
      of the best. But best is always relative to its context. The assumption in
      this study is that given the industrial norm of 2-4% of replacement cost,
      those organisations with expenditure levels between 2-4%, are probably
      following good practices. The challenge is to see if there are patterns
      among them.

Analysis and Finding

      Ten completed responses were received, and six were analysed. The
other four did not use the same definition of maintenance (in particular, their
definition of maintenance would not include day-to-day janitorial services,
security, utilities, and grounds keeping). Appendix 2 contains profiles of all ten
organisations.

      Of the six organisations that were analysed, there were one government
departments (G1), two municipalities (M1 and M2), and three crown corporations,
all provincial (C1, C2, and C3).

1.   The Two Expenditure Indices and the Relative 'Performances' of the
      Organisations

      Maintenance expenditure can be expressed as $/sq. ft. or % of
      replacement cost. The first is an average obtained through dividing the
      total expenditure by the total floor space of the portfolio. It is an absolute
      measure, and has the advantage of being easy to understand, since the
      concept of average square foot cost is used extensively by the building
      trades. The disadvantages are many. It is biased toward 'building'

properties, and does not capture the cost of maintaining 'land' properties. It is influenced by regional differences and climactic/natural factors. It also has to be adjusted for inflation. The percentage index is a relative measure. As such, it is immune to the influence of geographic and historic differences. More importantly, it is the measure adopted by the building maintenance industry (BOMA). It also has the advantage of relating directly to the value of the property, although this can turn into a disadvantage if the replacement cost of a property is not directly proportionate to its asset value (a not uncommon situation. See Appendix 3).

A.   The range of cost-per-square-foot expenditures ('$' for short) is between $0.86 and $10.42, a difference of 12-fold.
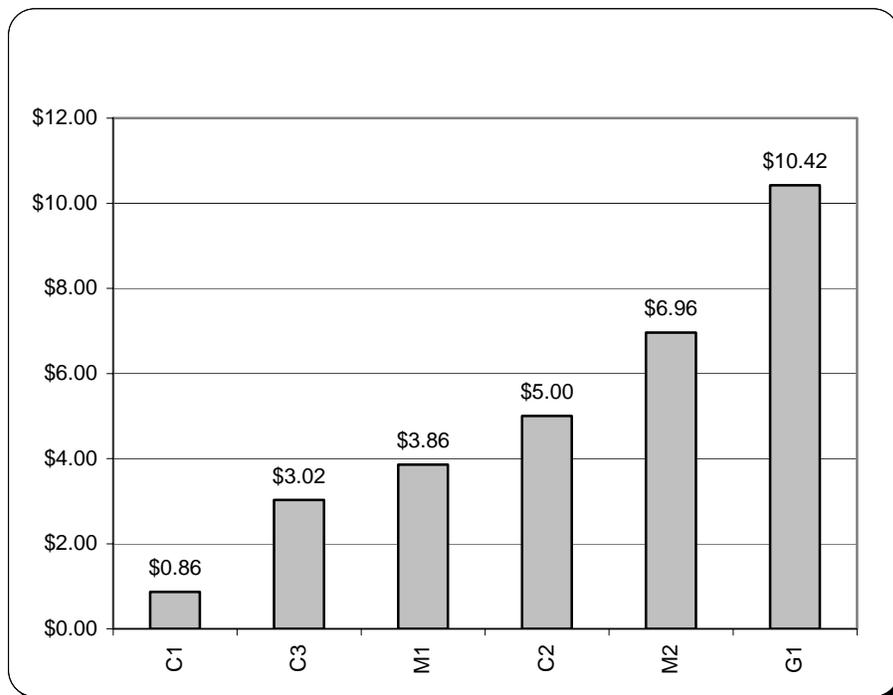
Figure 1: Maintenance Expenditure per square foot

Roughly, these clusters can be observed:

  i. Low expenditure (under $3): C1

 ii. Middle expenditure (between $3 and $5): C2, C3, and M1

iii. High expenditure (over $5): G1, and M2

Examined along jurisdictional lines, the following observations can be made.

	Governments	Crowns	Municipalities
High Expenditure	G1		M2
Medium Expenditure		C2, C3	M1
Low Expenditure		C1	

Table 1: $ clustering according to jurisdictions

B. The range of percentage-of-replacement-cost expenditures ('%' for short) is between 1.34% and 7.47%, a difference of about 5.5 times. [For C1, only asset value was available, and was used instead of replacement cost.]

Figure 2: Maintenance expenditures as a % of replacement cost
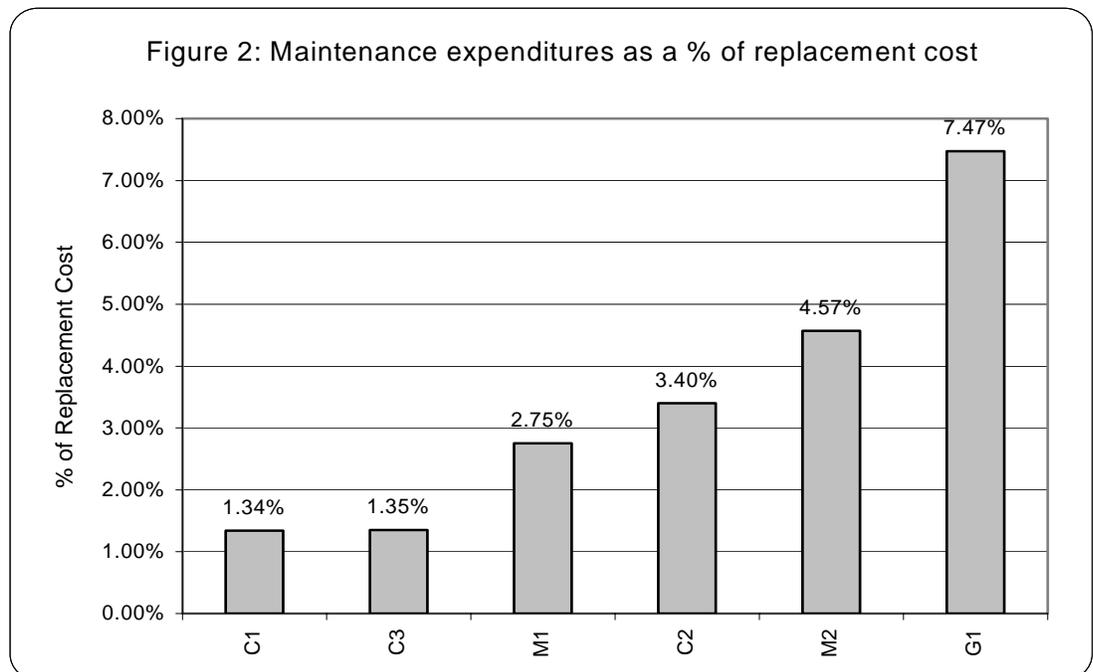
Figure 2: Maintenance Expenditure as a percentage of replacement cost

The clustering is quite observable.

    i. Low expenditure (under 2%): C1, and C3

    ii. Medium expenditure (2% - 4%): M1, and C2

    iii. High expenditure (over 4%): G1 and M2

	Governments	Crowns	Municipalities
High Expenditure	G1		M2
Medium Expenditure		C2	M1
Low Expenditure		C1, C3	

Table 2: % clustering according to jurisdictions

    i. Ranking the organisation according to their expenditures we can see that the Crowns tend to have lower expenditures, while there is no obvious patterns for municipalities.

2.   Factor Analysis

The literature talks about two kinds of factors that may influence maintenance costs. Parametric factors concern the characteristics of the stock and the physical environment in which it is situated. Management factors concern the way in which maintenance is organised and carried out.

A. Parametric Factors

On account of resource limitations many such factors (as mentioned in the section 'Caveat, #3') were not tested. Only a few stock characteristics were examined, yielding the following observations.

a. Average age of stock

Figure 3: Average age of stock versus % of replacement cost
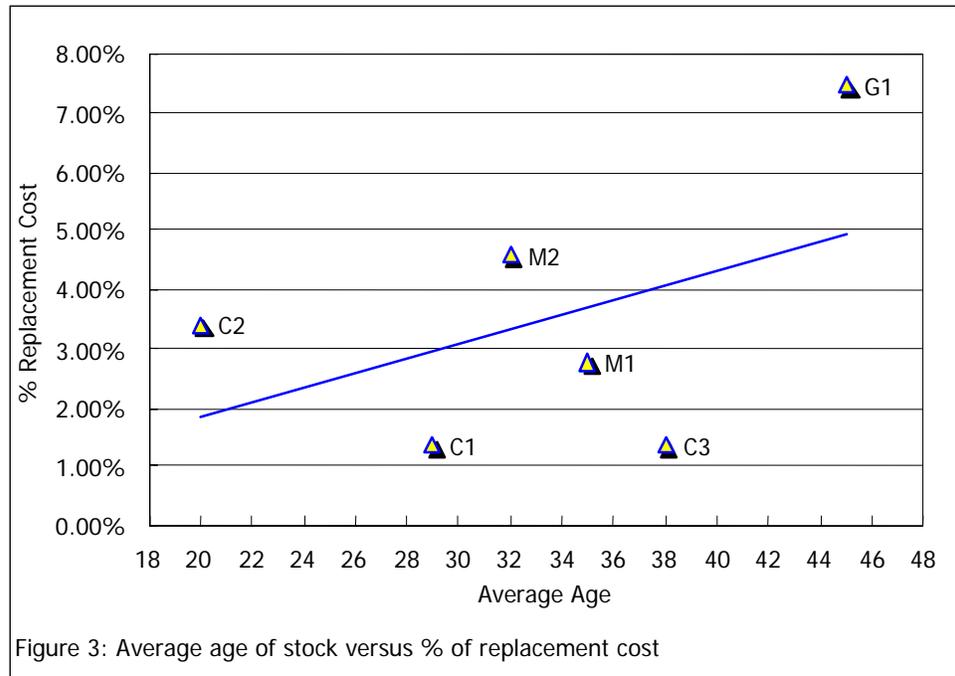
As anticipated, there is a slight positive correlation between the average age of the stock and its maintenance expenditure. Older stocks have high expenditures.

b. Size of stock, as defined by total floor area

Figure 4: Total floor area versus % of replacement cost
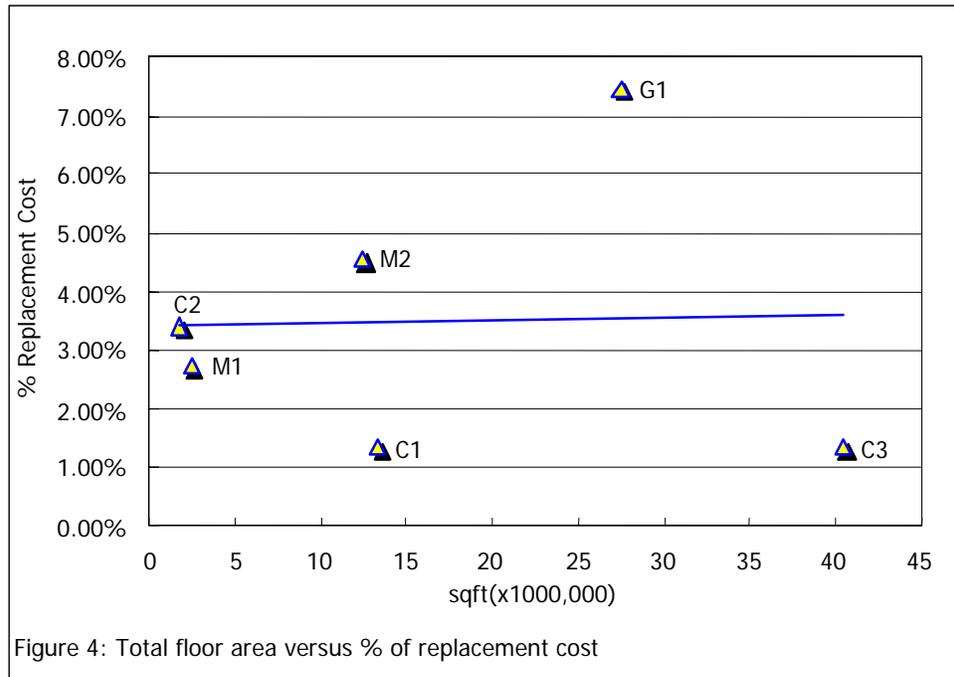
There is no apparent relationship between the size of stock and its maintenance expenditure. One confounding factor may be that the usually greater variety of property types within larger stocks prevents economies of scale.

c. Size of stock, as defined by the number of buildings

Figure 5: Number of buildings versus % of replacement cost
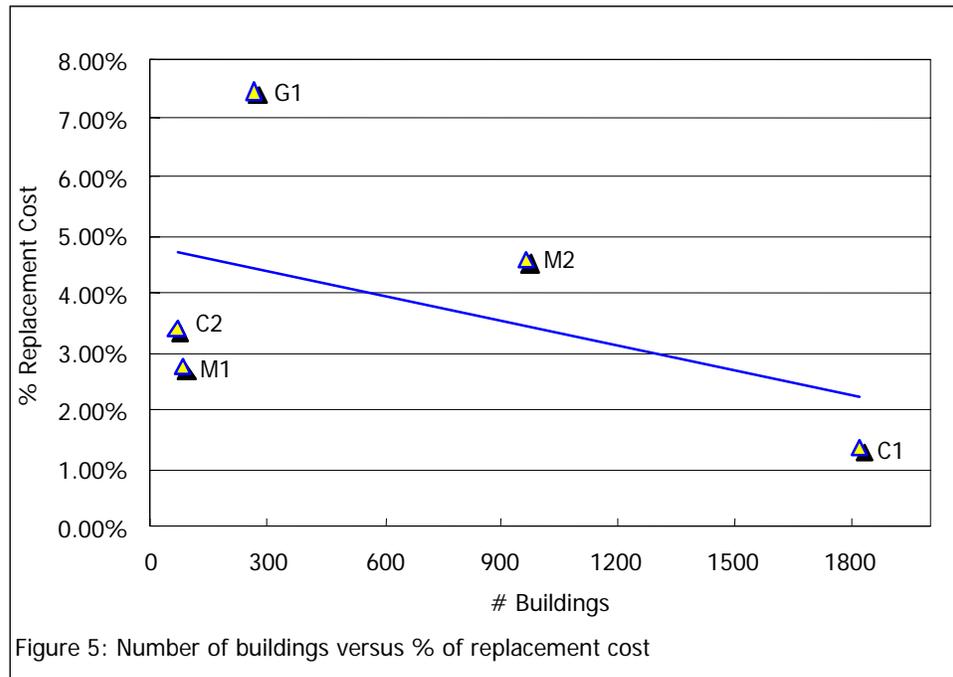
There is a slight negative relationship between the number of buildings in the stock and its maintenance expenditure. Stocks with larger numbers of buildings have smaller maintenance expenditures. This suggests that the larger the number of individual buildings in a stock the more difficult it is to achieve economies of scale in maintenance. Both this and the last finding point to a complicated relationship between the make-up of a stock and its maintenance expenditure.

B. Management Factors

These are the core concerns of the study. The assumption is that they affect maintenance expenditures directly, and that some management practices and better than others.

This section is divided into two parts: (i) identification of the common practices and (ii) identification of the relationship between different practices and their corresponding expenditure levels, with a view to locate the 'best' practices.

What is 'best' is always debatable. Notwithstanding the danger of equating what exists with what is good, our working definition is that organisations which are spending a 'normal' amount (2% - 4% of replacement cost) on maintenance are perhaps also employing best

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maintenance practices, that is, practices that are the most cost-effective in ensuring the functionality of the property throughout its life cycle. This definition can be challenged from a number of fronts. (i) An organisation may 'happen' to be spending a normal amount, but that does not guarantee it is spending it wisely. Disasters may be lurking. (ii) The amount one spends may have no relation to what one needs. There may be a lot of deferred maintenance or unnecessary maintenance. (iii) An organisation which is not spending a 'normal' amount may be using good practices nonetheless. Given these limitations the following is only a tentative and cautious attempt to find clues of best practices.

a. Maintenance Methods

Organisation Type		Reactive	Preventative	Proactive	Predictive	Reliability
Government dep't	G1	-	(X)	-	-	-
Municipality	M1	-	(X)	-	-	-
	M2	(X)	(X)	(X)	-	-
Crown corporation	C1	-	(X)	(X)	-	-
	C2	(X)	(X)	(X)	-	-
	C3	(X)	(X)	(X)	-	-

Table 3: Maintenance methods

 i. Reactive: 3 organisations (all in combination with other methods)

 ii. Preventative: 6 organisations (the sole method used by G1 and M1)

 iii. Proactive: 4 organisations

 iv. No organisation uses the Predictive and Reliability-Centred methods

The most common methods are preventative and proactive. No useful conclusion can be drawn on best maintenance methods.

b. Priorities Determination Methods

Organisation type		Life-cycle costing	Manager judgment	Technical survey	Visual inspection	Health and safety crisis
Government dep't	G1	(X)	(X)	-	-	(X)
Municipality	M1	-	-	-	(X)	-
	M2	-	(X)	-	-	-
Crown corporation	C1	(X)	(X)	(X)	(X)	(X)
	C2	-	(X)	(X)	(X)	(X)
	C3	(X)	(X)	(X)	(X)	(X)

Table 4: Priorities determination methods

i. Life-cycle costing: 3 organisations (always in combination with other methods)

ii. Manager judgment: 5 organisations (the sole method used by M2)

iii. Technical survey: 3 organisations

iv. Visual inspection: 4 organisations (the sole method used by M1)

v. Health and safety concerns: 4 organisations (always in combination with other methods)

The most common method is manager judgment. But C1 and C3, which had the lowest expenditure, use all methods. Maybe that is "the" best practice.

c. Decision-maker types

Organisation type		Agency staff	Agency management	Political body	Contractors
Government dep't	G2	(X)	-	-	-
Municipality	M1	-	(X)	-	-
	M2	(X)	-	-	-
Crown corporation	C1	(X)	(X)	-	-
	C2	(X)	(X)	-	-

Table 5: Decision-maker types

  i. Agency staff: 4 organisations (the sole method used by G2 and M3)

  ii. Agency management: 4 organisations (the sole method used by M1 and M2)

  iii. No organisation relies on the political body, contractors or users to make maintenance decisions.

Both staff and management are similarly common decision-making types.

d. Expenditure allocation methods

Organisation type		Priority-based	Across-the-board-allocation	Political expediency	Maintenance plan
Government dep't	G1	(X)	-	-	-
Municipality	M1	(X)	-	-	-
	M2	(X)	-	-	-
Crown corporation	C1	(X)	-	-	(X)
	C2	(X)	-	-	(X)
	C3	(X)	-	-	-

Table 6: Expenditure allocation methods

Everybody uses a priority-based approach to allocate expenditures, some supplementing it with a 'maintenance plan'.

e. Budget determination method

Organisation type		Historical	Maintenance plan	Assessment program	Priority based competition
Government dep't	G1	-	(X)	-	-
Municipality	M1	(X)	-	-	-
	M2	(X)	-	-	-
Crown corporation	C1	-	(X)	-	-
	C2	(X)	-	-	-
	C3	(X)	-	-	-

Table 7: Budget determination methods

i. Historical: 4 organisations

ii. Maintenance plan: 2 organisations

The more common practice is to use a historical base. There is no indication that budget determination methods are related to expenditure levels.

f. Space allocation method

Organisation type		User requests	Senior officials decide	Political body decides	Users 'purchase'	Allocation policy	Other
Government dep't	G1	-	-	-	-	(X)	
Municipality	M1	(X)	-	-	-	-	
	M2	(X)	-	-	-	(X)	
Crown corporation	C1	(X)	-	-	-	-	
	C2	(X)	-	-	-	-	Committee consensus
	C3	(X)	-	(X)	-	(X)	

Table 8: Space allocation methods

i. User requests: 5 organisations (most use it as the sole method)

ii. Political decision: 1 organisation (in combination with other methods)

iii. Allocation policy: 2 organisations (G1 uses this as the sole method)

The most common method is user request. It is interesting to note that G1, which has the highest expenditure, is the only organisation that uses an allocation policy as the sole method for allocating space.

3. Archetype

The sample size is too small to draw statistical significant conclusions, but two archetypes may be suggested: normal and low spenders.

1. 'Normal'

This organisation has an annual maintenance expenditure of 2% -4% of replacement cost of its stock. This also happens to be both the industrial standard and the statistical norm of the sample. The archetype is developed from the shared characteristics of M1 (a municipality) and C2 (a crown corporation).

Expenditure level:
-Between 2.75% and 3.40% of replacement cost
-Between $3.80 and $5.00 per square foot of building area
Expenditure amount (Budget):
-From $8.5 million to $9.5 million, which is at the low end of the expenditure scale in our sample (sample range is from $8.5 million to $280 million).
Portfolio size (square footage):
-Between 1.7 million sq. ft. and 2.5 million sq. ft., which is at the low end of the portfolio size in our sample (sample range is from 1.7 million sq. ft. to 40 million sq. ft.).
Portfolio size (asset value):
-Between $250 million and $343 million, which is at the low end in our sample (sample range is from $250 million to $3,700 million).
Maintenance methods:
No clear preference.
Priorities determination:
From simple visual inspection to a combination of methods, but does not use life-cycle costing.
Decision-makers:
No clear pattern.
Space allocation:

Through user requests only.

Putting the above characteristics together we have an archetypical organisation that is small, in terms of portfolio size and maintenance expenditure. Other than that, there is no clear pattern about the composition of the portfolio or the management factors.

2. Low Spenders

This organisation has an annual maintenance expenditure lower than 2% of replacement cost.

Expenditure level:
    -1.34% and 1.35% of replacement cost
    -$0.86 and $3.02 per square foot of building area
Expenditure amount (Budget):
    -$11.5 million to $122.5 million.
Portfolio size (square footage):
    -13 million to 40 million sq. ft.
Portfolio size (asset value):
    -$860 million to $3,700 million.
Maintenance methods:
    All methods.
Expenditure allocation:
    Mainly priority-based
Budget determination:
    Historical as well as maintenance plan.
Space allocation:
    Variety of methods, including user requests.

There does not seem to be any clear characteristics (size, operation, decision criteria, etc.) other than it is a provincial crown. Maybe that is the point. A provincial crown is run much more like a business, with economic and financial considerations being the prime operation and decision criteria. The low expenditure level is therefore perhaps just a part of the corporation's 'bottom-line' consideration.

Summary and Conclusions

Given the small and self-selected sample, any conclusion should be treated with caution. However, there are some useful hints.

1. The 'percentage-of-replacement-cost' index offers a more consistent and appropriate basis for comparing maintenance expenditures. The industrial norm of 2% to 4% is also consistent with the findings of the study.

2. One parametric factor seems to affect maintenance expenditure: age of property (the older the more expensive). The size of the stock (measured by the total floor area or number of buildings) does not seem to matter.

3. Common practices include the following:
    -Maintenance Method: Preventative and proactive
    -Priorities Determination: Manager judgment
    -Decision-makers: Split between management and staff
    -Expenditure allocation: Priority-based
    -Budget determination: Historical
    -Space allocation: User requests

4. There do not seem to be any best practices. The only suggestion is that the low spenders use all methods in determining maintenance priorities.

5. The normal spender (2% - 4% of replacement cost) is typically a small organization.

6. The low spender (less than 2% of replacement cost) is typically a provincial crown corporation.

APPENDIX 1: SURVEY INSTRUMENT

(A) QUESTIONNAIRE

Survey on Common Practices of Maintenance Funding
National Executive Forum on Public Property

July 17, 2003

Purpose:
This survey is intended to collect information that will be used to develop a database that describes common practices in maintenance provision and funding among public real estate agencies for their real property assets. Our objective is to provide public sector real estate managers with a yardstick to assess their maintenance practices, standards, levels, and funding arrangements that is developed from the experiences of other similar agencies.

Maintenance:
For the purpose of this survey we are using the standard definition of maintenance that includes operations. It should cover structural, architectural, or electrical/mechanical items. Where replacements occur, they should not raise the property's market quality level, for instance from Class B to Class A, but reflect the current quality standards for the class. But if your organisation uses a different definition, please state it clearly.

Note:
For multiple choice questions please circle the most appropriate choice. If you are typing your answers please place an asterix (*) in front of the letter representing your selection.

Definition of maintenance as above: _____
Definition different from above: _____
       Please specify:

I. Real Estate Facilities

   1. Please describe your agency's stock of real estate using the chart provided below.

Property Type	# of buildings	Square footage	Avg. # of stories	Overall condition. Defined as good, fair, poor, or critical as shown below*	% that are in poor or critical condition (based on # of buildings)	Avg. age	Replacement cost	% that are revenue generating (based on # of buildings)
Office								
Warehouse/ Industrial								
Laboratories								
Residential								
Commercial								
Other(s) Please specify								

   *   Good: Low risk of failure with little impact upon either operations or
                   functionality.
       Fair: Unlikely risk of failure with some variability in operational costs and few
                   impacts upon functionality.
       Poor: Likely risk of failure with operational costs being high and the facility
                   showing serious signs of deterioration.
       Critical: High risk of failure with significant impact upon operations and
                   functionality.

   2. What is the total value of assets (state asset valuation method used) for which
      the maintenance budget applies?

II. Maintenance Expenditures

   1. What is your annual maintenance budget?

   2. How is the maintenance budget determined? (What process and criteria
      are used.)

   3. Are renewal costs included in your annual maintenance budget? If not,
      what is your annual renewal budget?

4a. What is your target expenditure on maintenance?

4b. If your renewal costs are separate from your maintenance expenditures, what is your target expenditure on renewal?

5. Which of the maintenance approach(es) below best describes your practice?
    a. Reactive (corrective)
    b. Preventative (regular maintenance regardless of condition)
    c. Proactive (maintenance based upon conditions)
    d. Predictive (maintenance based upon anticipated conditions [modeled])
    e. Reliability Centered (predictive method based upon probability of failure)
    f.   Other (please elaborate):

6. How are maintenance priorities determined? Select the best match.
    a. Life-cycle costing
    b. Manager judgment
    c. Technical Survey
    d. Visual inspection
    e. Health and Safety Crisis
    f.   Other (please indicate method):

7a. Who has the most influence in determining maintenance priorities?
    a. Agency staff
    b. Agency management
    c. Political body
    d. Contractors
    e.   Other (please explain):

7b. How is that decision made? Select the best match.
    a. Priority Based
    b. Across-the-board-allocation
    c. Political expediency
    d. Maintenance Plan
    e.   Other (please explain):

8. Are maintenance policies and levels different for revenue generating properties? Please explain.

III. Funding

1. Please indicate your sources of funding for maintenance, including share and amount

Source of Funding	% Share of Funding	Amount of Funding
General Revenue		
Rents		
Transfers from higher levels of govt.		
Special Program/Other (please explain)		

2. Is maintenance funding different for revenue generating properties? Please elaborate.

3a. Have there been any major shifts in maintenance funding models, or maintenance methods?

3b. If the answer to 3a is yes, why and how did this happen?

3c. Do you anticipate any future changes in the maintenance funding model used? Please elaborate.

IV. Organisational Form

1. Please indicate the primary way your real estate is administered?

    a. Stand alone real estate department (Internal Dept.)
    b. Administratively distinct real estate agency (External Dept.)
    c. By individual government departments
    d. As part of corporate functions
    e. Other (please explain)

2. How is space allocated to users?

    a. Users request space
    b. Senior officials decide
    c. Political body decides
    d. Users "purchase" space
    e. Space allocation policy
    f. Other (please explain):

3. How is space accounting accomplished?
    a. Users are charged
    b. General budget item
    c. Other (please explain):

4. If users are charged rents, how are these rents set?

5. If rents are not used how is space budgeted?

Are you willing to answer any additional questions or provide additional information that we may require for our research?
Yes ___ No ___

If so, please provide the appropriate contact information.

Please suggest any organisations that we should contact to learn about what/how they do maintenance funding.

(B): SUPPLEMENTAL QUESTIONS

National Executive Forum on Public Property
Survey on the Common Practices of Maintenance Funding
Supplemental Questions

1. What is the annual maintenance budget for office properties alone?

2. What is the estimated amount of deferred maintenance?
   a. For all properties.

   b. For office properties only.

3. On a scale of 1 to 5 what is the situation regarding deferred maintenance? (where, 1= no problem, 2 = not a serious concern, 3 = deferred maintenance is a concern, 4 = serious problem, 5 = critical or becoming a critical problem)

   a. For all properties.

   b. For office properties only.

4. What are the most significant problems/challenges of your maintenance program, regardless of whether or not they are funding related?

(C): FURTHER CLARIFICATIONS

Dear Participant

We are now at the final stage of completing the study on maintenance funding. There are two remaining points in your response that we wish to clarify: the definition of maintenance, and the calculation of replacement cost. Please help us by checking off the following and return this form to Hok-Lin Leung at leungh@post.queensu.ca by June 18 so that we can wrap up the study. (Please mark all that apply with an asterix * in the space provided.)

1) Definition of maintenance that you used in responding to our survey questionnaire (July 17, 2003), which stated, "For the purpose of this survey we are using the standard definition of maintenance that include operations."

Please check off the items that you included in your response.

(a) Routine recurring work required to keep a facility in such condition that it may be continuously used.

(b) Janitorial services

(c) Security

(d) Utilities: water, gas, electricity, oil, etc.

(e) Grounds keeping

(f) Others, please state.

2) Calculation of "replacement cost".

Please check the method that you used in your response.

(a) Estimation by comparing to cost of alternate structure.

(b) Estimation by comparing to cost of alternate structure and adjusting for functional depreciation.

(c) Multiplying the total square footage of your assets by an appropriate per square foot construction cost.

(d) Other, please state.

APPENDIX 2: Profiles of Organisations Surveyed

G1

Annual Maintenance Budget: $287,000,000
Asset Value: $2,461,000,000
% Replacement Cost: 7.47%
$/sqft on Maintenance: $10.42
General Condition: Fair
# of Buildings: 264

This federal department is responsible for the provision of common services and the purchase/construction of facilities for other federal departments. It maintains offices and warehouses that have an average age of 45 years, all in fair condition. It has a total of 264 buildings with a total area of 27,531,000 square feet.

Property type	# of buildings	Square footage	Avg. # of stories	Overall condition. Defined as good, fair, poor, or critical	% that are in poor or critical condition (based on # of buildings)	Avg. age	Replacement cost	% that are revenue generating (based on # of buildings)
Warehouse/ Industrial	264	27,531,000	5	fair	10	45	3,842,000,000	100

GX
(Not included in the analysis because its maintenance definition does not include operations)

Annual Maintenance Budget: $408,360,000
Property Asset Value: $16,916,200,000
Total Replacement Cost: $16,916,200,000   [arrived at essentially through multiplying the total square footage by an appropriate per square foot construction cost, adjusting for inflation and location differences]

% Replacement Cost: 3.89%
$/sqft on Maintenance: $52.10
Average Age: 36.34
# of Buildings: 9727

This federal department has properties and responsibilities across the country. It has many functions that it must fulfil, and its portfolio reflects those responsibilities.

Its portfolio includes: offices, warehouses and industrial buildings, laboratories, residential facilities (for military personnel and their families) and commercial property. It also maintains agricultural and research management facilities, air transportation facilities (such as air bases), communications facilities, assembly and cultural (for gathering) facilities, education and training facilities, services and utilities (for the bases, such as electricity and water), health, medical and dental facilities, industrial facilities, military facilities, parks and recreation facilities and other facilities that are unclassified. The average age of the properties is between 30 and 40 years old

Its buildings are located both on bases and in urban areas. It has 9,727 buildings with a total area of 7,838,520 square feet and average heights between 1 and 2 stories. The total value of the building stock is $18,664,500,000.

Property type	# of buildings	Square footage	Avg. # of stories	Avg. age	Replacement cost	% that are revenue generating (based on # of buildings)
Office	610	890,160	1.45	36.34	958,340,000	0 %
Warehouse/ Industrial	4 196	1,422,120	1.03	29.38	1,691,170,000	0 %
Laboratories	159	93,230	1.19	31.06	280,850,000	0 %
Residential	714	1,060,320	1.64	34.68	1,168,240,000	0 %
Commercial	167	76,990	1.04	29.42	96,520,000	100 %
Other(s)						
Agricultural Research & Mgnt	21	4,700	1.00	35.44	3,960,000	0 %
Transportation - Air	129	669,090	1.41	38.70	1,148,910,000	0 %
Communications	258	71,720	1.19	25.08	182,330,000	0 %
Assembly & Cultural	724	701,170	1.20	35.14	988,720,000	0 %
Education & Training	443	848,840	1.39	28.59	978,060,000	0 %
Services & Utilities	461	111,110	1.11	35.60	499,690,000	0 %
Health, Medical & Dental	47	147,120	1.77	40.49	250,860,000	0 %
Industrial	486	727,900	1.26	38.20	764,450,000	0 %
Military	417	638,040	1.54	40.63	1,075,190,000	0 %
Parks & Recreation	262	155,520	1.09	30.16	180,330,000	0 %
Other (Not Classified)	633	220,490	1.10	27.63	225,700,000	0 %

GY
(Not included in the analysis because its maintenance definitions does not include operations)

Annual Maintenance Budget: $1,885,090
Property Asset Value: $200,000,000 (arrived at through multiplying the
                                                         total square footage by an
                                                         appropriate per square foot
                                                         construction cost)
Total Replacement Cost: $264,000,000
% Replacement Cost: 0.94%
$/sqft on maintenance: $0.95
Average Age: 30
General Condition: Fair
# of Buildings: 83

This provincial department primarily maintains office facilities, together with a few buildings for other uses such as warehouses and industrial facilities, laboratories, and correctional facilities. These facilities are spread across the province, serving various communities. The average age of the buildings is 28 years and they are in good condition. This department has 83 buildings with a total area of 1,990,363 square feet.

Property type	# of buildings	Square footage	Avg. # of stories	Overall condition. Defined as good, fair, poor, or critical	% that are in poor or critical condition (based on # of buildings)	Avg. age	Replacement cost	% that are revenue generating (based on # of buildings)
Office	74	1,710,503	3	fair	10	30		0
Warehouse/ Industrial	2	111,684	1	good	0	30		0
Laboratories	1	24,800	2	good	0	20		0
Other(s)								
Correctional Centers	3	139,625	2	good	33	25		0
Industrial	3	3751	1	good	0	30	NA	100
						Total	264,000,000	

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M1

Annual Maintenance Budget: $9,445,822
Property Asset Value: $343,000,000
Total Replacement Cost: $343,100,000   (Estimated by comparing cost of alternate structure)

% Replacement Cost: 2.75%
$/sqft on Maintenance: $3.86
Average Age: 34.5
General Condition: Fair
# of Buildings: 84

The city owns and maintains the typical array of municipal facilities. However, the data provided only cover offices and warehouse/industrial sites, with a total floor area of 2,450,000 square feet.

Property type	# of buildings	Square footage	Avg. # of stories	Overall condition. Defined as good, fair, poor, or critical	% that are in poor or critical condition (based on # of buildings)	Avg. age	Replacement cost	% that are revenue generating (based on # of buildings)
Office	37	1,830,000	2	good to fair	<1%	30	275,800,000	0
Warehouse /Industrial	47	620,000	1	fair	<1%	38	67,300,000	0

M2

Annual Maintenance Budget: $86,400,000
Property Asset Value: $1,890,000,000
Total Replacement Cost: $1,890,937,237   (arrived at through "reproduction cost" of a "copy" of the asset on an existing, owned, and serviced land mass of appropriate size and configuration)

% Replacement Cost: 4.57%
$/sqft on Maintenance: $6.96
Average Age: 32
General Condition: Fair-Good
# of Buildings: 966

The city has a number of building types which include offices, recreational facilities, social service facilities, public works facilities, protective services facilities (such as police stations), public libraries, arts and cultural facilities, as well as buildings that serve general municipal uses.

The oldest buildings are the arts and cultural facilities, which have an average age of 72 years, many of which are of historical interest. Transit services, protective services and public works facilities are all about 20 years of age. Other facilities are between 30 and 40 years of age. It is responsible for a total of 966 buildings with a total area of 12,406,378 square feet.

Property type	# of buildings	Square footage	Avg. # of stories	Overall condition. Defined as good, fair, poor, or critical	% that are in poor or critical condition (based on # of buildings)	Avg. age	Replacement cost	% that are revenue generating (based on # of buildings)
Office	18	980,685	3	good	<5%	35	111,798,090	<5%
Other(s)								
Recreation Facilities	294	3,252,378	1	good	12%	32	547,294,252	85%
Social Service Facilities	37	530,854	2	fair	15%	29	73,684,674	<5%
Public Works Facilities	244	3,611,057	1	fair	10%	23	564,046,054	<5%
Transit Service Facilities	39	1,160,976	2	good	8%	18	237,821,760	<5%
Protective Services Facilities	66	858,682	2	good	<5%	21	12,370,9551	0%
Public Library Facilities	21	257,868	2	good	10%	34	44,353,296	0%
Arts and Cultural Facilities	22	220,618	1	fair	15%	72	33,092,700	40%
General Municipal Use	225	1,533,260	1	fair	18%	43	146,136,860	<5%

MX
(Not included in the analysis because of different maintenance definition)

Annual Maintenance Budget: $51,000,000
Property Asset Value: $1,650,000,000
Total Replacement Cost: $4,549,300,000   (arrived at through multiplying the total square footage of each class of buildings by an appropriate per square foot construction cost)

% Replacement Cost: 1.12%
$/sqft on Maintenance: $2.14
# of Buildings: 1,165

The city is a provincial capital with a very large population. It maintains the following property types: offices, warehouse and industrial facilities, and residential buildings along with a variety of municipal use buildings. It is responsible for a total of 1,165 buildings that have a total area of 23,800,000 square feet.

Property type	# of buildings	Square footage	Replacement cost
Office	184	7,200,000	1,777,800,000
Warehouse/ Industrial	102	2,700,000	372,000,000
Residential	158	2,200,000	335,900,000
Other(s) Municipal use buildings	721	11,700,000	2,063,600,000

MY
(Not included in the analysis because its maintenance definition does not include operations)

Annual Maintenance Budget: $18,677,000
Property Asset Value: $1,200,000,000
Total Replacement Cost: $809,000,000   (arrived at through multiplying the total square footage by an appropriate per square foot construction cost)

% Replacement Cost: 2.31%
$/sqft on maintenance: $4.34
Average Age: 36
General Condition: Fair-Poor
# of Buildings: 668

The city is the provincial capital. It maintains the following property types: offices, warehouse and industrial facilities, residential buildings, commercial buildings and leisure facilities. Warehouses and industrial facilities represent the largest number of buildings that the city maintains, followed closely by leisure facilities. The oldest buildings are residential and commercial buildings, which are on average 50 years old. It is responsible for a total of 668 buildings with a total area of 4,303,000 square feet.

Property type	# of buildings	Square footage	Avg. # of stories	Overall condition. Defined as good, fair, poor, or critical	% that are in poor or critical condition (based on # of buildings)	Avg. age	Replacement cost	% that are revenue generating (based on # of buildings)
Office	3	650,000	12	fair	0	30	130,000,000	0
Warehouse/ Industrial	264	1,300,000	1	fair	10%	Not avail	227,000,000	20%
Residential	113	113,000	1	poor	50%	50	19,000,000	100%
Commercial	68	240,000	1	poor	60%	50	*	80%
Other(s)								
Leisure facilities	220	2,000,000	1	fair	10%	25	433,000,000	100%

*Value included in Warehouse/Industrial Replacement Cost

C1

Annual Maintenance Budget: $11,500,000
Property Asset Value: $860,000,000
Total Replacement Cost: $860,000,000
% Replacement Cost: 1.34%
$/sqft on Maintenance: $0.86
Average Age: 29
General Condition: Fair-Good
# of Buildings: 1820

This crown corporation provides and manages all building accommodations for a whole province. It maintains many different property types including, offices, heritage complexes, courthouses and jails, fish hatcheries, highway facilities, emergency services, forestry complexes, etc.

Its operations are privatised and are highly decentralized. Average building age is about 26 years old, and the buildings are in fair to good condition. It has a total of 1,820 buildings with a total area of 13,311,000 square feet.

Property type	# of buildings	Square footage	Avg. # of stories	Overall condition. Defined as good, fair, poor, or critical	% that are in poor or critical condition (based on # of buildings)	Avg. age	% that are revenue generating (based on # of buildings)
Office	85	2,053,000	4	good	0%	25	100%
Warehouse/ Industrial	169	698,000	1	good	0%	NA	100%
Laboratories	5	NA	1-2	good	0%	7	100%
Residential	109	196,000	1	fair to good	5%	20	100%
Other(s)							
Highway Yards	831	1,610,000	1	fair	30%	40	100%
Correctional, Courthouses, Ambulance Stations, Health Units, Miscell, Special Use	621	8,754,000	1-2	fair to good	5%	20	100%

C2

Annual Maintenance Budget: $8,500,000
Property Asset Value: $250,000,000
Total Replacement Cost: $250,000,000
% Replacement Cost: 3.40%
$/sqft on Maintenance: $5.00
Average Age: 20
General Condition: Good
# of Buildings: 64

This is a provincial crown corporation responsible for the generation and distribution of electricity in the province. The data supplied apply only to the maintenance of office and office-warehouse facilities and do not include generating stations. It has a total of 64 buildings with a total area of 1,700,000 square feet.

Property type	# of buildings	Square footage	Avg. # of stories	Overall condition. Defined as good, fair, poor, or critical	% that are in poor or critical condition (based on # of buildings)	Avg. age	Replacement cost	% that are revenue generating (based on # of buildings)
Office	2	900,000	20	good	none	11	150,000,000	50%
Office/ Warehouse	62	800,000	2	good	2-3%	20	100,000,000	10%

C3

Annual Maintenance Budget: $122,488,474
Property Asset Value: $3,700,000,000
Total Replacement Cost: $9,098,000,000
% Replacement Cost: 1.35%
$/sqft on Maintenance: $3.02
# of Buildings: NA

This provincial crown corporation maintains all of the province's real property assets. It also handles construction management, facilities management, and portfolio management for the province's real estate. Its portfolio includes offices, institutions and other buildings. The average age of buildings is 38 years old, all being in fair condition. It manages a total floor area of 40,500,000 square feet.

Property type	Square footage	Avg. # of stories	Overall condition. Defined as good, fair, poor, or critical	Avg. age	Replacement cost	% that are revenue generating (based on # of buildings)
Office	7,100,000	1- 10	fair	38	1,157,300,000	100%
Special Purpose Space	9,300,000	1- 10	fair	38	2,790,000,000	100%
Institutional	14,200,000	1- 10	fair	38	3,834,000,000	100%
Excluded from Base Rent	9,900,000	1- 10	fair	38	1,316,700,000	

APPENDIX 3: DATA SUMMARY CHART

Building condition

Organisation	Percentage in poor and critical condition (number of buildings)	Percentage in fair condition (number of buildings)	Percentage in good condition (number of buildings)	Average age of building stock	Overall condition (total number of buildings)
G1	10% (8)	80% (64)	10% (8)	30	fair (83)
G2	10% (26)	90% (238)	–	45	fair (264)
M1	–	100%	–	35	fair (84)
M2	27% (179)	73% (489)	–	36	fair (668)
M3	12% (117)	47% (454)	41% (395)	32	fair (966)
C1	3.3% (61)	82.7% (1500)	14% (259)	29	fair (1820)
C2	2% (2)	–	98% (62)	20	good (64)
C3	–	100%	–	38	fair

Financial data

Organisation	Percentage of replacement cost spent on maintenance	Asset value	Replacement cost	Maintenance expenditure	Sum of square footage	Amount spent on maintenance per square foot
G1	0.43%	$2,000,000,000.00	$2,640,000,000.00	$11,325,000.00	1,990,363	$5.69
G2	7.47%	$2,461,000,000.00	$3,842,000,000.00	$287,000,000.00	27,531,000	$10.42
M1	2.75%	$343,000,000.00	$343,100,000.00	$9,445,822.00	2,450,000	$3.86
M2	2.31%	$1,200,000,000.00	$809,000,000.00	$18,677,000.00	4,303,000	$4.34
M3	4.57%	$1,890,000,000.00	$1,890,937,237.00	$86,400,000.00	12,406,378	$6.96
C1	1.34%	$860,000,000.00	–	$11,500,000.00	13,311,000	$0.86
C2	3.40%	$250,000,000.00	$250,000,000.00	$8,500,000.00	1,700,000	$5.00
C3	1.35%	$3,700,000,000.00	$9,088,000,000.00	$122,488,474.00	40,500,000	$3.02

Budget determination methods

Organisation	Historical	Maintenance plan	Assessment programme	Other
G1	⊗	–	–	–
G2	–	⊗	–	–
M1	⊗	–	–	–
M2	⊗	–	–	–
M3	⊗	–	–	–
C1	⊗	⊗	–	–
C2	–	–	–	–
C3	⊗	–	–	–

Organisation forms

Organisation	Internal department	External department	Individual government department	Part of corporate function	Other
G1	⊗	–	–	–	–
G2	⊗	–	–	–	–
M1	⊗	–	–	–	–
M2	⊗	–	–	–	–
M3	⊗	–	–	–	–
C1	–	–	–	⊗	–
C2	⊗	–	–	–	Outsourced
C3	⊗	–	–	–	–

Space allocation methods

Organisation	Users request space	Senior officials decide	Political body decides	Users' purchase space	Allocation policy	Other
G1	⊗	–	–	–	–	–
G2	–	–	–	–	⊗	–
M1	⊗	–	–	–	–	–
M2	⊗	–	–	–	–	–
M3	⊗	–	–	–	⊗	–
C1	⊗	–	–	–	–	–
C2	–	–	–	–	–	Committee consensus
C3	–	–	⊗	–	⊗	–

Expenditure allocation methods

Organisation	Priority-based	Across-the-board-allocation	Political expediancy	Maintenance plan
G1	⊗	–	–	–
G2	⊗	–	–	–
M1	⊗	–	–	–
M2	⊗	–	–	–
M3	⊗	–	–	–
C1	⊗	–	–	⊗
C2	⊗	–	–	⊗
C3	⊗	–	–	–

Decision maker types

Organisation	Agency staff	Agency management	Political body	Contractors
G1	–	⊗	–	–
G2	⊗	–	–	–
M1	–	⊗	–	–
M2	–	⊗	–	–
M3	⊗	–	–	–
C1	⊗	⊗	–	–
C2	⊗	⊗	–	–
C3	⊗	–	–	–

Maintenance methods

Organisation	Reactive	Preventative	Proactive	Predictive	Reliability
G1	–	–	⊗	–	–
G2	–	⊗	–	–	–
M1	–	⊗	–	–	–
M2	–	⊗	⊗	–	–
M3	⊗	–	⊗	–	–
C1	–	⊗	⊗	–	–
C2	–	–	⊗	–	–
C3	⊗	⊗	⊗	–	–

Priorities determination method

Organisation	Life-cycle costing	Manager judgment	Technical survey	Visual inspection	Health and safety crisis
G1	–	⊗	–	–	–
G2	⊗	⊗	–	–	⊗
M1	–	–	–	⊗	–
M2	–	–	⊗	–	–
M3	–	⊗	–	–	–
C1	⊗	⊗	⊗	⊗	⊗
C2	–	⊗	⊗	⊗	⊗
C3	⊗	⊗	⊗	⊗	–

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