

4.4 Long Term Maintenance Plan

This section provides the basic principles in planning for long term maintenance. Some topics though look theoretical, can give readers some ideas on the importance of planning ahead and carrying out preventive measures to minimize any possible danger to lives. Interested readers are encouraged to consult other text and publications for more in-depth understanding on the subject. With some background knowledge in the field, readers may find it easier to communicate with building professionals to device action plans for long term effective maintenance.

4.4.1 Maintenance in General

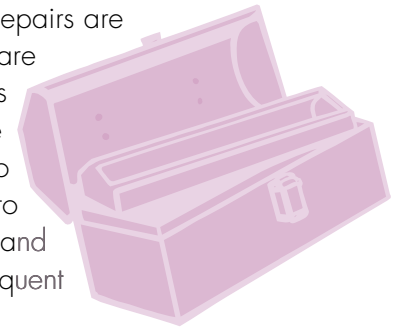
The following are aspects of maintenance that should be considered for formulating plans:

(a) Servicing

It includes periodic inspection, cleansing, oiling (mechanical parts) and adjustments. The objective is to minimize wear and tear, and to prevent breakdown.

(b) Repairs

Apart from regular servicing, building elements, installation and facilities require repairs from time to time. Repairs are usually on a need basis and in most cases are passive response. Good design, materials and workmanship together with proper use and regular maintenance can contribute to deferring the first major repairs. In addition to the above, regular and thorough inspection and regular repairs can also help defer the subsequent major repairs.



(c) Replacement

When a building element or part of a system reaches the end of its economic expected lifespan, repairs are not advisable. Replacement will be more cost effective.

(d) Upgrading

This might involve re-decoration, improvement and refurbishment, etc., to upgrade part or portion of the building to a higher standard.

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4.4.2 Planned Maintenance

Passive repairs upon breakdown usually cause inconvenience to users. They will also cost more as the extent of the worn out parts could usually be confined by regular inspections and minor repair. Planned Maintenance is therefore more cost effective and enhance a higher standard and level of performance of the facilities. Planned Maintenance can be divided into:

(a) Planned Preventive Maintenance

In order to ensure its continuous operation, maintenance work is carried out within the anticipated life cycle of a facility before symptoms of failure or breakdown are detected. This serves to prevent failure of a facility or a component.

(b) Planned Corrective Maintenance

Spare parts or components of installations are kept in stock. Sources of labour are also identified, secured or engaged. But maintenance work is not carried out until the service breaks down or the problem surfaces. Occupiers would have to tolerate temporary shutting down of services if this approach is adopted. As the required works may not be effectively scheduled, the labour cost of this approach might be higher than that of the preventive approach.

4.4.3 Survey of Existing Conditions

Before any maintenance works are carried out, a condition survey of the building is usually conducted. The purposes of a condition survey are to:

- understand current conditions and degree of deterioration of the building;
- identify the causes of deterioration so that appropriate repair methods can be specified;
- assess the extent of works, prepare for budget, plan the implementation priorities and program; and
- estimate the quantities of repair and maintenance works for the preparation of contracts.

Readers may refer to Section 4.3.4(b)(i) of this Chapter for details on selecting building professionals for carrying out the survey.

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4.4.4 Maintenance Strategy and Standard

Inadequate or inappropriate maintenance will result in frequent breakdowns or failures, causing inconvenience and hazards to the users and public. It would also expedite the depreciation of assets. The property manager has the responsibility to set policy and program to meet the owners' requirements.

Different usages and grades of buildings will have different demands in maintenance. The maintenance policy of a building must include two fundamental indicators, namely, are the quality of service and the response time to a complaint.

Examples of quality of service for different building categories:

Building category	Level of maintenance	Response time
Residential (low dependency)	corrective (unplanned)	Up to 24 Hours
Residential (high dependency)	corrective (unplanned)* or planned	Up to 4 Hours
Commercial	planned*	Up to 4 Hours
Prestigious	highly planned*	0.5 Hour or less

* Planned maintenance may be corrective or preventive

4.4.5 Maintenance Budget and Replacement Reserve

(a) Approach to Derive the Maintenance Budget

(i) The Conventional Approach

In this approach, the building maintenance budget is a percentage of the annual budget. It is very often based on the previous year's expenditure with minor adjustments. Its most serious drawback is that the budget available has no direct relation with the prevailing conditions of the building and therefore may not be sufficient to carry out the required works.

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4.4.5(a) Approach to Derive the Maintenance Budget (continues)

(ii) The Formula Approach

The annual maintenance budget is derived from some agreed formula which quantifies needs in terms of cost per unit area, a percentage of current replacement cost, or some other factors, to project future needs.

Like the conventional approach above, this technique does not match budget with identified needs. The method also assumes a generic renewal pattern and does not allow for the varying life cycles of different building elements/components.

However, when used in conjunction with a condition survey, this approach will enable the maintenance property manager to arrive at a more realistic assessment of maintenance and renewal needs.

(iii) The Condition-based Approach

This approach incorporates a thorough survey of conditions of the building to identify needs of maintenance works. Though accurate, it is a time-consuming and costly exercise that is difficult to be adopted on an annual basis.

(b) Replacement Reserve Fund and Sinking Fund

A **replacement reserve fund** should be set up once a new building is occupied. It caters for the future replacement of major equipment such as water pumps, electrical switchgears, emergency generators, air-conditioning plant, roof waterproofing, etc.

It is also advisable to provide for a **sinking fund** for the future modernization of the common areas. A small portion of the monthly management fee from the owners and occupiers could contribute to the fund. This reserve will avoid an abrupt and dramatic increase in the management fee because of replacement or modernization works, hence minimize criticisms from Owners' Committees and occupiers.

4.4.6 Maintenance Cycle

The following maintenance cycles are suggested for reference. They are dependent on the particular circumstances of the building, and the cycles can be adjusted to suit a circumstances and level of maintenance expected. However, for essential items which affects safety of the occupiers and the public such as external wall finishes, fire services and lift installations, the following suggestions should be regarded as the reasonable cycle and should not be lengthened.

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Facility	Items of Work	Cycle
External Walls Painting	Redecoration	4-5 years
External Walls Finishes	Regular inspection	yearly
	Detail inspection and check up	5-6 years
Internal Walls	Redecoration/touching up	3 years
	Structural repair	as and when necessary
Fresh Water Supply	Inspect grease, switches pumps & check valves	monthly
	Cleanse water tanks & check valves	3 months
Flushing Water Supply	Inspect, grease, switch pumps & check valves	monthly
	Cleanse water tanks & check valves	6 months
Windows, External Railings & Metalwork	Inspect condition & refix	yearly
	Repainting (steel and iron)	2-3 years
Drainage-Roof	Check and cleanse drains and surface channels	Bi-weekly and before and after typhoon/heavy rainfall
Drainage above ground	Check externally for defects or vegetation growth	yearly
Drainage-Underground	Check and cleanse manhole	2 months
	C.C.T.V. survey for underground drains (if frequent subsoil movements are expected)	2 years
Lifts	Oiling & servicing	monthly
	Overhaul	yearly
Fire Services	Inspect & refix by management staff	weekly
	Overhaul & report to Fire Services Department	yearly
	Fire-resisting doors	1-2 days

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4.4.6 Maintenance Cycle (continues)

Facility	Items of Work	Cycle
Play Equipment	Inspection by management staff	1-2 days
	Inspection by mechanics/ specialist	yearly
Slopes and Retaining Walls	Inspection of surface drainage channels and surface protection by management staff	At least once a year before the onset of the wet season, and after a heavy rainstorm or a typhoon
	Routine maintenance inspections	At least once a year before the onset of the wet season, and after a heavy rainstorm or a typhoon
	Inspection by a qualified Geotechnical Engineer	At least once every 5 years
Others	Alarms, Communal Aerial Broadcasting Distribution System (CABD), security, etc.	6 months -1 year
	Roofing, floors, finishes	yearly