AMQ International

Strategic Asset Management

Issue 84, March 22, 2002

Infrastructure Depreciation 249
VS: Taking Asset Management Communication Out of the Middle Ages 256

INFRASTRUCTURE DEPRECIATION

AN ALTERNATIVE TO STRAIGHT LINE

- and we will show you how to do it

There are some issues that draw both engineers and accountants together—or else drive a great wedge between them—and depreciation has the capacity to do both!

However, there is one proposed depreciation methodology that, whenever I have discussed it over the last 8 years with many large groups of both engineers and accountants, has won universal favour. The only question was—how do we make it work?

Two years ago the South Australian Local Government Financial Managers Group, Inc set themselves the task of answering this question and are now about to run pilot tests of a set of guidelines. We will be reporting on these pilot tests and providing a set of 'do-it-yourself' templates, plus examples, as well as sources of extra information and help, in a later issue, but first an update on WHY a new infrastructure depreciation method is needed.

The following report is couched in terms applicable to local government in particular, but infrastructure depreciation is equally applicable to state and federal governments and, with the increasing privatisation of infrastructure services, to the private sector as well. Indeed, a form of this depreciation was first applied by private water companies in the UK.

The introduction of a new infrastructure depreciation standard in the USA has brought the need for an operational set of guidelines into the spotlight, there as well as here.

Researched and written by Dr Penny Burns, AMQ International.
Published fortnightly. Subscription, Comment, or Inquiries to

AMQ Intenational
PO Box 75 Salisbury South Australia
Tel 618 8258 4342 Fax 618 8281 5795
Email: sam@amqi.com Website: www.amqi.com

WHY THE NEED FOR AN ALTERNATIVE TO STRAIGHT LINE DEPRECIATION FOR INFRASTRUCTURE?

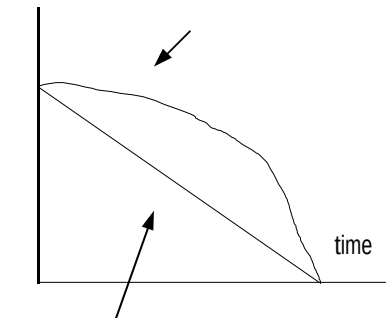

Fig 1

For some time now, councils have been concerned that straight-line depreciation is an inappropriate measure for the annual consumption of infrastructure assets. It overstates depreciation costs at all points (except the very end of life) and thus consistently understates remaining values. (See Fig 1)

Current methods of calculating depreciation of infrastructure assets do not provide useful information for asset management because they deal in averages. While this may be useful for pricing purposes (e.g. for water rates) it is not helpful for management and forward planning, particularly renewal.

But the most serious deficiency of straight line depreciation is that infrastructure assets are not, as other assets are, replaced in their entirety when their value has been used up. Rather they are renewed piecemeal so that their value is maintained at or above a minimum level determined by the service needs of the asset. This generally results in infrastructure values being kept within a range; say somewhere between 65% to 95% of replacement value. The actual range will depend on the criticality of the asset and the nature of the services that it needs to provide. (See Fig 2)

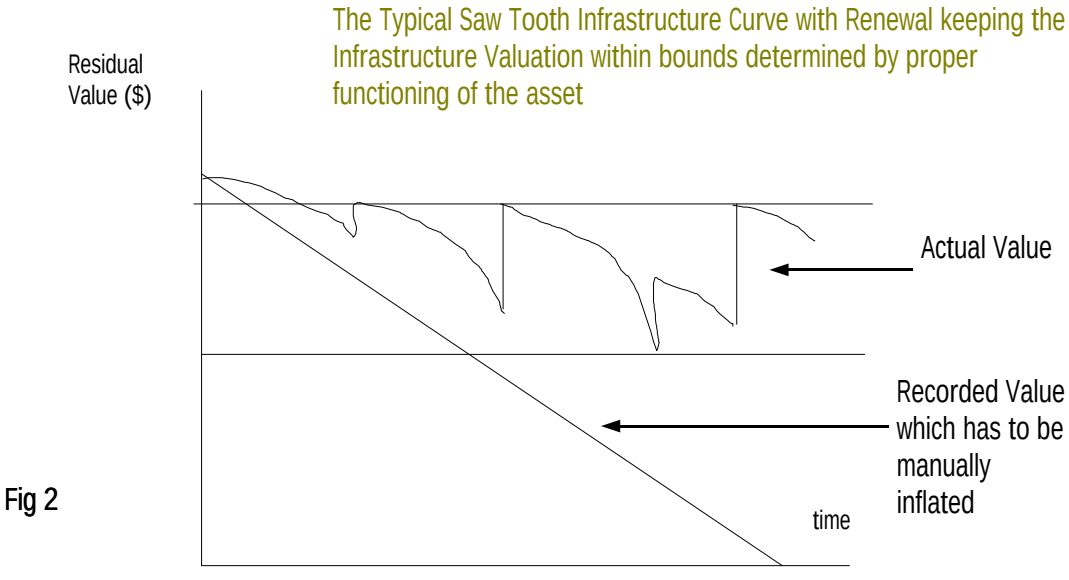

Fig 2

This Saw Tooth pattern of infrastructure degradation brought about by periodic renewal is the norm.

Periodic renewal has two major impacts

(1) it means that the year-on-year change in value does NOT reflect the actual costs of asset consumption – an important measure for asset management, and

(2) traditional formula depreciation (straight-line or any one of the alternatives, such as 'sum of digits' that reflect a change in the rate of value decline over time) will overstate the decline in the real value of the asset – an important measure for accountability.

Furthermore, all traditional formula depreciation approaches assume that the lifespan of the asset is knowable in advance. With ordinary assets, such as furniture, fleet or computers, this may be a reasonable assumption. But it does not apply to infrastructure assets that, *by definition* (see sidebar), can last as long as the need is there.

This is perhaps the KEY REASON why any depreciation formula based on an assumed life is inappropriate for infrastructure. (However, estimating intervention points for renewal is important but this depends on projecting distributions not averages, see over the page.)

THE CHALLENGE TO FIND AN ALTERNATIVE

Few would now dispute that straight line depreciation is inappropriate for infrastructure but the challenge has been to find a suitable alternative that reflects the change in value of the asset within the relevant range (recognising that the value will move both up and down within the range).

The alternative needs to be one that is

- rigorous enough to meet the needs of accountability,
- relevant to the needs of management, and
- not inordinately time consuming nor expensive.

Preferably the alternative measure would utilize the same type of information as that used by good local authority managers and thus reflect what was really happening within the organisation. Such a measure could be a costless 'spin-off' from existing management information.

Infrastructure Asset Lives are NOT infinite but they ARE INDEFINITE, (that is, unpredictable)

There are many definitions of infrastructure asset but the one adopted by the SCARM Report – Water Industry Asset Valuation Study in its report to COAG, and the one now in most common use, is

" An infrastructure asset is a system with two major characteristics:

1. It is renewable rather than replaceable because of its nature as a complex of items, each of which may be renewed/replaced/ or rehabilitated to maintain the operating capacity of the asset system as a whole, and
2. For the foreseeable future, demand is such as to warrant continual extension of the asset system life by this renewal."

It follows from the second characteristic of infrastructure assets that it is not possible to determinate a definite life for any given infrastructure asset. The lives are not 'infinite' but they are 'indefinite' making any life assessment approach inapplicable.

Inquiry was not limited to methods currently acceptable to the Standards Board but looked more widely for a method that would be rigorous and 'management worthy'.

The South Australian Local Government Financial Management Group, Inc. decided that they could not limit their inquiry to those methods currently acceptable to the Standards Boards but should instead look further afield with the intent, should a viable alternative present itself, of then testing this alternative in the field and presenting the findings to the Standards Board for review and inclusion in the options available to councils—as the USA has now done with its 'modified approach' under the General Accounting Standards Board statement no 34.

THE CHOICE

GHD was commissioned to investigate the options and they identified three three contenders:

(1) straight line depreciation (the status quo)
(2) condition based assessment
(3) the infrastructure consumption approach

Of these contenders the first, straight-line depreciation, is currently acceptable by the Standards Board. However it was discarded on the basis of the arguments presented above

The second, condition assessment depreciation, is a variant of the straight-line depreciation method that calculates the remaining value of the asset and depreciates this over the estimated remaining life of the asset. This approach is also accepted by the Standards Board. It results in a series of straight-line segments that approximate to the convex degradation curve expected of infrastructure assets and is thus a closer representation of the actual pattern of asset degradation than the straight-line approach. (This approach is often called "Condition Based Depreciation" see sidebar)

However, being a variant of straight-line depreciation this method still suffers from some of the limitations of that approach. It also suffers from some additional difficulties, the most important of which are:

- Insufficient level of accuracy. It uses asset condition assessments to determine asset values. Since most condition assessments are within very broad rankings, (condition grades 1-5 being the most common) the accuracy of the resulting condition based valuations is not fine enough to measure changes caused by depreciation over a five year period of say an asset with a nominal lifespan of about 80 years.

Condition Based Depreciation—What's in a name?

When I first introduced the notion of a form of depreciation that would be based on maintaining the asset condition throughout its useful life, I called it "Condition Based Depreciation"

But many engineers were applying straight line depreciation in a sensible way to overcome some of the difficulties. They would estimate the remaining value of the asset (based on condition) and then depreciate the asset straight line over its estimated remaining life. At each valuation period both the remaining life and the remaining value would be re-assessed. They called this "Condition Based Depreciation

It is time to face this nomenclature problem head-on—by renaming BOTH methodologies as is done here

- Understates asset consumption. Where renewal activity has taken place, the change in valuation from one valuation period to the next understates the real cost of asset consumption. (And where such costs are included in cost assessments or pricing, decision-making may be skewed).

The consultants, however, correctly considered that condition assessment depreciation was an improvement on the traditional straight-line depreciation.

The third, the Infrastructure Consumption Approach, measures the cost of the asset service potential consumed during the period. This is approximated by the cost of maintaining full service potential over the given planning period. This is sometimes also referred to as the 'renewal annuity' method since the process is to identify and then cost and time the justified activities required to maintain the service potential of the asset over the next ten years (30 years in the case of very stable water and sewerage assets). Depreciation is then measured as the annualised amount (the annuity) required to offset the decline in service potential and so maintain the infrastructure asset in full functioning form. (And it is the method that I have referred to in the past as "Condition Based Depreciation" - see sidebar on the previous page and also sidebar on this page.)

The Infrastructure Consumption Approach (ICA) is not currently accepted by the Standards Board because it is not based on the valuation of the asset but is based instead on the costs of maintaining service potential. It is consistent with the Statement of Accounting Concepts No 4 but not with the standards.

Nevertheless the ICA has a number of advantages for management. It is

- **More reliable**. All councils have been advised to develop asset management plans and most are in the process of doing so. ICA takes advantage of the information gathered, evaluated and analysed for these plans and thus presents a more reliable estimate of asset consumption that a generic formula based approach.

- **Cheaper.** No extra data or processing is required above that for good asset management.

- **Technically auditable**. The data and the assumptions that go into the construction of the asset management plans can be technically audited and verified. There is no way to verify the 'economic life' assumptions used in straight line depreciation (to do so would evidence to be collected over the entire life distribution, about 80 years for an 'economic life' of 50 years.)

Definition:

Infrastructure Consumption Approach (ICA)

The ICA approach is based on the notion that for infrastructure assets which are periodically renewed indefinitely, the cost of renewal is the best measure of the periodic run-down (or depreciation made good) of the asset.

The method is to estimate the cost of renewal (by a rigorous process of planning and cost justification) over a reasonable forward planning period—for councils, this is usually about 10 years.

This is then annualised to provide an annual cost of asset consumption. This is why this approach is sometimes referred to as a 'renewal annuity'

Why do accountants reject renewal annuities?

Unfortunately, when this term was first used it referred to a system where ongoing renewal was simply assumed and not proven—and hence it was rightly rejected by the accounting profession.

How to Calculate ICA

The ICA approach is based on the agency's Asset Management Plans. With these plans, ICA is a costless spin-off.

Even if you do not have a good set of asset management plans, however, it is still possible to do ICA.

And in a later issue of SAM we will show you how in a set of carefully worked out templates with real life examples—and sources of further help.

ICA can be adopted by anyone with benefit as a management tool.

And,

There are moves afoot to have it considered by the authorities also as a **Financial Reporting Tool**.

The South Australian Local Government Financial Management Group, Inc, received very solid support from the National Local Government Finance Management Meeting when these Infrastructure Depreciation ideas were presented.

And it is

- **Easily Updateable** as technology changes or information improves, as it is based on estimates of replacement for *specific* rather than general asset components.

WHERE IN THE WORLD?

The consultants were asked to examine infrastructure depreciation practices throughout the world to see if an improvement on the straight-line approach had been employed elsewhere.

The study showed that just as Australia (and even more so, New Zealand) were in the lead in terms of adopting accrual accounting for municipal asset reporting, so were they in the lead in terms of measuring more relevant forms of infrastructure asset consumption.

The Consultants noted that straight-line depreciation was common throughout the world *but that current valuation of infrastructure was not.* For example, the UK has adopted current value reporting and accrual accounting (with depreciation) for its property assets, but has yet to do this for its infrastructure assets, which are still valued, and depreciated straight line, at historic cost. Canada is also still using historic cost valuation.

Applications Within Australia

The Victorian Irrigation Industry has used ICA as a management tool since 1994 where the transparency and accountability of the straight-line depreciation alternative eased the fears of irrigators that they were being overcharged.

Following a major study on transparency of costing and pricing, ICA has been recommended as the standard for all Australian water industry businesses.

The Road Traffic Authority in New South Wales has operated with ICA for over ten years, based on annual condition assessments using its pavement management systems.

Using ICA to Avoid Double Counting

New Zealand Councils explained to their Auditor General that, given they were constantly renewing their infrastructure, to be forced to also depreciate it would be to indulge in double counting.

The Auditor General gave councils the option of SL depreciation or what they called the renewals annuity approach provided that councils could demonstrate that they were, in fact, maintaining their infrastructure assets—in other words that they had soundly based asset management plans.

Applications Outside Australia

New Zealand adopted a form of ICA in 1994, after the Auditor-General attended the National Accountants in Government Congress in Hobart in 1993 where the original work that I did on this form of depreciation was presented.

At that time, there was no standard prohibiting its use and the Auditor-General, gave councils the option of using the ICA variant or straight-line depreciation. (see sidebar) Councils recognised the advantages and were not slow to change over to the ICA variant, which gathered more adherents every year reaching about 70% of councils before the Accounting Standards Body brought down a standard in 2000 prohibiting its use based solely on the argument that it 'did not comply' with accounting regulations. There was no attempt on the part of the Standards Body to argue which approach was more reliable, efficient or useful.

Many councils in New Zealand are now producing two sets of accounts, retaining the ICA variant for management purposes. There is still considerable interest in New Zealand, both in the Audit Office and within councils, for a form of ICA that would be acceptable to the Accounting Standards Board.

UK Water Businesses have used a variant of ICA for the past decade or more and a similar system has been recommended for other UK utilities although not adopted at this time.

USA "modified approach" for infrastructure. The USA has debated, for some time, the problems of accounting for infrastructure. In 2000 it released its new infrastructure accounting standard, GASB 34. This requires agencies to value their assets at current values and depreciate them straight-line **OR** to adopt what it calls the "modified approach", basically to estimate the cost of maintaining full service potential for their assets, in other words ICA.

The consultants realised that with the major infrastructure market in the USA moving in the direction of ICA, this could also influence Canada and other markets that follow the lead of the United States.

The movement towards the Infrastructure Consumption Approach is thus strong. Once the South Australian pilot studies have been conducted, we will bring you more information on this valuable management tool.

The VS:
Taking Asset Management Communication out of the Middle Ages

In the Middle Ages, news travelled slowly. Travellers were keenly welcomed into homes to bring news of the wider world (often just 20 miles away!) Today we have newspapers, radio, TV news and, of course, CNN with world news on the hour and 'as it happens'. For general news we are now well served, but what about our specialised needs for asset management news?

Until now asset managers have been left back in the Middle Ages. Going to conferences is like attending the annual village fair in the hope of meeting travellers with news of the wider world, whilst association's professional journals might be likened to the present day version of information exchange within professional guilds.

The VS has been designed to take asset management out of the Middle Ages –

A temporary hiccup!

But not just yet! At the 11th hour, we have come across a problem outside our control. It is being fixed but will take another few months. Still, leaping a few centuries since the Middle Ages is probably worth waiting another few months!

Rest assured, SAM readers will be the first to know

Strategic Asset Management is $220 (incl 10% GST) for 26 issues with complimentary binder and cumulative indexing. To Subscribe, complete the following and post to Strategic Asset Management, PO Box 75, Salisbury, SA, 5108
Or Fax to Strategic Asset Management, Fax # (08) 8281 5795

Name _____
Position _____
Company _____
Address _____

Phone _____ Fax _____
Email _____
Signature _____