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Puzzles and Paradoxes

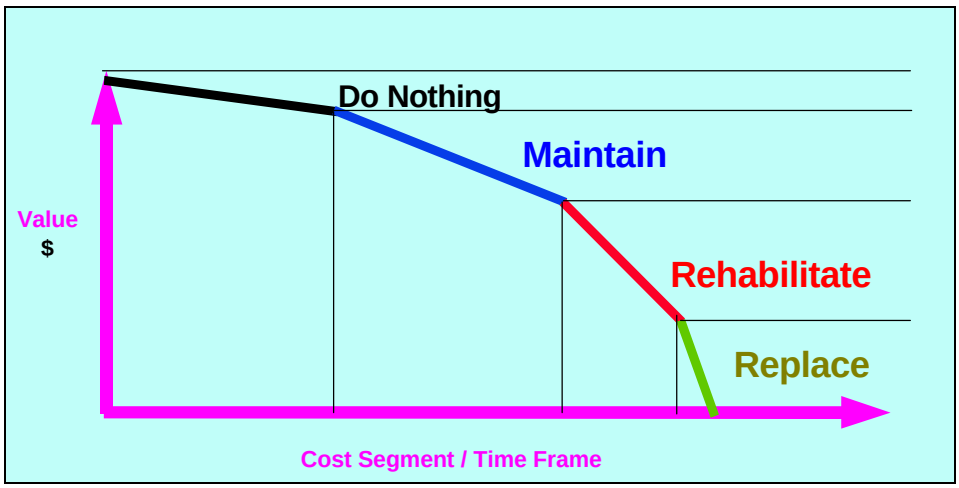
There are a number of puzzles and paradoxes in Asset Management. Here are some of them to ponder on over the coming holiday break.

1. (from engineering)

The Degradation Curve

The degradation curve is a model showing how an asset degrades over time. They have been determined for a range of infrastructure assets but are most used in the area of roads and drains.

The paradox is that the degradation curve provides 'a guide to corrective action' – *but it is only relevant if you ignore it!*



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As Phil Holloway, Ballarat City Council, pointed out in his 1998 prize winning competition entry, this model really only has relevance if the description of the cost segments are changed to:

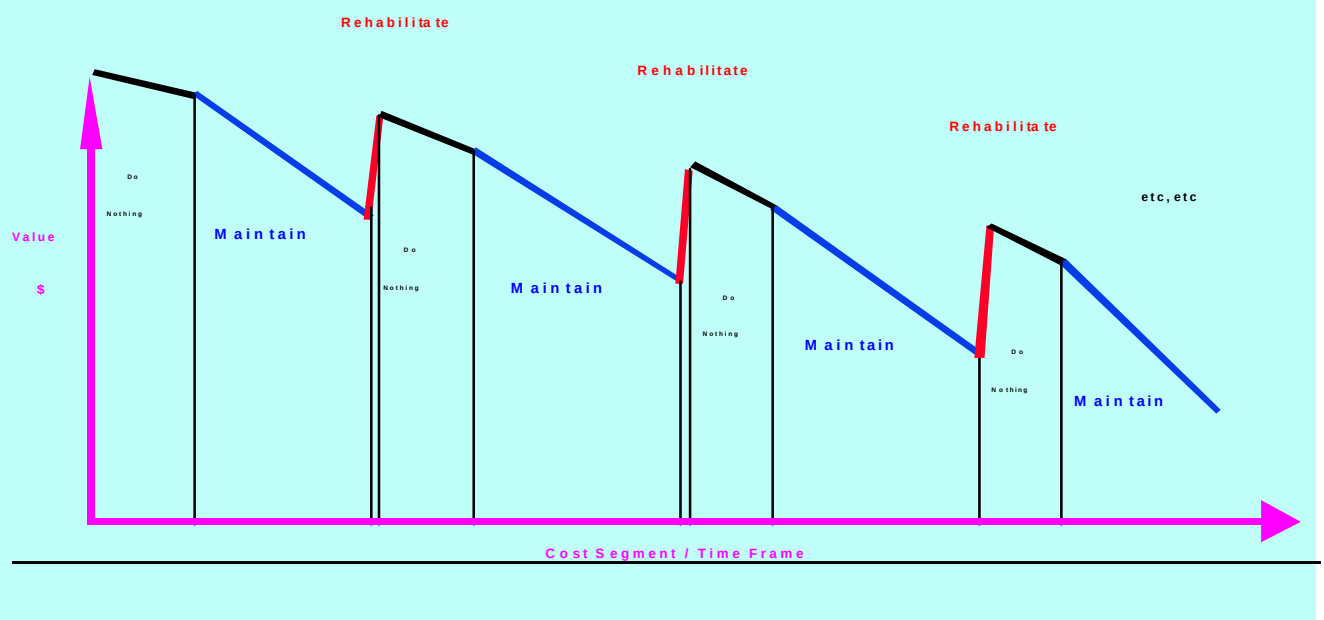
- Should **Maintain** But Didn't!
- Should Have **Rehabilitated** But Didn't!
- Have To **Replace**!

In other words, the degradation curve only remains a valid corrective prescription as long as the recommended action of the previous segment is ignored!

If the prescribed recommended action DOES take place, then the curve itself changes.

For example if rehabilitation takes place periodically it extends the time at which the asset will eventually need to be replaced. But undertaking the rehabilitation doesn't simply shift the remainder of the curve to the right, it radically changes the shape of the subsequent segments as can be seen in the following graph.

Hence the paradox! And hence the difficulty of applying degradation curves in practice.



2. (from valuation)

Replacement Cost

Some Valuation Puzzles

Does the cost of constucting an asset on a greenfields site give (a) the right replacement cost or (b) the correct asset valuation?

Company A lays underground electricity cable in a conduit. It costs $200 per metre to do so. When the time comes to replace the cable it is a simple matter of dragging the old cable through the conduit and pulling the new cable in behind it – replacement cost per metre, just $50 per metre. *What is the replacement cost $200 or $50 per metre? What is the replacement value of the asset?*

Company B lays underground cable directly in the ground. This saves on the first up cost and the laying cost is only $100 per metre.

When the time comes to replace, the work to replace is more extensive than the initial first up laying work for now the cables lie under a road surface that needs to be cut in order to lay a new trench and a new cable. The cost of replacing the cable works out at $150 per metre. *What is the replacement cost $100 or $150? What is the replacement value of the asset?*

It is common practice to calculate replacement cost by the cost of a new asset constructed on a Greenfield site. For company A this greatly overstates the replacement cost, for company B it greatly understates it. *What's the answer? (All costs illustrative only and stated in real terms)*

You might say that we should value at the cost that it will actually take to replace. In which case, consider the following:

Is "replacement cost" the same as "replacement value"?

A council in a long established area has some beautiful old street trees. If the trees were to be destroyed, they would be replaced but with younger specimens, perhaps saplings. *Is the value of the old trees the cost of the saplings?*

A school has an old wooden building that no longer complies with the building code. The school has determined that when the building is replaced it will be replaced by a modern brick building with air-conditioning, carpeting, and fully equipped for today's computing generation. *How should the existing building be valued, by the cost of its replacement with the new style building*?

In case you think that these are invented examples, let me say that examples of valuable old street trees valued at sapling prices, and scruffy old buildings valued at the cost of modern updated equivalents DO actually exist! And in each case the answer is "we apply the replacement cost approach". Examples also exist of the laying of cables directly in the ground and in conduits and in each case the replacement cost has been determined by reference to the initial cost. Even more interestingly, it would seem that none of these practices has been questioned by the relevant auditors. Which is another puzzle.

3. (from Finance)

"Less is more"

This is most commonly applied to the architectural style known as minimalism. It is a paradox taken to heart by treasuries that call a 3% budget trimming an "efficiency incentive"! We all tend to act as if more money would cure all of our problems and few would see a lack of money as an advantage which is why the following is so interesting.

A young, untutored, Australian film maker wanted to make a feature film but he had no money. He sold everything he had and raised $20,000 and borrowed another $20,000 from friends. In a world in which feature films cost $40m and up, he made his film "Occasional Coarse Language" for a budget of $40,000. It was picked up by Roadshow and distributed in Australia where it did very well. It was then taken to New Zealand.

I was in Auckland when it was launched there and the young film maker was interviewed on television. When asked how he ever thought he could make a film (for which, incidentally, he wrote the script himself 'over a weekend, while watching the test match') he replied

> " I figured I would never again have the freedom that having no money gives you. Funding ties you up with all sorts of conditions, constraints and responsibilities. When you have no money *you are free to be resourceful"*.

(my emphasis)

Do your 10 year plans show a hump of expenditure in the early years tailing away in the later years of the plan? It's as if everyone had a Keating "J" Curve fixation (best described as things have to get worse before they get better – but then they don't get better!) We seem endlessly to be promising a more rosy future that never eventuates.

Daniel Buros is a futurologist specialising in technical trends. He says "Most plans fail because they start with the present year - year one – and proceed to year 2, year 3 and so on. As a result, all of the specifics tend to be front-loaded and based on current reality. As the plan carries forward it gets more and more vague".

Buros recommends "Think 10 years out and plan back to the present". In other words, start with a vision of what your council, organisation, or company is going to look like in 10 years time. What kind of customers will you have and how many? How will you be organised to cope with the world as it will be then? If you think about this, it is petty clear that without a picture of a desired future state, the ten year plan has no where to go!

Special Issue on the Future of Asset Management Coming in the New Year - and you can be part of it

What will be happening in asset managementover the next ten or so years? I have asked futurologist, Annie MacBeth, from Annimac in Western Australia to write for our special New Year Issue of SAM. Annie is in great demand by infrastructure organisations in WA that want to have some idea of the shape of the future to help in planning their long term infrastructure needs. Annie will be joined by some far thinking readers who will give their ideas on "where asset management is going in the next century", or at least in the early part of the new century.

If you would like to be part of this special issue, please email me at info@amqi.com and I will send you a pre-publication copy of Annie's paper to inspire and prompt!

- see back page (p.192) for more ideas about the future of asset management

Lease or Purchase?

First thoughts can end up as lasting regrets if you do not check. Avoiding mistakes won Lee Gannon, Statewide Asset Services, Queensland Health, a *High Commendation* in the *International Asset Management Competitions.*

An opportunity arose for Queensland Health to purchase a building it was leasing. Under government guidelines, since it had spent $800,000 in refurbishment since 1990, it was able to buy the building for land costs only. The site was well situated, had the expansion capacity required to house the newly amalgamated health services as well as take care of growth, and seemed, on the face of it, to be an excellent proposition. So good, in fact, that many organisations would have carried out only perfunctory examination before going ahead. Statewide Services, however, examined this option against no fewer than 9 other options. The results showed conclusively that not only was this 'build' option not the best, *NO* 'build' option rose higher up the ranks than 5th or 6th. The department was influenced by the analysis to lease its new accommodation.

Since this decision, which turned around the initial thinking, the SAS units has investigated and designed guidelines for assessing lease/ purchase options, incorporating the learning from this exercise into future decisions.

Lee Gannon, Statewide Asset Services, GPO Box 48, Brisbane, Qld, 4102

BARWON WATER:

Using Valuation to Create an 'information tool'.

Award for Asset Management Excellence

Valuations are Inescapable.

Every agency is now required to value its assets. You cannot escape it. Your only choice is whether you opt to treat valuation merely as a 'compliance' issue or whether you take a more pro-active management approach. Barwon Water Authority chose the latter.

But Management Information is Optional!

The external requirement for revaluation could have been met by either a desk top database aggregation or a summarised valuation technique based on soil type, asset class, diameter, commissioned year and material. Each would have provided some broad scale information in addition to meeting the immediate financial requirements. However when the Authority considered how many people would be able to use the data so provided, and what use they could make of it, it realised that it was limited to those who had access to the databases and the information available was of little use for future planning and management.

So Barwon chose to undertake a valuation modelling process that would build on existing physical data to yield a useful base for asset management. This took longer and cost more but the Authority now has an established methodology that provides a high level of confidence in the valuation outcomes, will deliver long term savings in revaluation as the entire process is now automated, is integrating valuation data into decision making, and can be accessed widely by Authority personnel.

Barwon's Reticulation Asset Revaluation Project

Building on previous work

The valuation study built upon previous work. In 1995 Barwon had carried out an inspection of all above-ground non-current physical assets, which included an evaluation and conditional assessment of the assets. Identification and data capture for below-ground infrastructure assets needed for the implementation of a geographical information system (ProFIS) was completed in 1997/98.

In 1997/98 the Authority had also

- Reconciled the above-ground assets identified in 1995 with the asset information held in the Prophecy Financial System and updated the value of these assets to June 1998.
- Identified and classified all below-ground assets in accordance with relevant accounting standards and recorded them in Prophecy
- Assigned a value to these assets based on the methodology recommended for government trading enterprises.

The Challenge

Having achieved valuations for the above-ground assets, the challenge was now to do the same for the below-ground assets – a much more difficult task.

Criteria/Valuation Assumptions

The valuation was to be based on the deprival value methodology. This is represented by the optimised depreciated replacement cost of Barwon Water's infastructure assets – the loss it would incur if it were to be deprived of the assets. The following requirements/assumptions/criteria were established:

- The modern engineering equivalent (MEE) of the existing asset would be used
- Replacement assets would be designed to meet the current service demand of the respective systems including any statutory or environmental obligations
- Systems would be optimised in terms of

the configuration to eliminate redundancy or unnecessary duplication
- Current techniques and materials would be used in constructing the replacement assets
- The optimised current replacement cost would be written-down to take account of the elapsed service life

In essence this approach replaced the existing network with an optimised network utilising contemporary techniques and materials.

The Methodology

The below-ground assets were to be held *summarily* in the financial Asset Register with an interface into the physical database or ProFIS system. This ensured all necessary detailed information was available from ProFIS, avoiding inefficient duplication of data and the overloading of the Financial System. Valuations for each reticulation asset class were conducted at the asset level and rolled up to a consolidated asset within the Financial System Fixed Assets Register.

The rate of depreciation was calculated using the sum of the elapsed time of each asset together with the remaining useful life of the MEE. The depreciation rate is assumed to be linear over the total life of the asset. When the remaining life is re-assessed, this rate may change.

Engineering consultants Fisher Stewart prepared a tabulation of current replacement costs for the range of asset types in the reticulation networks. This table provided current cost (as at June 1995) unit rates for water and sewer reticulation pipelines and components, such as manholes, valves and vents. It was presented as a matrix which took into account:

(for water and sewer pipelines)
- diameter
- pipe depth
- type of material
- construction techniques related to ground conditions and surface restoration
- location of assets, and
- current replacement technology

(for components)
- manholes, for a range of depths
- water main valves and fire-plugs, for a range of diameters.

Barwon Water engineers updated this matrix in 1997 for use in estimating the cost of developer constructed vested works. It is regularly tested against actual tendered prices for construction works, with results indicating the rates are within 5% of the current competitive market. Engineering consultants, Gutteridge, Haskins & Davey (GHD) were engaged to review the matrix and have confirmed the accuracy for all rates in the matrix.

The valuation of below-ground assets was determined by applying the standard rates in the MEE rates table matrix to the respective assets in the optimised reticulation networks.

Value to the Authority

The system minimises the drain on resources inherent in revaluation since the rates are automatically updated as a by-product of ongoing letting of tenders and the updated rates can be automatically applied to all components in the system. Major MEE revisions need take place only very infrequently, or when radically new techniques are developed. Reports from the system are easily produced.

Value to External Parties

Currently the authority records assets for the City of Greater Geelong within the ProFIS system. As the authority spans several Shires and Councils, this opportunity is also available to other local government organisations.

Further information on the Reticulation Asset Revaluation Project (RARS) can be obtained from Wayne Welcome who will not only happily, but enthusiastically, meet your needs. *Contact:* 61 (0) 3 5226 2345; or waynew@barwonwater.vic.gov.au

Every year I travel around the country meeting with asset managers and I am constantly being asked how to secure a bigger budget for maintenance and asset management. On reflection, the best advice that I can offer is to

STOP COMPLAINING!

I am sure that you have noticed how senior management readily devote many hundreds, thousands, even millions of dollars to new capital works but begrudge cents to maintenance and management. But have you ever tried to *seriously* ask why?

When, for example, was the last time that a successful *new* project proposal was promoted in negative terms? They are not. New projects promise only positive images – new assets, new horizons, expanded service delivery, enhanced quality. New project proposals stress the positive benefits, the desirable outcomes.

Contrast that to the general way that maintenance programs are promoted – focussing on disasters to be avoided, poor performance to be dealt with, unreliability of existing assets, risk management, future problems.

The typical maintenance/renewal proposal is, in fact, full of negatives!

Given a choice, what would you, if a CEO, prefer to go with?

Be Positive

So, stop complaining. Present your maintenance/renewal programs in the glowing light of positive SD outcomes in the way that the proponents of new capital works do. Don't talk about reducing negatives (ie reducing the probability of breakdown); speak about *increasing* reliability. Talk in terms of *improved* performance, *enhanced* service delivery.

Forget the negative scare tactics.

This aversion to negativity may be something in our collective psyche. Remember the political debates and the on-screen 'worm' that recorded the audience's approval rating of the speakers? Every time one of the speakers made a negative comment (whether in general or about the opposition), the approval ratings *turned down*!

I reckon that we all like to be positive. And negatives make us despondent. So it may not be *what* you are selling (ie maintenance and renewal) that is failing to capture the decision makers' attention, but *the way you are selling it.*

No Votes in Maintenance?

In support of this, it is worth mentioning that despite the commonly voiced opinion that "there are no votes in maintenance", the SA Government, some years ago and going into an election, deliberately chose to by-pass the normal practice of announcing new schools for marginal electorates and, instead, opted to allocate the same level of capital funds for the education sector but across all electorates in the form of catch-up maintenance allocations.

The Government had been sold on the positive impact on the many as against the few. It worked. Frustration levels in the community fell. School communities felt empowered. And the Government was re-elected!

Asset Management is in the News!

- and it will stay!

Two major power outages and a rail disaster in Australia have brought asset management into focus in the press this week.

Greater demands on asset managers can be expected.

As State power companies move to adopt 'leaner, meaner' commercial practices, whether or not they have been privatised, the first thing that goes is wasteful excess, under-utilised capacity. Without the buffer of spare capacity, managing risk of outages becomes a matter of managing the assets better. 'Routine' maintenance gives way to 'just in time' maintenance, and the ability of the asset systems, and the asset managers, to correctly determine maintenance priorities becomes paramount.

More money for maintenance too simple an answer.

Richard Bevan, chief of Transend, Tasmania's transmission company, lost no time in putting in his bid for greater funding saying, on the evening news, that the incident "highlighted Transend's need to spend around $50 million a year for the next five to ten years to ensure the ageing system's reliability". But the Regulator will be seeking to ensure that Transend is managing its assets correctly and wisely allocating its existing $54 million maintenance budget before recommending price increases.

Issues like this will put a greater onus on asset managers in coming years. The reliability that used to be provided inefficiently through excess capital, now needs to be provided by better asset management. Compounding this is an increased level of community expectations.

Increasing community expectations

As Bevan observed, "Because the power is so reliable, there is a community expectation that it never will go off and, of course, when it does, all hell breaks loose". Indeed! But now asset managers must rely more on their wits and less on funding to keep the lights on and other services running.

More publicity

Asset management is not a 'safe' backroom technician's position. Asset management *will* be in the news. You can be pro-active, coming out on the front foot, as Richard Bevan has done, or fight a rear-guard action. Either way, the pressure is now on and will only increase. It is worse when the incident involves loss of life. What is the role of the faulty signals in the Glenbrook rail disaster? The track at the centre of the Glenbrook crash was reportedly inspected five days before the crash the rails renewed just a year ago and the signals at the crash site were replaced in November, 1990. The particular area of line between Springwood and Penrith had $3.2 million spent on it for maintenance in 1998-99 with a projected $3.6 million budget earmarked for maintenance in 1999-2000. On the face of it this does not suggest that it was the assets that were at fault. But recent TV coverage has brought the earlier Glanville disaster, which happened in the same area, to the public attention and more questions will undoubtedly be asked.

More accountability

Questions of compensation have already been raised in all instances. Performance measures are already in place in the Victorian Water Industry, and companies such as Yarra Valley Water have adopted voluntary programs for compensation in the event of lengthy outages. Similar practices may well be coming for electricity, and possibly for other services. Compensation for loss of life, however, is difficult to handle.

And, paradoxically, less accountability

When States had monopoly suppliers it was clear who was responsible for supply. With competition the issue is far from clearcut. The Adelaide power cut hit just days before the lodgement of final bids for the first stage of the state's power privatisation program. When several companies supply capacity, subject to price regulation and other controls, who will be responsible for a general capacity shortfall? Who determines whether such a shortfall does, in fact, exist? Finding answers will impose heavy demands on managers to utilise their assets to best effect – *and to show that they are doing so* – but regulators will also need to understand more about asset management in order to do their job.