MANAGING ASSETS: ACHIEVING FINANCIAL SUCCESS THROUGH LIFE-CYCLE ANALYSIS

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Introduction

Life-cycle cost analysis is a technique facilitating the decision making process in the successful management of assets. Such an analysis assists stakeholders to make informed decisions about the asset in a more systematic way. This paper presents an outline of a technique known as life-cycle analysis of assets and examines this technique with reference to three case studies, an Australian university campus, the Commonwealth Law Courts of Australia and the Canadian Blood Services. These organizations use life-cycle analysis to help plan and manage their respective real estate portfolio; assess the appropriate maintenance budget to support the required condition level of their respective facilities; and apply for long term funding. The paper further discusses and demonstrates how life-cycle analysis supports the decision making processes in managing real estate assets; monitors the projected cashflow and income against a series of important factors; and more significantly, influences the securing of adequate funding to achieve financial success over the long term.

The life of an asset

The life of an asset parallels the stages of the human life- span. An asset is measured and monitored during the initial design (conception); development (gestation); construction (birth); defects liability period and early years of occupation (infancy); height of occupancy and functional support, with the associated series of upgrades and renewal processes (adulthood); and before reaching the end of its useful life (terminal stage of life).

As every asset is formed from a series of components, the life of an asset is measured as the aggregate of the life of its various components. The series of upgrades and renewal process required during the 'adult' life of an asset, results from some of the components of the asset already reaching the end of useful life, before the main framework of the asset itself. As with people who may require knee or hip replacement, upgrades and renewals are similarly needed to extend the functionality and life of the overall asset.

The longevity of an asset depends on a number of factors influencing the potential of the asset itself. Whilst the potential of the physical life of an asset is primarily determined by the original materials and workmanship forming the asset, exposure to weather and levels of use or abuse are also key determinants. Maintenance management plays an important role in preserving the integrity of the original materials and construction and in guarding against exposure to the elements and general wear and tear.

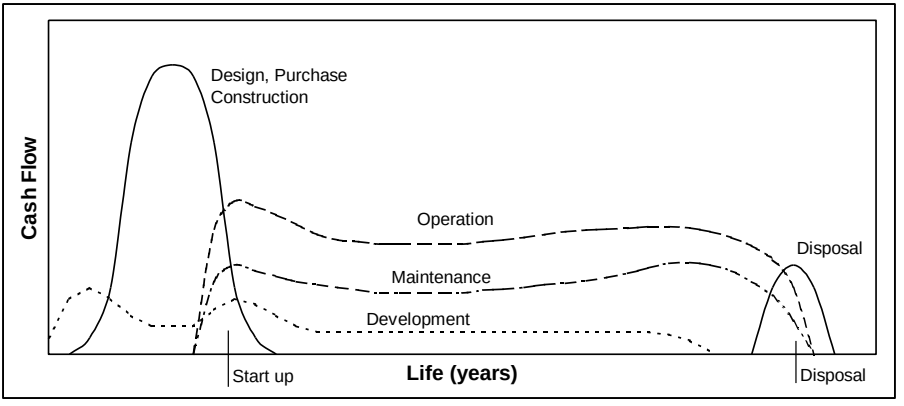
Whilst maintenance management can assist in either accelerating or slowing down the deterioration rate of an asset, the service life of the asset may still end earlier than its physical life. The service life of an asset ends either when the demands for the functions supported by the physical aspects of the asset diminishes, or when the asset can no longer perform that function effectively. An asset may have more than one service life during its physical life.

Life-cycle cost analysis

'Life-cycle cost analysis infers that the total life span of a particular asset or group of assets (portfolio), needs assessing in terms of the specific costs associated with the different life stages. These stages include the initial costs of providing the asset; the expenditures required to operate and maintain the asset over time; and later, the costs associated with the disposal and/or modification of the asset' (Ibrahim, 1992).

Figure 1 below shows a typical life-cycle cost profile of an asset, from its design to its disposal stage.

Figure 1 – Typical life-cycle cost profile of an asset



Source: Terotechnology and Life-cycle Costs Ibrahim, 1991.

Organizations can acquire their asset either by building or purchasing. When building an asset, organizations will incur the costs of the initial study; its design and development; its construction costs; and later, the costs associated with testing and commissioning, as well as modifications due to defect clearance. When purchasing assets, organizations generally incur the costs of the asset itself, plus commissioning, duties, tax and other costs associated with buying the asset.

Much emphasis is placed on the initial cost of providing the asset. The operational and maintenance costs are largely hidden or neglected and the asset disposal costs are rarely or never mentioned. It is the operational and maintenance costs that are crucial to the financial success and efficient management of the portfolio. Such costs can be controlled to suit not only the portfolio's level of usage and operational requirements, but also adjusted to suit their current service life as well as market conditions.

During the years of normal operation and maintenance, the annual costs will arise from operating the asset (labour, power, fuel, equipment, insurances and overhead charges and other consumables); maintaining the asset (labour, parts, materials, and overhead charges) to keep the operation running; and major repairs, refurbishment, renewals and overhauls which are required to extend the life of the asset in general. For real estate, these annual costs are often met by direct revenues through rental income, or in an industrial estate situation, through the production volume and sales revenue.

Refurbishment and renewals in real estate are generally required to upgrade the internal fitout and building services, to ensure reasonable operating conditions and to continue attracting financial revenue. The renewals program is necessary because the life span of many of the internal finishes and building services are shorter than the basic structure of the asset itself. In many instances, refurbishment and renewals are also required to meet the ever-changing functional requirements of the asset, as changes may occur even when the asset itself has not reached the end of its useful life.

At the end of its physical life, the asset will need to be completely replaced, disposed of or removed. The cost of such disposal action also needs to be taken into consideration, particularly if the asset has special features. Whilst it may be relatively easy to sell or demolish a piece of real estate, the cost of disposal of highly specialist facilities, such as Nuclear Power Plants, will be very high and will need expert consideration.

Estimating life-cycle cost for an asset

Canada and White (1980) devised an effective and straightforward formula to estimate the life-cycle cost of an asset.

LCC = Capital Cost
+ Life time Operating Costs
+ Life Time Maintenance Costs
+ Life Time Plant Losses
+ Plant Disposal Cost

However, many other influences determine life-cycle cost estimates, with inflation and discount rates being important factors. The formula for estimating life-cycle costs can become quite complicated, depending on a range of factors including the time frame used for the analysis and the number of alternatives sought.

However, a number of computer software systems are now available to assist asset managers prepare these essential cost estimates. This means that asset and real estate managers can now concentrate on applying the findings of these software calculations, discover the potential within their asset from a life-cycle analysis and establish the opportunities to optimise their financial success from their real estate.

Its purpose

Life-cycle Cost analysis is used primarily to forecast cashflow during the life of an asset and to find alternatives on materials or renewal methods, based on costs. Following this cost analysis, the life-cycle approach can also facilitate decision-making regarding the potential and quality of the asset and optimise the possibility of creating financial success from the real estate in a more systematic way.

Canada & White (1980) refers to the systematic approach to analysing assets as a coordinated set of procedures that addresses the fundamental

issues of design and management: that of specifying how people, money and materials should be combined to achieve a layer of purpose. It includes investigation of proper objectives; comparing quantitatively, where possible, the cost, effectiveness, and risks associated with the alternative policies or strategies for achieving them; and formulating additional alternatives if those examined are found wanting'.

In most cases, only the initial costs are considered, as developers aim for the most cost-effective way to acquire an asset. However, it is often found that simplistic design concept, improper choices of materials, inappropriate installation methods and a lack of adequate maintenance leads to excessive maintenance and operating costs.

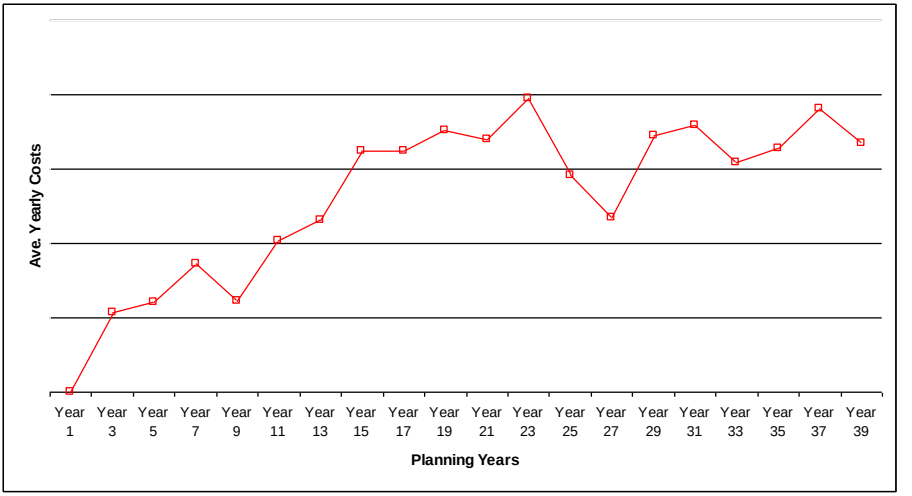
Many building materials, particularly those related to interior finishes are not only expensive to acquire and install, but also require extensive maintenance efforts to keep them in good condition. Building services that are installed in obscure spots around the building to maintain a certain aesthetic effect can be difficult to access and hence cannot be maintained. Many glamorous glass window panels appear to be dirty and elaborate timber panelling inside impressive function rooms show signs of minor cracks due to dryness, simply because available ladders and other extension devices have NOT been tall enough to clean them regularly. Such problems would have been identified during the design phase by a life-cycle cost analysis of the asset.

Application of life-cycle analysis in asset management

As mentioned earlier, the life of an asset is the aggregate of the lives of its various components. Although the life of the actual building structure may last hundreds of years, its building services and internal fittings and finishes will only have an economic life of between 10~25 years each, depending on the original materials used, their level of usage, and maintenance management procedures. Without taking interest and discount rates into

consideration, the LCC graphs for such a facility over the first 40 years period is presented in Figure 2 as follows.

Figure 2. LCC profile for a single facility



Source: Conceptual model, A. Sudjiman, 2000.

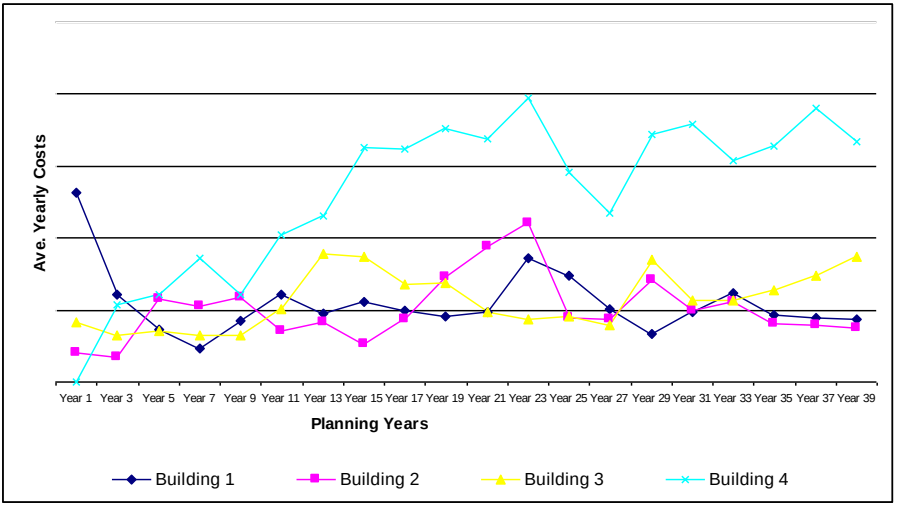
Looking at the above Figure 2, real estate managers can immediately start identifying the long term operational and maintenance budgets for the asset and more fully appreciate the peak periods due to a combination of major refurbishment. Appropriate plans for finance to fund these costs can then be devised, including comparison between these costs and any identified projected revenues or income.

Looking further into the long term, it may also be obvious whether this asset will remain economically viable or not, particularly when the projected revenues cannot support the projected expenditures. Decisions to continue on with the asset, or to sell, or to demolish and re-build, can be based on informed knowledge.

Developers or real estate managers will have very interesting life-cycle scenarios to consider when they are responsible for a series or portfolio of

assets, of differing ages or functions. They will be presented with not only a series of life-cycles for each of the individual assets, but also their aggregate, which forms the life-cycle scenario of the portfolio itself. This is illustrated in Figure 3 below.

Figure 3. Life-cycle cost profile of a series of real estate within a portfolio



Source: Conceptual Model – A. Sudjiman 2000.

A further series of analysis and planning will need to be implemented with a set of life-cycle scenarios similar to the above. Other issues may need to be factored in before any decisions can be made on the future plans for any of these assets. Such issues may include the current strategic plan of the organization, the organization's attitude towards their method of operation, or general market conditions.

Longevity of the physical life and service life of an asset

Assets have physical life-cycles which must be planned for, costed properly and brought into the pricing matrix. This constitutes the supply side of the equation (Smart, 1998). The physical life of an asset is the life of the physical integrity of the asset, including all the potential and qualities that are implied.

As mentioned before, the basic life of an asset is dependent on a number of factors, including its original materials, the quality of the workmanship, the level of usage, exposure to the elements and the overall maintenance of the asset. Despite these influencing factors, the general longevity of an asset's physical life are widely known. For instance, the estimated life for various building components are well published, including broad estimates such as 200 years for building's basic structures and 15 years for their interior linings.

Life-cycle cost analysis refers only to the physical life of an asset, as it analyses the ingredient materials which physically form an asset. Although it is used to find alternatives based on costs and takes maintenance and operating costs through the life of the asset into consideration, it does not take the asset's service life into consideration.

Equally important issues are the life-cycles of the 'products' or services of the asset. Product lives, determined by changes in demand, may be very different from the physical lives (Smart, 1998). In real estate, service life can be a combination of a number of factors, but generally represents the asset's capability and fashion in providing facilities or accommodation for certain type of activities.

Hence, the service life of an asset is more complex to determine. The service life is generally shorter than the asset's physical life, as it not only relates directly to organisational demands, but is also very susceptible to people's social and political attitudes, the community's thinking towards work, technological advances and subsequent market conditions.

Market conditions often dictate the service life of an asset, in terms of the demand of their functional existence. As demands for certain functions within real estate drops, the service life of this type of real estate also diminishes,

despite the fact that the real estate may still has a lot of physical life left in it. Refurbishment and alterations are often used to renew such services life, either to support a new market trend or to meet increased demands in alternative functions, based on the same physical structure and life of the asset.

For instance, the new concept of mega shopping malls in capital cities has meant that the service life of the typical suburban boutique style shop is diminishing. Having manufacturing industry near the CBD is regarded as too expensive these days, forcing manufacturers to move to the outskirts of the city, providing spacious and more comfortable factories for their workers. Trendy alteration projects and refurbishment of these inner city factories are attempts to provide a new service life to these old structures.

In real estate, the service life of an asset becomes a critical factor. This needs to be mapped against the physical life-cycle analysis of the asset.

In many instances, the maintenance management of an asset can play a pivotal role in balancing the physical and the service life of an asset. Maintenance management for real estate can also be manipulated to change the original scenario of the physical life-cycle of the assets. Such manipulation is needed to match the service life-cycle and achieve long term plans. It is possible to extend or shorten the life of the asset by adjusting its maintenance management and, even to a certain degree, alter its service life.

Strategic Facility Services has conducted a number of condition appraisals of real estate assets based on this life-cycle analysis to assist organisations plan and manage their assets, and to better support their goals and objectives. By comparing the life-cycle cost of an asset with the projected service life and using risk management techniques, we have expanded the life-cycle process to include financial and business planning frameworks in addition to the cash flow analysis.

The following case studies represent applications of life-cycle analysis to real estate.

University Campus

A new Director of Facilities was appointed to manage the Campus buildings and grounds of a University in Australia. Little information was provided to the New Director regarding the condition of the 1,420,000sqm of assets, with no clear long-term management program in place.

Significant proportions of the assets were approaching the terminal stages of life. His predecessors did not have a clear long term capital works upgrade program, other than a list of proposed works submitted by pro-active Faculties and Centres demanding better facilities for their lectures and research activities. The new Director of Facilities was given a formula to establish a maintenance budget based on the previous year's budget. However, it remained unclear that this amount would be sufficient to maintain the buildings and the Campus.

As part of growth planning and to match other institutions in offering tertiary programs, the University Council had recently developed extensive marketing material promoting excellent research facilities offering educational investments and industry links to various corporate bodies. This posed many implications for the new Director, who was aware of the importance to get accurate details of the current condition and potential service of the assets, to support such educational programs. The gathering of this data (in a systematic and defensible way), was crucial to the development of an effective business plan of the University's asset which will, over the long term, assist the University Council achieve its business initiatives.

In conjunction with Strategic Facility Services, the University conducted a condition appraisal of the assets on Campus, and implemented a life-cycle approach to estimate capital and maintenance budgets for the next fifteen years (Strategic Facility Services, 1998). The findings were later compared against the long-term business objectives of the University to gauge the remaining service lives of the individual buildings, centres and facilities.

Over a period of three to four months, a true condition and age profile for each of the individual components of the University asset was prepared, as

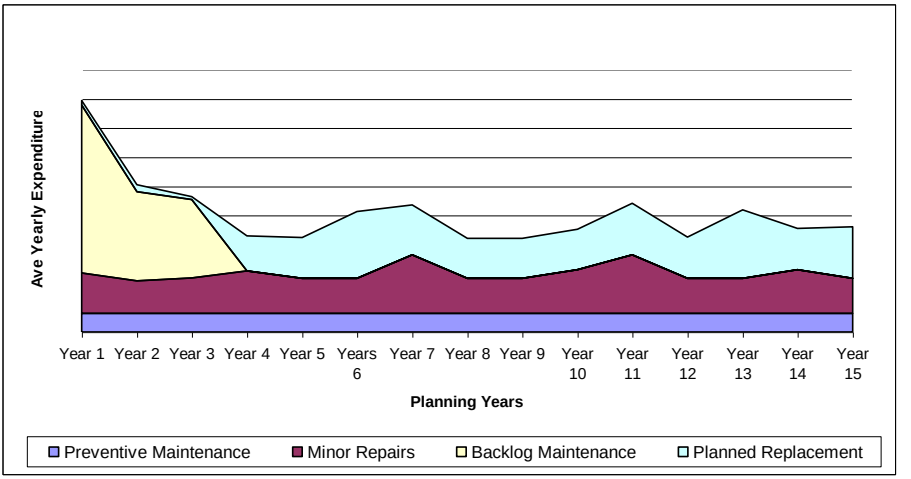
well as a fifteen year life-cycle cost estimation, calculated for each of these asset components. The key issues throughout this process involved:

- identifying viable assets with satisfactory remaining physical and service life;
- investing in assets which carry the most potential to bring returns to the University, in terms of corporate research sponsorships or higher fee paying courses;
- assessing the potential financial, occupational, health and safety risks associated with the asset;
- improving the service life of the assets by accommodating changes in business direction and/ or educational philosophies; and
- managing the asset to meet business and financial success.

It was also acknowledged that changes in education delivery methods from face to face sessions (relying on white boards and other visual aids) to chat room sessions over the internet, has direct impacts on the service life of the facilities. Hence, similar changes to building services and technological supports for these facilities also need to be considered.

Figure 4 shows the life-cycle cost profile for the facilities on campus. Based on the projected life-cycle costs of the remaining assets, a more realistic operation and maintenance budget was approved, including backlog and preventive maintenance as well as capital development budget for the coming fifteen years. Whilst the recommended budget well exceeded the previous years' figures, the University Council was able to grant the additional funds, as the condition appraisal process and life cycle analysis clearly demonstrated the link for directly supporting activities generating substantial revenues for the University in the future.

Figure 4. Life-cycle cost profile for the facilities on campus



Source: Condition Appraisal of the Buildings and Ground of the Campuses of UoW- Strategic Facility Services, 1998.

Further, the process raised the consciousness of the members of the University Council to liaise more closely with the Facilities Director when preparing strategic long term plans for the University, as the commitment to provide excellent educational and teaching services will need to be equally supported by excellent facilities.

Commonwealth Law Court buildings

The Commonwealth Government of Australia appointed a property management firm to manage the prestigious and high profile Commonwealth Law Court buildings portfolio. This portfolio consists of three older estates, four recently constructed estates and a number of leased properties to supplement accommodation needs. The property management firm was

allocated a yearly maintenance budget which appeared to be modest, with no longer-term management funding plan for necessary upgrades and/or renewal for deteriorating components.

The property management firm engaged Strategic Facility Services to conduct a life-cycle analysis of the portfolio, to support their financial plan in managing and operating the assets efficiently. The life-cycle analysis identified appropriate management strategies to support the operational condition of the portfolio and mapped a twenty one year cost program to implement these strategies (Strategic Facility Services, 1999).

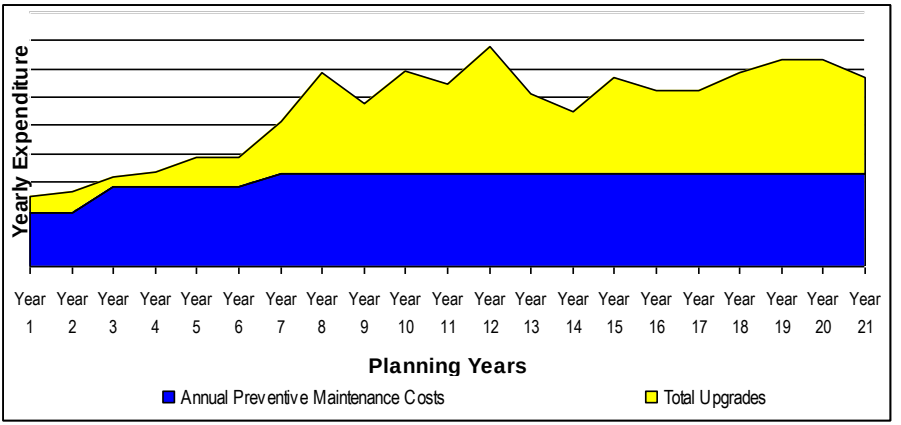
The analysis of the Commonwealth Law Courts Buildings portfolio took into consideration the desired condition levels to adequately support the Court activities into the future. Despite the range of ageing of the various components of the asset, the condition assessment found the Commonwealth Law Courts Buildings portfolio to be in robust operating condition, with minor evidence of diminishing physical and service life. However, the assessment also found that, given the nature of the judiciary systems and the prestigious ***icon profile*** such buildings impose on the general community, it was not possible to apply the same property management and maintenance strategies that would normally be adopted for commercial buildings.

Figure 5 presents the volume of preventive maintenance costs and the frequency of upgrades required to keep the portfolio at the desired condition level. The judicial system demanded that all HVAC, electrical lighting and sound systems were operating effectively at all times to avoid delays and postponement of court proceedings. Such delays will attract penalties due to the high costs associated with the services of lawyers, barristers, judges and the general staff supporting court activity.

The building interior, particular furnishings and fitouts, needs to be maintained at a higher level, to meet the high profile and expectations of the judiciary systems. The unique circumstances of the Commonwealth Law Court Buildings demands high quality finishes and performance and requires extensive and expensive operation and maintenance programs. Such programs further demand a more frequent renewal cycle that would

otherwise be normally expected, despite the fact that these Court buildings may have indefinite service life.

Figure 5. Maintenance budget profile for the portfolio over 21 years

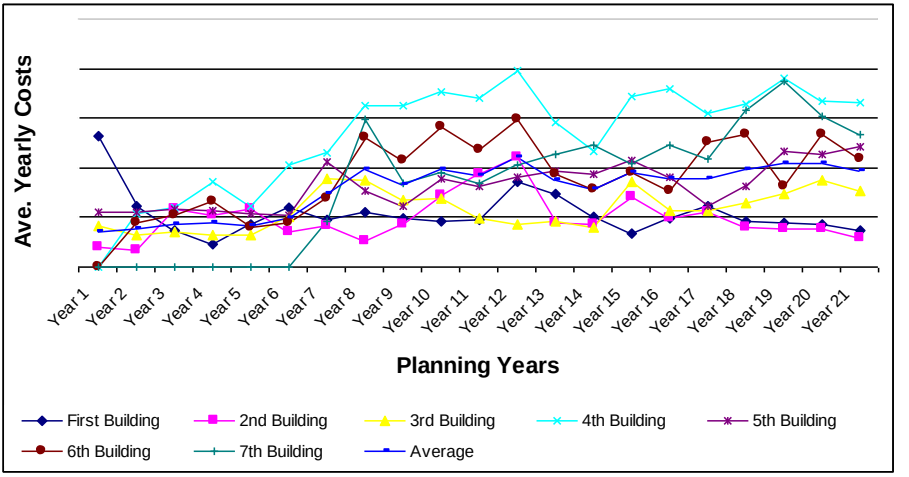


Source: Life Cycle Analysis and Costing Report for the CLC- Strategic Facility Services, 1999.

The 21-year cost program developed by Strategic Facility Services enabled the Property Management firm to establish and confirm an effective financial plan for the successful management of this important portfolio. This program is illustrated in Figure 6 above.

The program further provided evidence of sound asset management plan to the buildings' owner, the Australian Department of Finance and Administration, supported by an in depth appreciation of the unique operational requirements of contemporary judiciary system and a willingness to optimize returns on the Australian Government's assets. This has resulted in the approval of satisfactory funding from the Government, to maintain and operate the total portfolio for the next 21 years.

Figure 6. Life Cycle Cost profile for the portfolio over 21 years



Source: Life Cycle Analysis and Costing Report for the CLC - Strategic Facility Services, 1999.

Canadian Blood Services

The Canadian Blood Services (CBS) evolved from the Canadian Red Cross Society (CRCS). The CBS purchased a series of CRCS facilities in 1998, to continue its business objectives in manufacturing blood products for the North American communities. The selection of the facilities to purchase was based on types of operations carried out within the facilities and their locality, which were deemed to be essential for the CBS at that time.

The true physical condition or age profile of the portfolio was unknown, as limited historical records were provided during the handover. The process of assessing the condition of the real estate was also confounded, as there was no agreed Standard in place to guide these facilities to manufacture blood products in a safe and uncontaminated manner.

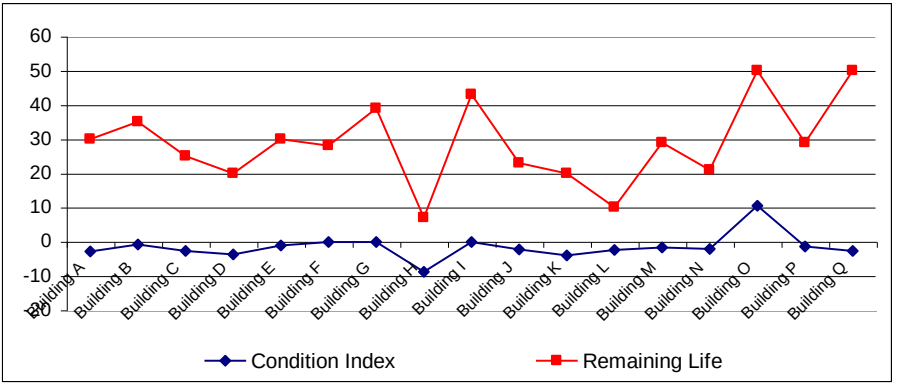
Together with the CBS, Strategic Facility Services in association with HDP Inc in Ottawa carried out a search on a number of existing laboratory

Standards. A decision was finally reached to use the NCCLS Laboratory Design (USA) and the Therapeutic Products Programme (Health Canada) to set the required condition for all CBS facilities.

The CBS later engaged Strategic Facility Services to conduct an assessment of the condition, suitability, space utilisation within the portfolio and to prepare a 5 year financial and implementation plan. This assessment process is designed to bring the portfolio to a condition level that would support the business objectives of the organization (Strategic Facility Services, 2000).

The condition assessment considered the current condition within each area within the facilities against the agreed laboratory condition, taking the life-cycle of their physical asset into consideration. In many cases, it was obvious that the facilities have diminishing service life, due to the CBS changing direction, adopting a more professional approach to blood production. Latest technology in blood manufacturing and stricter health and fire code requirements also contributed to this diminishing service life.

Figure 7. Relationship between the remaining life of the asset (in years) and the current condition levels (indexed).

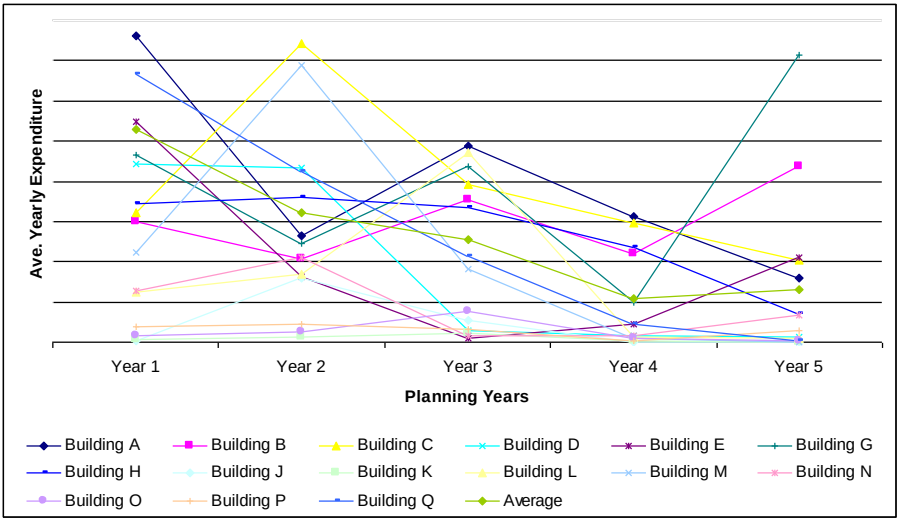


Source: Condition, Suitability and Space Utilisation Assessment of the CBS - HDP-Strategic Facility Services, 2000)

After completing the assessment of the current condition of the facilities against the desired condition requirements, a number of facilities were identified as being deficient. Given the stage of their physical life, it was economically non-viable to invest in and carry out major upgrades to some of these facilities. Figure 7 below illustrates the relationship between the remaining life of the asset and their current condition levels.

A 5-year capital and maintenance budget for the portfolio was established, based on meeting the agreed standard requirements and the operation of facilities in a professional and responsible manner. This is illustrated in Figure 8 below.

Figure 8. 5 years expenditure profile for the portfolio



Source: Condition, Suitability and Space Utilisation Assessment of the CBS - HDP-Strategic Facility Services, 2000.

This 5 year financial and implementation plan was approved by the CBS Board of Directors, as it was agreed that the professional image of an organisation should be reflected through its facilities. The life-cycle process provided a sound rationale for investing sufficient funds to manage and maintain the facilities at a professional standard.

Achieving financial benefits

A life-cycle analysis approach can be utilised to help organizations or developers reap the most from their assets and achieve financial benefits. By preparing a life-cycle analysis of the assets–from development to disposal stage–and using the known cycles as a benchmark, it is possible to find opportunities to reap financial benefits.

Optimising the development process through life-cycle analysis

A life-cycle analysis at the development stage of the asset is useful particularly in finding alternative type of material or technology. Higher capital costs do not translate directly to high long-term operational costs; in fact, it may lead to more economical long-term costs.

Some equipment is not only expensive to purchase and install, but also has high energy consumption and requires special maintenance procedures and follow-ups. The latest technology concept also needs to be treated carefully, as its long term advantages are not yet known and its pitfalls are usually not discovered or disclosed. Some floor finishes are also difficult to keep in good condition, which means that they have shorter life and need to be frequently replaced or upgraded.

The ability or potential for a component to allow for efficient maintenance (maintainability) can determine the long term maintenance costs of the overall asset. Items that cannot be easily maintained will attract higher premiums because of the need for special expertise or special equipment. In some cases,

the equipment is installed in such a position that it cannot be easily reached for cleaning or maintenance.

The development or design stage is also a good opportunity to determine the likely total maintenance and operating expenditure to be incurred over a certain period. There is nothing wrong with having high or expensive maintenance and operating costs, as long as the organization is aware of it right from the beginning and is willing to accept these expenses.

Undertaking a life-cycle analysis during the development stage of a large master planning exercise also provides an opportunity to make decisions on further staged development. Careful timing of the next stages of development may need to reflect both the physical and service lives of the existing stage and the surrounding development.

Finding optimum operation and maintenance costs

As already discussed, maintenance strategies can be adjusted to suit performance and operating requirements. Accordingly, maintenance strategies can be modified to extend the life of the asset so that it can be preserved a little longer at the desired operating level. Such extension of asset life may assist in deferring a projected capital replacement program, or it may buy time before selling the asset at the anticipated boom time.

Maintenance strategies can be intensified for a number years, to ensure high performance and reliability demanded by current tenants bringing large revenues, especially during competitive market conditions. Maintenance strategies can also be reduced, even to the stage of being unreliable, due to a low tenancy rate in a poor market environment; or to run down the asset so that its disposal costs will be minimal.

Whatever maintenance regime is adopted for the asset, its main aim is to preserve the continuity of the service level and the market value of the asset. However, it is also possible to plan for no maintenance to be carried out at all, and expect a shorter physical life-cycle of the asset. In some cases, this may be acceptable, particularly when the capital costs generally are low and that

finances are more readily available for capital costs rather than operating costs. So, in these instances, developers are encouraged to build shorter life assets and continually demolish and rebuild them to meet market demands.

However, this approach to optimising financial benefits will only apply to certain types of assets. So, what works in one region or type of development, may not necessarily apply to others.

Renewing physical life to match service life

Real estate properties tend to require major internal refurbishment every 15-20 years, due to the life span of most internal fittings and finishes. Such refurbishment cycles provide windows of opportunities to align the assets physical state with its projected service life, particularly when a change of image is required or a different usage is anticipated for the asset.

In many cities around the world there are old warehouse buildings in inner city industrial areas, which have been refurbished into office accommodations as industrial activities move to the outskirts of the city to make space for increased demand of office accommodation. In recent years, a number of office buildings in Australia have been turned into serviced apartments, following an increased demand for short-term accommodation in the CBD areas. All of these redevelopment projects were carried out with minor alterations to the building structures and facades, whose economic life span exceeds 100 years. In each case, the asset manager has been able to utilise the potential of the core asset and adapt its role and function to current market demands.

Shopping centres and hotels are being built in many countries, with each presenting interesting architectural features and innovative technologies. However, the public's admiration of their prestigious status appears to be short lived and the public is soon attracted by the bigger and better new hotels and shopping centres which are continually being built.

Does this mean that all of these buildings have a short life-cycle? Or does it mean that developers need to act earlier than the life-cycle scenario originally

projected, to carry out refurbishment or upgrade programs? This can become a costly 5-year refurbishment cycle for many public buildings, as developers strive to achieve a return on their assets.

Planning for effective sale or demolition

By matching the life-cycle of the asset and the predicted market condition, asset and real estate managers can start gearing up to either sell or dispose of their asset in the most economical way at the correct time. They can start upgrading their asset leading to a good sale during a boom. Or, when faced with the fact that the current asset is no longer appropriate, they can start preparing for relocation or building a new asset, and run the existing asset down whilst waiting for a good opportunity to sell it.

Mapping the physical life-cycle of the asset against their service life

Organizations can also achieve further financial benefits by conducting life-cycle analysis of their assets, and mapping them against the projected service life to determine the long-term management direction of the assets. Such organizations generally have set business objectives for certain time periods, but remain flexible to adapt to new demands and expectations. Organization restructuring or change in methods of operations often impact on demands on facilities. The trend for higher fee paying courses in universities will place demand on more presentable lecture theatres, just as modern judiciary system will require installations of computer systems in their often conservative Courtrooms.

Change of government or policy has different impacts on the real estate industry. A policy against foreign investors may mean fewer foreign companies operating in the country. This can lead to vacant office buildings and abandoned industrial estates. What to do with the assets will depend again on the current stage of life of the asset.

Properties generally are given a number of years to adopt to any new planning Codes, as it is not always possible to do so in the short term. The timing to adopt the new Codes may be better planned to coincide with the next refurbishment program. Depending on the nature of the change, it may also be possible that the asset is not capable of meeting the new Codes without radical modifications. This can lead to its disposal or needs a change of use.

Many Asian countries adopt the policy of providing right of use of land or properties to foreign agents, as foreigners cannot own land or properties outright. In many countries, the time frame for such right of use is 20 years. The aggregated life span of most internal fittings and finishes of properties is also 20 years. If the right of use commenced at the time of the construction, this means that at the end of the 20 years period, the local community will inherit a property which will be in need of extensive refurbishment before they will be able to see any return on their property.

All of these issues usually have a direct impact on the local economy, either creating boom or bust conditions in the region, which should be considered when analysing the physical life-cycle of real estates.

Should we start construction projects at the beginning of a bust time? Is the anticipated boom going to coincide with the next refurbishment program? Should we dispose of this property in its poor state during a bust? All of these decisions need to be considered carefully by comparing them with what the asset has to offer within its lifetime.

Reviews and adjustment

Many aspects change over the years as corporate demands and perceptions within organizations shifted, leading to a need for re-structuring and improved image. Hence the life-cycle scenarios of our assets also need to be reviewed regularly, to ensure that we continue to be aware of the potential our assets have to offer, at their differing stages of life.

We may need to adjust the maintenance regime and its operational procedures to support the new requirements, and the costs associated with this change of life style also needs to be examined. We may need to renew or refurbish our asset to suit demands and direction of growth, and maintain the value of the asset.

Regional development

When preparing a master plan of a large development, the life-cycle of our real estate needs to be compatible with the service life-cycle of the surrounding area. Redevelopment of an older suburb often creates interesting atmospheres, but is not always feasible. When our property is caught in the middle of an ageing area, it will be good to capitalise on the possibility of a regeneration; otherwise, we need to consider the options of disposing the property or changing its function to better support the surrounding area. Conversely, when we are surrounded by new growth due to an expanding city development, we need to assess the stage of the property life and see if there is an opportunity to support this growth. This may still mean modifications to our asset to ensure alignment with the surrounding area.

This paper shows how it is possible to achieve financial success in real estate management through life-cycle analysis. However, it is also possible to reap more financial benefits from the synergy developed, where many organizations are planning the life-cycle of their assets. Real estate and asset managers should encourage others associated with the industry, like town planners and developers to take a similar approach.

By involving as many participants as possible in the planning stage, including the life-cycle analysis, it provides opportunity to canvas all the possible external factors that may impact on our real estate, as well as determining the impacts on possible booms and bust in the foreseeable future. It is also a method of assessing and acknowledging the stage of life of the region. And what defines the life of a region? Is it the industry that is being

promoted, the population age, the duration of the current government, the age of the infrastructure, or is it the age of the general real estate?

It may be possible for developers and the general community to collectively make decisions on the most appropriate steps to extend or shorten the life of the region. For instance, it may be appropriate to open a new major tourist attraction in an aging area, to attract more business activities and some employment, and extend the life of the region. However, the infrastructure supporting the region may be at the end of its economical life and will need to be carefully assessed before proceeding with this type of development. Furthermore, what is the likely life of the tourist attraction itself? Is it long enough to provide returns on the original costs associated with renewing the aging infrastructure?

Life has a beginning and an end, but it is possible to intervene with nature, to extend or shorten it, to suit our social and financial needs. By using a life-cycle analysis of our assets, it is possible to find opportunities to optimise the financial benefits that the asset itself provides. Such opportunities can be found even during poor market conditions or when natural disasters occur, provided we understand where our asset stands in its life-cycle.

The key to achieving financial success using life-cycle approach in real estate management is by mapping the physical life-cycle against its service life and those within the region. Expanding the life-cycle analysis to the surrounding region also means providing opportunities for everyone to achieve financial success.

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