

Talking Points



What are asset managers talking about now? Here are some of the issues that have been raised in the discussion forums in the last several weeks – plus a comment on risk analysis (on page 540) as the all encompassing solution.

- Is Finance right when it argues an NPV case against “maintenance now” – and thus causes early renewal of the asset?
- What are the cultural changes and potential pitfalls of starting an asset management program?
- Reconciling design life and asset life
- A practical calculation of building maintenance – and the ‘Sherman-Dergis’ formula

Want to have your say?
Don't believe that these are the 'real' key issues?
The answer is a simple one
Add your ideas to www.amqi.com/forums

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Some discussions have attracted attention over a long period of time, for example, the following from the Discussion on "The Commercial Reality of Asset Renewal"

1. Query: To be or not to be (maintained that is)

Chris A led off the discussion (Jan 29 2003)

"[given a choice between maintenance that would extend life, and saving the maintenance money now but renewing earlier as a consequence] most asset managers would favour undertaking the maintenance works, while an NPV analysis might show that the most cost effective solution is to NOT do the maintenance now [and take the consequences of earlier renewal].

Of course, when it comes to the utilities industry, the commercial considerations are only one part of the equation.. the water industry plays a central role in a range of significant social and environmental factors....

So I would suggest that renewal decision be accompanied by both a risk analysis as well as a commercial analysis."

2. Suggested: A rating system for assets (cf the energy ratings of washing machines?)

Roger Thompson wholeheartedly agreed with Chris A. (June 13 2003)

"The risk to the business of failure, the disruption to the business continuity of having to replace an asset, the impact of this disruption to the 'clients' of the business, all need to be considered.

Wouldn't a method of scoring products and materials in relation to life cycle value which considers costs, disruption, environmental issues, business criticality, etc. be useful? Why does this not exist.?"

3. Life Cycle Costing - It Costs!

Guest (June 21 2003) pointed out that a great deal was involved in developing good costing models – and supports his argument with the detail that must be covered. In his long list of items there is a detailed operational and maintenance risk assessment as well as criticality analysis. He concludes:

To get there (ie a complete life cycle cost plan for an asset) the entire process will last between 3 months and 3 years, depending on the size and complexity of the industry.

4. Whose benefits? Whose Costs?

Ashay Prabhu (July 17,2003) observes that while from an agency point of view the best option may be to do nothing, this often does not take into account the cost to the USER.

Shao Ng (July 18, 2003) currently has the last word in this discussion.

...For example, the costs considered in the management of a road might include the road agency costs for maintaining and operating the road, and also the road users' vehicle operating costs on fuel and repairing of their vehicles after using the road. **If the road agency desires to spend less on maintaining... road users will have to spend more....**

From Discussion "Drainage—Are 'Service Delivery' lives the answer?"

The discussion on asset lives is also a perennial – this one started in January with an observation by Max Benefit that for drainage pipes the structural condition is not a good indication of its service capability (see also SAM 106)

1. Structural versus Hydraulic Condition

Recently the issue was picked up again. **Stewart** (June 26, 2003) drew attention to the difference between structural condition and hydraulic condition. He said that it was hydraulic condition that was more relevant for service delivery. He argued that the discussion to date had assumed that these aspects were unrelated.

“However, deterioration of structural capacity implies an increasing risk of pipeline collapse. This may result in: Total and sudden loss of hydraulic (service) capacity; Damage to, or destruction of, adjacent public or private infrastructure such as road pavements, buildings, etc.; Potential injury to people; Inconvenience and economic loss to the community while repairs are undertaken. The real question then appears to me to be ‘when does the risk of the adverse consequences occurring become great enough that replacement is warranted.

2. Design Life versus Service Life

Stewart also points out the difference between design life and service life. Design life, he suggests, is the time at which assets START to decline, it is the leading edge, the 5% percentile of the failure distribution. Service Life, on the other hand, is the mean of the distribution. An important and useful distinction!

The challenge, he suggests, ‘is to develop a mechanism that equitably considers the serviceability (hydraulic) condition and the structural condition based on an assessment of business risk arising from the collapse.

3. Approaching Functional Life?

Guest (June 26, 2003) agrees with this risk based approach and suggests an approach similar to the ‘functional life’ approach that we discussed in the last SAM issue (No 118)

Basically it goes away from the ‘how long will the asset last’ to ‘how long will it be until the combination of factors that affect service become so great that the asset will be replaced’ Condition +Risk/Criticality models (such as in SAM 109) are helpful in making this decision. They will give a different answer in every single case....

4. When Analyses Conflict

D Watt (July 18 2003) responded that he uses 'a strange mix of service delivery versus asset condition versus serviceable life'

His example runs like this:

"Inquiry of a particular road section for all asset conditions.

- All models indicate perceived hydraulic deficiencies within the water and sewer underneath the section.
- Pavement Management System shows road base failure.
- Data warehouse gives ages and materials of construction that are less than desirable.
- Financial model shows items are beyond their 'best bang for the buck' rehab period.
- MMS does not show any complaints or failures related to the system.
- Criticality analysis shows that the three items serve one farmer at the end of the road.
- Modern asset management theory would dictate that this analysis shows a subsection of the system that requires immediate attention, however the criticality analysis and MMS shows otherwise."

Editor: One has the feeling that this is not the end of this discussion!

While some discussions may take months to get started, others simply seem to take off! Like this one . The query was posted on July 21 and by July 22, two very thoughtful comments had been received.

You can read them in the discussion forum "*Cultural Changes Required for Effective Asset Management*"

Mike Rudge (July 21 2003) started it off

"We have a client who is just starting on a programme to improve asset management systems and processes. Before they start they wish to understand the cultural changes required and potential pitfalls that they may come up against."

He sought case studies or examples in the fields of

- governance,
- organisational structure,
- decision making,
- IT systems implementation,
- customer service, and
- personnel issues (eg information hoarding, etc.)

These two responses are, I think, worth giving in full

1. Asset Management and Governance

Chris A (July 22 2003) writes: Great subject Mike!!!

"I can't say that I'm a guru in organisational behaviour but I can give a couple of examples on how to/ how not to improve governance.

I think that issues of governance needs to be sorted out at a whole of business level. I've done this by developing a business charter which states the roles and responsibilities of the owners (typically local Councils), of managers, and customers. This helps to clarify exactly who is responsible for what. As part of improving the overall governance of a business, we have recommended development of an Independent Board (or an Advisory Committee) which assists with the development of strategy and oversees its implementation. Seems like a good idea, right? OK, heres the good and bad sides.

First the good - One Council has done this and it works very well. By appointing external expertise, the business benefited from the broader (in this case process and accounting) expertise. The advisory committee also brought a certain amount of objectivity to the businesses review process which the Councillors have liked. So, this is working well.

Now the flip side - Another Council also has a Advisory Committee which has come badly off the rails. With little in the way of a formal charter, some committee members have seen almost every aspect of the business as part of their responsibility. This has led to the absurd situation where committee members have instructed staff to undertake work, have become engaged in management issues and, in one case, even approached the regulator to advise them of weaknesses in the businesses structure.

What I've learned from following this case is that a level of independent review is great from a governance perspective but make sure that everyone understands their roles otherwise the agenda can be hijacked.

Regarding Customer Service standards - Refer to this issue in the *Water Forum*"

2. Information Systems Can be a Nightmare if Overlooked

Margit (June 22 2003) responds

"I have looked at several businesses in the private and public sectors, and the information system implementation can be quite difficult. There are several off the shelf packages available for asset management and maintenance management which are very good. However, the question is what information do you require back and what resources are available for the maintenance of the system? How do you plan to store the asset information (what hierarchy will you adopt?).

I am currently working with a private industry client that has decided to take the path of electing for a customised solution that can be developed further as its understanding of asset management grows and also the resources become more available to maintain the system. This process has lead to reviewing their current practices and also determining the assets that they are responsible for.

I have been involved in organisations which have relied on purchasing an asset management system that will

supposably solve all their problems and tends to be shelved due to the inability to maintain the system. Many organisations see an asset management system as a quick solution, and overlook the work required to populate the system. Typically the more simple the system, the easier to maintain, however it must be able to provide you with the information that you are after. Other issues tend to be related to organisations not utilising the full potential of the system and also not realising its capabilities. **Integration of the asset management system with existing systems such as the financial system tends to be a stumbling block during the implementation phase without thorough planning.**

I suggest workshops be undertaken with the operators (maintenance leaders) of the assets to determine the information they require for the system. The workshop should be used to determine the hierarchy to be adopted in the system, since they will need to be able to locate assets in the system. It also encourages ownership of the system by the users. The chief financial officer should be involved to enable a clear link between systems or else you may need to maintain two separate asset registers. One for financial reporting, the other for maintenance. Need to determine a clear line of responsibility for the maintenance of the system and the operators must share their knowledge of the assets managed. This can be difficult at times, but often, operators can see the benefit of having the information readily available to them. “

Editor: Norm Eason's book "Maintenance and Asset Management Information Systems" which we serialised on the web and is now available from the Resource Library at www.amqi.com is the best reference I have come across on the practical problems of implementing asset information systems. Written by a fellow with 30 years experience at doing just that!

Max Benefit sent the following to me because he wanted to respond to something I had removed from the forums!

(In the interests of keeping things current, if something sits around not being responded to for awhile, I can remove it from the lists. If this happens to you—just go ahead and start a new discussion on the point! I will be encouraging Max Benefit to do with this interesting posting—so keep an eye out for it on the forums and add your comments.)

Building Maintenance Planning and the Sherman Dergis Formula

He writes;

“I've just completed the Buildings Asset Management plan for my council.... Phew!!

When it came to renewal and maintenance planning I took this approach:

1/ Maintenance - The facilities manager had costed all major and minor works required from site visits. Major works should be done as capital projects, so I deducted these from the 5 year budget. Years 1 and 2 were still in catch up mode even on the smaller stuff, so these were locked in but not used to inflate the long term needs. The long term needs used the years 3-5 average, plus CPI allowance. I then compared this with a % of CRV minimum, and used 1%, as this was more or less what the year 3-5 average resulted in...thus it was based on local reality rather than a hazy, unjustified "industry standard".

I then also compared this with the growth in portfolio size predicted by planned upgrades and additions. I found that the additions (and their CPI effect) outstripped just adding CPI onto the original needs based amount...ie eroded the maintenance budget so that it was 0.95%CRV, 0.92% CRV, etc, so keeping a "bare minimum % of CRV" was a good idea, to cope with portfolio size changes. I kept operating costs (cleaning, security, water/energy) separate/additional to these calculations, as they are often confusingly paid from the "maintenance" budget.

2/ Renewal - I analysed the asset stock using our current (wrong, basis never stated) accounting policy asset life of 75 years - i.e. for the whole building. I had already split out major fixed plant and equipment, and based on detailed analysis came up with a 15 year average life (3-40 year scatter) for that.

I looked at how old known-age buildings were and when they had been "renewed" (around 51 years on average - typically structure and fit-out) or "upgraded" (23 years on average - typically fit-out driven). I then looked at current structural condition and age and came up with an extrapolated average life of 56 years. I then split buildings into Building Shell, Building Fit-out and Other Structures (typically fences, sheds, shade sails etc). These compared well with CSIRO research I also used on component lives and values—our own QS allocated 50/50 split on building shell value versus Building fit-out, and the CSIRO paper I used came out at 48/52.

Using an equivalent life calculation from the CSIRO model, the fit-out components lasted on average 26 years, the Other Structures 23 years, the Shell 68 years, on "residential type" construction...not University buildings or offices. Most of ours are glorified residential construction...less than 10% being commercial/institutional, so I felt on safe ground.

I then came up with a "raw" renewal need based on the new adopted lives of 55 years (shell) and 25 years (fit out, Other Structures), using their proportion of the overall asset class value. I then adjusted this long term average based on their current condition ie accounting for the diversity of when they were built...the non uniform profile. I also allowed separately for renewal vs upgrades/new assets based on known 5 year plan projects, long term strategies and drivers of change. I allowed CPI on the budget impacts also.

Comparing this with the Sherman Dergis formula, we would only "get" on average about 40% of what we really need ie the S-D formula is woefully inadequate in our case."

Editor:

The Sherman Dergis formula that Max Benefit refers to was a response question on the Discussion Forum back in February when Mathew asked for firm data to compare the Dept of Defence's maintenance funding against comparable industry levels. He said that he had the 1989 data predicted by the Sherman-Dergis Model which predicted maintenance expenditure of 2.6% Gross Replacement Value over a 50 year life.

I pointed out in SAM 107 that "The Sherman-Dergis formula, developed at the University of Michigan, is NOT a Maintenance prediction model but rather a formula designed to reflect the greater Repair and Renewal (over and above maintenance) required as a building ages. It is apparently widely used in the US Education sector. The formula is based on a 'life' of 50 years for the entire asset. It makes no distinction between the longer living structural elements, the shorter living fit-out, and the medium term building and site services. The Sherman Dergis formula = Replacement Cost x 0.75 x (Age of Building/1275)"

There are many maintenance 'formulas'; they all produce different answers; but there is nothing like doing your own sums!

Concluding Comments *(for the moment)*

RISK ANALYSIS—panacea?

In the discussion forums, risk management crops up frequently when the issues get complicated. For example, Chris A suggested that the issue of the financial versus the 'engineering' answer on renewal be resolved by ensuring that 'the renewal decision be accompanied by both a risk analysis and a commercial analysis' Other discussants agreed, but what they did not necessarily agree on was the nature of the risk analysis. (The industry guest detailed the necessary life cycle cost analysis but it did not seem to include risks other than to the agency.) We had a similar situation in the discussion on asset condition and service lives. Which brings me to raise a few important issues

1. WHOSE risks?

Choices include

- the engineering or asset management section
- the business as a whole
- the community (current members of = social outcomes)
- the community (future members of = environmental outcomes)

The answers that optimise one will de-optimize the others! Thus you cannot do, as so many would like to do, say "Oh well, of course, we want all of these!"

2. WHOSE decisions?

Given that there is bound to be conflict between the 'best' answers depending on whose risks you are focussing on, the question about **who chooses** is not a trivial one.

Here are some choices that are currently in place. For myself, I am happy with none of them!

- operations personnel (as part of day-to-day management decisions, that is, no formal strategy)
- senior management (as part of annual, strategic decision making—but how are externalities addressed?)
- a 'black box' mechanism - this is the situation you get when a computer model makes the decisions for you. This is perhaps the most dangerous. It provides 'answers' that nobody in the organisation has consciously thought about!

3. WHOSE Benefits/Costs

Economists speak of "internalising the externalities". This means making the decision maker take the external effects of his decisions into account—by making them internal effects! Eg by applying penalties to certain behaviours. (Not so good, since compliance is really only 'being as bad as you can legally get away with' , it does not bring real community costs and benefits into the equation.)

These issues need much more discussion. Join me, won't you? At www.amqi.com/forums