AMQ International

Strategic Asset Management

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Rock stars do it. The Queen does it. And now we are doing it too.
- AMQ International is 'on tour'.

In the current and the next few issues, we bring you the best of asset management in the UK, Canada and New Zealand, including a new technique for quantifying the unquantifiable that could radically change the way you measure, monitor, benchmark, evaluate and communicate, but that is coming up next week.

Asset Management in the UK - 2000

Rapid Growth in Interest in Asset Management

In 1996, a survey of local government in the UK revealed that 'asset management' was largely an unrecognised term, the same could NOT now be said. Heavy emphasis is now being placed on asset management by local government by the national co-ordinating and regulatory bodies such as the Department of Environment, Transport and the Regions (the UK winner of the SBS-Confirm Award in the 1999 International Asset Management Competitions), the Department of Education (on whom we reported in Issue 29) and the UK Audit Commission.

Role of the Audit Commission

The Audit Commission has a unique position as both a regulator and a guide. Local authorities and national health service bodies in England and Wales spend nearly £100 billion of public money (~$Aust 250 billion) annually – this amounts to around 15% of the nation's GDP and it is the Audit Commission's role to ensure that the money is well spent. The Audit Commission appoints auditors to all local government and NHS bodies and receives audit fees. A certain percentage of the fees is devoted to current audit and effectiveness issues, such as asset management, and the production of well researched and written papers that document the current state of play, provide examples of both good and poor practice, and provide practical guidelines for the bodies it audits.

You may care to visit their website at www.audit-commission.gov.uk

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Asset Management starting with Local Government

In the UK, asset management has started with local government. This is for two reasons. One is that much of the spending is carried out at the local government level. (Unfortunately, funding as well as a lot of the decision making and rule making is carried out at the national level and this is, in a number of cases, hampering good asset management on the ground). Two is that only the local government level has so far adopted accrual accounting and current valuations for its property assets (although local government roads are still valued at historic cost and where current valuations have been adopted there is considerable reservation over their reliability). The national government is only now introducing accrual accounting.

Need for Asset Management at Central Level

Relative to Australia and New Zealand, UK councils suffer from a lack of control over their own finances. About 80% of their funding comes by way of grant allocations from national government. It is thus important for good asset management in the UK that strategic asset management principles be well understood and adopted at the national level.

Managing the AIS - Keeping Data Up To Date

This article and the next has drawn extensively (with his blessing) on an article by Norm Eason, past president of the British Institute of Asset Management, and a software developer himself who, in 1985 won the "Services to Maintenance" Award for his maintenance management system. You will find his paper "Managing Asset Information" on our website www.amqi.com in the resources section.

A matter of Developing the Right Attitude

The right attitude to data is to ensure

- As much as we need – and no more
- As accurate as we need – and no more
- As timely as we need – and no more

for not only does excess data cost, it gets in our way!

Cheap computer memory encourages bad management habits

With the increasing availability of very cheap computer memory, there is a tendency to disregard the need for data cleansing or archiving. This results in a *poor attitude towards the control of data* and no real strategy for determining what data should be kept and what should be discarded. Having too much data can be even worse than not having enough.

Excess Data Reduces Efficiency

Many data software systems have fields which, while maybe relevant to other organisations, is not relevant to yours. Vendors may try to convince you that you need them or that you can by-pass them. But the truth is that unnecessary data fields can affect the operation of the systems and add to the burden of sustaining data quality. It follows that if data is not relevant to the business or to some legislative requirement, then it should not be collected! *But what is relevant? Or may become relevant as the business changes?*

Retaining Relevance

Norm Eason says "No Board will sign off a justification request if the end result is simply the implementation of an information system populated with data. Approval is always based on the organisation receiving benefit to the target operation from the money injected into the project. At the completion of the implementation stage, no benefits will have been accrued. (Although it is surprising how often organisations consider their information projects to be complete when the software has been implemented.)

How do you Evaluate a Project when the Goals are Changing?

The real benefits will be accrued once the system has been in use for some time and the information, knowledge and wisdom have all benefited from the better acquisition and use of more accurate data. But this may be a further two years after the implementation phase. So we are now faced with the fact that the results of the project will not be able to be tested against the original requirements upon which the project was justified until around four years after its authorisation by the Board and at this time the REAL need for these results may have changed in ways that could not have been predicted at the start.

How then can the project be judged? Against its original objectives or against its new objectives? And if it becomes obvious to the project team that requirements have changed during the implementation of the project, what should they do about it? On the one hand they will be judged by the delivery of the original benefits and on the other hand they can see that some of these are no longer relevant. In the latter case, any changes to the system will delay the implementation and at the same time will probably result in costly fees from the vendor of the system. It is a difficult situation, but it is a common problem. It also results in animosity between users and vendors and a more frequent replacement of systems than one would reasonably expect.

Answer: Use "scenarios"

So what can be done about it? If we return to the original problem, we can see that all of the eventual difficulty stemmed from the fact that it was almost impossible for the user to predict his requirement for data and information beyond his current business horizon of perhaps two or three years. If we can remove or reduce this difficulty, then everything else becomes easier.

> **Make use of "asset scenarios" - ask yourself what could be required of the asset/asset group.**

Without a crystal ball, it is necessary to think more laterally. If we consider that the ultimate goal of the system and its information is to *improve the effectiveness of each asset in its business role* as well as *extending its useful life*, then we can start by measuring the asset's current position in respect to both of these. Then, instead of trying to predict future business consider what could be required of each asset. Is it possible that it could become more critical? Is it possible that more throughput could be required of it? Will its reliability need to be improved? Will its use of energy need to be examined? Is it possible that its life cycle will need to be extended, or might it be replaced by a more efficient alternative?

If the prediction of future requirements is brought down to a study of each asset or group of assets, in respect to their physical entities and their functional roles, we have reduced the problem down to something that is more manageable. Stated simply, for each of these, is there a possibility that we will need more data, less data or different data?"

Managing the AIS—The life Cycle of Data

"the quality of data can never improve"

Data needs maintenance

As with a physical asset, data needs to be installed in order to make use of it and the effectiveness of its installation (i.e., on an information system) will determine how well it can perform its role. However, just as with a physical asset, if there is not an effective plan for the *maintenance of the data*, it will quickly deteriorate and its useful life cycle will be curtailed. However, it does not show this deterioration in an obvious manner.

Once Credibility Has Gone, There Is Often Little Choice But To 'Start Again' – An Expensive Solution

Awareness of the deterioration begins with a growing questioning of the results of analysis.

This quickly moves to outright distrust of the results and hence of the information and the data upon which these results are based. At this stage, any attempt at restoring the quality of the data – and the users' respect for it – is likely to be both prolonged and costly. It requires an audit not only of the data and information but also of all the processes acting on them throughout their life cycles. When data has deteriorated to such a length, nothing short of the replacement of the information system seems to satisfy most organisations. (This may account for the oft-stated observation that most organisations do not keep their AIS more than about 3 years; another reason is undoubtedly changing business structures – see previous article)

The Quality Of Data Can Never Improve

When one considers the life cycle of data, the most obvious truth that appears is that the quality of data can never improve. It has two possible states; either it remains at the same quality level at which it entered the system or it deteriorates from that level. No other possibilities exist. The management of the life cycle of data and its resulting information must start from this basis. It is necessary to determine what is required of the information system in order to ensure that the data remains at the same quality level at which it was entered. It is then essential that all factors and influences that could contribute to the deterioration of this data quality are understood, are identified and that mechanisms are put in place to combat their effect.

Identifying Deterioration Factors is Not Easy

The identification of all the factors that contribute to data deterioration is not easy; they will vary from organisation to organisation. There are so many different factors that the best policy to adopt is one of aggressive identification and action, backed by good professional data management. However, what usually happens is that there are always other tasks that overtake these actions in immediate priority and consequently insufficient attention is paid to activities that would ensure real data quality.

Look to the Process

How do we capture data on assets? The answer to this question is that we usually capture both maintenance and asset management data in the same way, i.e., by writing the findings down on the back of a job card in long hand with perhaps fault codes used for failure analysis. These job cards are then sent to the maintenance department offices, where a clerk keys the data into a computer system. Remember what was said earlier about data quality. Data quality never improves! Therefore the data entered into the system at this point is as good as it gets! It can at best remain at the same quality or it can deteriorate. So let's examine the possible level of quality at this stage.

Follow the Ball

The data has been entered by the workforce onto a medium (paper) that has no capacity to validate that data. Errors can occur at this point that will be difficult or impossible to check or rectify at a later date. Also, the method of transfer of the data onto the medium can result in further errors at a later stage. For example, poor handwriting can mean that the wrong data is entered into the computer system. However, the potential for correcting these errors becomes more difficult because of the possible difficulty in contacting the writer of the job card or his ability to remember what actually happened. We then have the errors that result from the inattention of the clerks when entering the data and possible poor validation of the data by the system.

Two Things May Cause Error Rate To More Than Double

- **Separation of data entry from point of collection**
- **Lack of intimate knowledge of purpose by person entering the data**

A major international quality forum recently examined this data entry process. Some of the findings of this study are very pertinent to the data collection example that we have just considered. The study found that if data was entered into an information system at the point where the data was collected and by a person who is intimately knowledgeable about the type of data and the purpose for which it is collected, then the likely error rate is less than 0.5%. Clearly, any errors can then be easily checked and re-entered. However, the study

also found that if the person entering the data is separated by distance and time from the point of collection of the data and is not intimately knowledgeable about the type of data or its purpose, then the error rate is likely to be at least 10%!

That is >10% of the data entries are wrong!

Just how wrong we don't know. And that is the problem. If we know the order of magnitude and the direction of bias, incorrect information may be useable, but when data entries are just plain wrong, this does not apply.

If this was pointed out to a Board of Directors tasked with the authorisation of a new asset management information system, how many systems would go ahead? But this is rarely identified as a possible problem and there is a tradition of using data clerks to enter data, so these procedures are perpetuated.

Trying To Put Things Right Can Make Them Worse.

Norm refers to a client of his that had a sophisticated computer system and in most areas ran a very tight ship. His procedures were good and it was difficult to improve most of his areas of work. However, his procedures for data entry threatened all of his other good work. He had a number of data entry clerks who entered job requests and job reports into the computer system, using telephone communication as well as hand-written sheets containing the work details. The data entry activity was very poorly managed and the operators had no interest in their work or knowledge of what was involved. Also, the computer system had relatively poor data validation facilities and the operators were adept at entering anything as long as the system accepted it and they could get on to the next task and finish their work.

The result of this situation was that the record of what work was requested and what work was done was so poor that it was common to find work completed on a particular asset that was impossible to do! Now this is a bad enough situation in itself, but the actions taken by the organisation made it even worse. They had an engineer spend a significant amount of his time – two days per week! – going through all work records and correcting any anomalies that he found. The fact that the system allowed him to change records after entry was a quality problem in itself, but the possibility that he misinterpreted a problem meant that all the data was suspect. He had tried to improve the quality of the data, but had ended up by probably making it worse! He acted in good faith without appreciating the overall picture.

Solution? Reduce information collection to that which can be handled at source.

From data we can generate (by appropriate data management) information. With analysis this can generate knowledge, and from this can come understanding. Without good data validation and verification we build the entire edifice on shaky foundations. Thus, if we do not have sound data policies or if they are adhered to in a lackadaisical manner, then everything based on these entities has to be questioned. As far as data quality is concerned, if you can't do it well, then don't bother doing it at all!

Do you want to know more?

- **What to keep and what to throw?**
- **How to write specifications that are not out of date before the job is completed?**

See Norm Eason's article "Managing Asset Information" in the resources section on our website **www.amqi.com**

And watch out for our next issue
With a special focus on:

"Quantifying the Unquantifiable"

CAT—Comparative Assessment Technique is a simple technique that could radically change the way we measure and monitor performance; benchmark; evaluate asset proposals and communicate to management. Developed by Norm Eason as a response to a need in Facilities benchmarking, it is applicable to a wide range of situations where we need to measure outcomes that are essentially quality based rather than quantitative. A breakthrough!

Advanced Asset Management - "Distributed Lives"

How to get more reality into your renewal forecasts - without it costing you an arm and a leg in resources!

'Lumpy' Forecasts May Lack Credibility

In forecasting renewal the standard practice is to take the economic life for a class of assets and project the whole class out for its remaining life. So if the economic life is 30 years, we project those assets of this class which are now 10 years old out for another 20 years, and for those which are now 17 years old, we project them out for another 13 years, and so on. If assets within the class are reasonably well spread, in terms of age, then this gives no obvious problem in terms of credibility (and presumably the 'overs' on some will counter the 'unders' on others). However, if a period of intense construction – such as may happen in the development of a new subdivision – creates many assets with the same age and economic life – this could lead to forecasts that are distinctly 'lumpy'.

One Size ('Economic Life') May Not Fit All

There is nothing wrong with 'lumpiness' per se – as long as it truly reflects the situation. But using one economic life prediction for all assets within a class, say, of 'sealed roads' takes no account of the different climatic conditions that different road sections face, or different use patterns. If one sealed road is a bus route, it may have a considerably shorter life than others which do not carry buses. Roads that border irrigation areas may suffer more damage from water overrun and again have a shorter than 'normal' lifespan. However, classifying sealed roads by location and use could lead to an enormous number and range of classifications and we can actually lose information by being overwhelmed by detail.

Adjusting For Variation (1)

Fortunately there is a middle way. Rather than separately measure and classify individual road segments into a myriad asset classifications, we can make use of the 'on the ground' knowledge to estimate some major variations. For example, we could say that while the 'normal' life of sealed roads was, say, 30 years, we would expect about 20% of our sealed roads that are less heavily trafficked to last about 50 years, whereas some, about 25% of the heavily trafficked roads we may need to replace in about 20 years. A small proportion of roads under very difficult conditions could be expected to be replaced in 15 years.

This would then produce a table such as this:

	Economic Life in Years	% of assets achieving
Modal Life (the life that most roads would be expected to attain)	30	50
Other 1 (principally back routes with little traffic)	50	20
Other 2 (bus routes)	20	25
Other 3	15	5

The modal economic life is the one that we would expect the majority of the asset class to achieve. The asset life distribution is then applied to the age distribution for the asset to produce a more realistic renewal profile. This approach has been adopted in the new South Australian local government infrastructure study.

Adjusting for Variation (2)

'Economic Life' estimates are conceptually the weighted average of the life of all assets within a class. Although we know that, in practice, some assets will last longer and some will fail in less time, the economic life is the statistic

mean or 'expected' life. In the absence of better knowledge we might assume a normal bell shaped distribution. We might then choose as our 'sub-class' economic life estimates some distribution about the mean. So we may estimate, on the basis of such experience as we have that, if the mean of the class, ie the 'standard economic life' is, say, 50 years, then we would expect about 20% to fail sooner, perhaps around 40 years and about 20% to last for around 60 years. Again we have a 'distributed profile'.

Clearly the Variation (1) is preferable where we have a good basis for estimating, but Variation (2) is better, in the sense of being a more credible projection, than a straight 100% projection of failure at the mean economic life point.

Cost effective

Neither of these adjustment mechanisms require more than thoughtful consideration by the asset manager. They do not require detailed survey of asset conditions or usage. If such exist, they may inform the manager's decision but the use of distributed lives does not rest upon this information. Nevertheless, this technique makes use of general asset knowledge and generates renewal profiles that are more credible.

Case Studies from the UK

If the proposal you are considering was first developed some years ago, review! Chances are things have now changed!

A shire district was considering a $2m scheme to build new offices so that all departments would be under one roof. None of the existing offices were separated by more than five minutes walking time. While the existing offices were not modern, they were of an acceptable standard and the external auditor investigated the basis of the plan.

It was found that:

- There was a feasibility study but it was 10 years old and designed for a different site
- The original plan was devised before the council invested in a computer network and modern telecommunications system which now linked all offices, and
- There was no up-to-date cost estimate

The auditor invited the council to review whether its plans would provide value for money. Members decided not to proceed with the scheme. (Audit Commission "Just Capital" 1996)

(The Head of the South Australian Audit Commission considered that of all the recommendations he could personally make as a result of his previous Audit Commission experience in New South Wales and Tasmania this would be the most important – *to critically revisit any existing project proposal that had been initiated more than three years previously*. This was in 1994 – the pace of change nowadays only serves to emphasize the point)

Good design keeps track of who is doing what—leading to improvement in multi-project management

Wirral Metropolitan Borough's property services department has installed a computer-based management information system (LAMP) which among other things holds:

- Details of project programmes – actual and planned;
- The percentage actually completed for each stage of each project
- Target predictions of resources required for each team member of a project;
- Records of actual time spent by each team member on each stage of the project; and
- Hourly rates for each member of staff.

Outputs from this system provide:

- Overall projections of people's availability in a summary format;
- Reports on the overall health of each project, indicating the total time spent against targets, time remaining, fee position, etc; and
- Time and cost reports on individual members of staff against the targets set

Resource management

Resource targets are set at the start of each project to establish both the cost of fees and the time commitment of each team member. These are reviewed, and adjusted if necessary, as a regular agenda item for each design team meeting. Managers receive regular summary reports relating to all ongoing and predicted workload. These allow decision to be made with respect to:

- Staff levels and work allocation
- Expenditure and project viability; and
- Fee levels for similar work

(Audit Commission, "Just Capital" 1996)

Getting subcontractors involved in design options saves British Airport time and money

British Airports Authority (BAA) worked with its project manager and subcontractors to use value management and engineering to reduce the project cost and completion time for a canopy over its proposed visitor centre at Gatwick's South Tower.

BAA initially proposed a 100m long, 14m wide, barrel-vaulted roof light to form an atrium for the visitor centre. When completed with double-glazed curved glass, as specified, the roofing contractor, Coxdrome, estimated the cost at £650,000.

Mace, a project management firm which works regularly with BAA, was asked to produce a feasibility study for the visitor centre. Mace asked its trade subcontractors to come up with ideas for cost savings and arranged a design workshop with BAA's designers to discuss alternative solutions. The original design required bespoke materials and structural steel support, but Coxdrome were able to offer two cheaper solutions that required less sophisticated 'engineering'.

Balancing cost against design, BAA rejected the cheapest alternative for aesthetic reasons, but accepted the second at a cost of £420,000 – a saving of 35%. By working closely with Coxdrome and using standardised panels, the timetable for procuring the roof was reduced from 33 to 18 weeks.

Mace's managing director said:

'This is a prime example of how value management can cut costs. All subcontractors are encouraged to become involved at an early stage – preferably when objectives are being discussed. At these design workshops, the subcontractor's alternatives can be thrashed out between designers and construction managers. The discussions are not just about cutting costs. The aim is to add value. This can mean that solutions are found that, for example, improve lifetime costs.'

(originally published in Building (8 March 1996) and cited by the Audit Commission)

Good Practice Examples

If you have an example of good practice in asset management, contribute it to the **International Asset Management Competitions** and you could be flying off to the UK to find more examples for yourself

See details on www.amqi.com

Entries close July 30th