

AMQ
International's **STRATEGIC**
336 ASSET MANAGEMENT



March 5th, 2012

**VALUATION FOR THE
ASSET MANAGER**

Some asset managers may believe that they do not need to understand the principles of asset management and that this task can be safely left to the valuer himself. I would argue that this is not true for the *strategic* asset manager who needs to understand so that he can correct mistakes that are commonly made by others before they become policy prescriptions that undermine his work in sustaining asset portfolio capability.

A case in point is the observation and policy prescription of the South Australian Commission of Audit in the early 1990s that the (then) current renewal rate was sufficient to sustain asset capability. However they had come to this conclusion by comparing renewal to the written down valuation of assets when they should have been comparing it to the full replacement cost (which was about double the value).

Another reason is that while many valuation methods can produce a value that is acceptable for the balance sheet, not all valuations produce information suitable for asset management. It therefore pays an asset manager to know what to ask for.

A third reason is that a combination of valuation principles and asset management produces the most valid value assessments.

In this issue we illustrate a case where AM 'saved the day' [2] and in "Techniques to Try", we feature a 'hand-built' valuation method that incorporates full asset management knowledge [3] with step-by-step instructions [4] and a fully worked example [5-8]; we look at how to deal with assets that wear out partly by usage and partly through the passage of time,[9] and we deal with assets that change their service function partway through their physical life [9]. We also give a brief summary of valuation issues that we have dealt with in past issues, with references to the full discussion [10].

Please consider - and enjoy!
Penny

Dr Penny Burns, Editor, AMQ International
08 8359 0559 www.amqi.com

How Valuation using Asset Management solved a political impasse.



The National Rail Corporation

The Australian Government, New South Wales and Victoria established the National Rail Corporation in 1992 to combine the freight operations of the three governments. The plan was to transfer the operating assets of each of the governments into the new corporation which would then be owned jointly, and in proportion to the assets contributed.

How much should the new corporation pay for the existing assets?

One would have thought that the ownership arrangements would make the governments indifferent to the price at which the assets transferred but this was far from the case. Each individual (state and federal) treasury wished to get the *highest* price possible for its assets because this was money that they could use for other demands. The new corporation, however, wished to have the *lowest* possible starting asset value since this would affect its ability to demonstrate a good rate of return on assets.

What was the 'right' depreciation method and rate?

The debate revolved around the depreciated price of the assets being transferred. As rail assets had not been previously privately owned in the country there was no track record that could be used to determine the 'right' depreciated price. By 1995 things were at an impasse and tempers were running high. It was at this time that the task came through to my colleague, an experienced plant valuer, and myself. He was given the poisoned chalice task of determining, once and for all, at what price the second hand rolling stock should take place. 'But', he despaired 'the two sides will not agree on any of the depreciation rates or methodologies that have so far been proposed'.

Can a knowledge of the asset help us to determine the most useful approach?

We reviewed all the options - and there were not many! Eventually we came to the conclusion that we should stop seeking an accepted formulaic approach (e.g. straight line, declining balance, etc) for our depreciation rate. Instead, we should work it out for ourselves - and demonstrate our calculations so conclusively that all objections would be seen to be self serving and dismissed. By applying everything we knew about asset management and locomotive assets in particular that is exactly what was done. Not only did it work but the techniques we used can be applied to just about any asset. By the time we had finished, my friend said to me "I think we are almost there, both sides hate me." A good measure of equality!

(After we had finished and the approach accepted by all parties, we found that the implicit depreciation rate used was almost exactly the same as the depreciation rate used by a North American private rail company. This was the icing on the cake and we were happy to be so vindicated.)

As the National Rail Corporation no longer exists, this story can now be told.

Techniques to Try # 2

DETERMINING THE VALUE OF AN AGED ASSET WHERE TECHNOLOGY HAS CHANGED



ACCURATE ASSET VALUATIONS

What we did - and what you can do, too.

The following is the proposal on valuation principles that was submitted to the warring parties, and accepted, as a basis for the valuation itself.

INTRODUCTION

In the past, valuations have been derived from depreciated replacement cost or historical cost approaches, however these methods fail to take into account the cost penalties associated with the operation of partially obsolete technology.

The methodology here proposed is that which we believe a prudent purchaser would employ and takes into account the net present value of the excess operating costs and deducts this value from the depreciated replacement cost of the locomotive. Other adjustments for tractive efficiency and availability are also made.

The figures used in our worked examples may be argued by the shareholders but these are presented as examples only and some adjustments are expected after consultation with the shareholder (owner of the subject equipment) and National Rail.

We believe the approach we have taken will provide the most equitable assessment of value of the subject equipment for all parties and enable National Rail to acquire the used locomotives and rolling stock at realistic levels of valuation.

METHODOLOGY

(A worked example follows)

Step 1. Determine Replacement Cost

Determine the least cost new equivalent of a locomotive of similar capacity and quality.

For our worked examples we have adopted the following replacement costs:

| | | |
|--------------------|-------------|-------|
| 4000 HP Locomotive | \$3,300,000 | (NR4) |
| 3000 HP Locomotive | \$2,900,000 | (NR3) |

In all further steps adjustments will be made in each area with reference to the appropriate benchmark locomotive (4000 or 3000 HP).

Step 2. Performance Adjustment

Compare the locomotive tractive efficiency with the benchmark locomotive and adjust value accordingly.

For example, if the subject locomotive had 80% of the tractive efficiency of the benchmark locomotive, it would take 5 locomotives to produce the equivalent performance of 4 locomotives indicating a 20% write down of value

Step 3. Determine the Value of Time in Service Limited (TISL) Components

Identify major components which depreciate (deteriorate) due to factors other than age, ie components which are 'time in service' limited. Components such as the locomotives diesel/alternator unit and traction motors will be valued on a kilometre before overhaul basis. This approach involves subtracting the cost of a major rebuild from the value of the locomotive and valuing this cost as a percentage of the kilometres remaining before overhaul.

Step 4 Depreciate Remaining Value of the Locomotive

The remaining value of the locomotive (ie the resultant value after the rebuild cost component has been subtracted) would be depreciated on a straight line basis over a determined lifespan (example life 30 years). It appears that the economic life of locomotives engaged on long distance freight work is in the vicinity of 15 years with a further 15 year life on short haul or shunting work.

Step 5 Determine Functional Obsolescence

Determine the net present value (NPV) after tax of excess variable operating costs (in comparison to the benchmark locomotives) of the subject locomotive over its remaining service life.

These excess operating costs may be the result of -
fuel efficiency
maintenance costs

Step 6 Determine Availability

Compare the locomotive class average downtime with benchmark locomotive. Adjust value to reflect availability.

Step 7 Determine Deferred/Impending Remedial Work

Deduct the cost of repairs required which are outside routine maintenance or rebuild work. For example, work required for compliance to current OH&S standards or other work such as body damage. We do not intend to deduct the cost of work to improve the locomotive's performance, acquisition costs or repainting.

ASSUMPTIONS

(note: every methodology needs to spell out its assumptions if it is to be taken seriously)

Operating Environments: Standard Sydney - Brisbane Superfreighter trip (ie 2400 gross trailing tonnes in 16 hours)
Total Train Fuel Consumption @ 7.4L/1000 GTKM
2400/1000 x 7.4L/GTKM

This will be used as the benchmark fuel consumption with adjustments made (plus or minus) the subject locomotive.

Note: This is a worst case fuel consumption figure as on some runs the fuel consumption figure may be in the range 5.5 -6L/GTKM.

Maintenance Costs

| | |
|------------------------|-----------|
| NR4 | |
| Fixed costs per year: | \$10,000 |
| Variable costs per km: | \$0.72 |
| Rehabilitation costs: | \$650,000 |
| Rehabilitation kms: | 1,600,000 |

| | |
|------------------------|-----------|
| NR3 | |
| Fixed costs per year: | \$10,000 |
| Variable costs per km: | \$0.69 |
| Rehabilitation costs: | \$600,000 |
| Rehabilitation kms: | 1,600,000 |

Availability NR4 and NR3 95%

Footnote: The NR4 and NR3 figures quoted are for the purpose of explaining the methodology and the actual costs will be derived from the locomotive tender

Distance Travelled Per Annum: 200,000 kms

Inflation: We have referenced Syntecs long term CPI forecast for 1995-2004. This shows an average CPI for 5.75% for this period. No forecast is available after 2004. We have adopted 5.75% as our average inflation rate.

Discount Rate: We have referenced Syntecs 10 year Government Bond Rate forecast for 1995-2004. No forecast is available after 2004. We have adopted ..% as our discount rate.

Cost Differential: We have assumed that a stable relationship in cost differentials will exist over the life of the forecast between the subject and benchmark locomotives.

EXCLUSIONS

We have not taken into account the loss of utility and increased costs due to:

- The additional cost of maintaining a diverse fleet.
- Limitations on operating hours in metropolitan areas due to excess noise.
- Utility limitations of single cab operation.

We have also excluded the following:

- Acquisition costs such as repainting, performance and communications improvements.
- Financing costs and interest payments.
- Support set up costs.

WORKED EXAMPLE - A N CLASS

| | |
|-------------------------|----------------------|
| Locomotive Class: | AN |
| Operator: | AN |
| Builder: | Clyde |
| Engine: | 167`0G34EMD |
| Power for Traction: | 4000 hp (2984 kW) |
| Year(s) of Acquisition: | 1992-1993 |
| Average Age: | 2.5 years |
| Locomotive Mass: | 132 tonne |
| Adhesion: | 29% |
| Conversion Efficiency: | 85% |
| Traction Index: | 121.176 (91% of NR4) |

AN CLASS VALUE SUMMARY

(see the step by step workings that follow)

| | | |
|-----------------------------------------------------|------------|--------------------|
| Replacement Cost (from step 1) | | \$3,300,000 |
| Deduct Performance Adjustment (from step 2) | -\$297,000 | \$3,003,000 |
| Deduct Total Value of TISL Components (step 3) | -\$650,000 | \$2,353,000 |
| Depreciate "Rolling Chassis" for age (from step 4) | -\$196,083 | \$2,156,917 |
| Add remaining value of TISL Components (step 3) | +\$446,875 | \$2,603,792 |
| Deduct functional obsolescence (fuel, mtce)(step 5) | 0 | \$2,603,792 |
| Deduct for Availability Adjustment (from step 6) | 0 | \$2,603,792 |
| Deferred/Impending Remedial Work (from step 7) | -\$25,000 | <u>\$2,578,792</u> |
| Functional Depreciated Value | | \$2,578,792 |
| Rounded (to nearest \$5,000) | | \$2,580,000 |

WORKINGS

Step 1 - Determine Replacement Cost

| | |
|------------------|-------------|
| Replacement Cost | \$3,300,000 |
|------------------|-------------|

Step 2 - Performance Adjustments

| | |
|-------------------------------------|-------------|
| Tractive efficiency compared to NR4 | 91% |
| $3,300,000 \times 91\%$ | \$3,003,000 |

Step 3 - Value of Time in Service Limited (TISL) components

| | |
|------------------------------------------------------|-------------|
| Rebuild cost | \$650,000 |
| Kilometres travelled: | 500,000 kms |
| $\$650,000 \times (1,600,000 - 500,000) / 1,600,000$ | \$446,875 |

Step 4 - Depreciate (for age) remaining value of the locomotive

| | |
|-----------------------------|-------------|
| $\$3,003,000 - \$650,000 =$ | \$2,353,000 |
|-----------------------------|-------------|

Life-Age = Remaining Life

$30 - 2.5 = 27.5$

| | |
|--------------------------------|-------------|
| $\$2,353,000 \times (27.5/30)$ | \$2,156,917 |
|--------------------------------|-------------|

Step 5 - Determine Functional Obsolescence

| | |
|--------------------------------|-----|
| Fuel penalty (compared to NR4) | NIL |
|--------------------------------|-----|

| | |
|---------------------------------------|-----|
| Maintenance penalty (compared to NR4) | NIL |
|---------------------------------------|-----|

Step 6 - Determine availability

| | |
|-------------------------------------------|-----|
| Availability adjustment (compared to NR4) | NIL |
|-------------------------------------------|-----|

Step 7 - Determine deferred/impending remedial work

| | |
|---------------------------------------------|-----------|
| Occupational Health and Safety Improvements | -\$20,000 |
|---------------------------------------------|-----------|

| | |
|-----------------------------|------------------|
| Crew Amenities Improvements | <u>-\$ 5,000</u> |
|-----------------------------|------------------|

| | |
|--|-----------|
| | -\$25,000 |
|--|-----------|

Example with Negative Results

(Note: In another example with a much older locomotive, the results turned out to be negative. In this case the locomotive is economically obsolete for the specified purpose (Superfreighter Sydney-Brisbane). However the locomotive may be viable on shorter hauls or for shunting. In this situation we recommended a nominal value of 5% of the adjusted replacement cost (\$110,000) or depreciated historical cost (whichever is the greater) as the locomotive is clearly not scrap but is not suited to the modelled application. _

When An Asset Changes its Function

Many assets serve one function when new and another as it ages. In this example, a locomotive would be expected to be employed on the long haul runs when new and at its most efficient. Later in its life (here estimated to be at Year 15) it changes its role and is employed in short haul runs.

Other examples would include generating plant that serves the base load when it is at its most efficient and later moves into use for peak loads and perhaps even a third use at the end of its life as seasonal or occasional emergency use. Or buildings that are 'prestige' when new and bread 'n butter functional later in their life.

How do we treat such assets?

One way is to treat them as two (or more) separate assets. This is what I did for generating plant in the Public Accounts Committee report on the cost and timing of asset renewal for electricity assets. In this case the benchmark asset would be selected according to the task at hand (ie. baseload, or peak load) and the exercise above carried out separately for each life span or asset.

Alternatively you can do what we did here and make an ad hoc assumption as to value. This would only be done when the exercise did not warrant finer details.

When Asset Usage is a Hybrid

Some asset components wear out because of use, others simply through the passage of time. Here we separated the components into the two categories and treated them according to their nature. This is a sound basis for valuation and avoids lots of arguments about the type of depreciation method to be used. Electrical and mechanical plant will likely have a high usage component whilst passive civil infrastructure will be almost, if not entirely, time based.

Adjusting this model for non-locomotive assets

Step 1. Choose your benchmark

Value your benchmark (a modern equivalent asset)

Step 2. What things change?

Determine what changes as the asset ages (capability? reliability? availability? service level? aesthetics? function? efficiency? maintenance costs?)

Step 3. Determine what parameters you will use to measure the changes that matter.

Brief Summary of other Valuation Issues

Use of Market Value

Be aware that market value is a written down depreciated value. It does not represent the renewal cost. Valuers can be asked to calculate both market value and replacement cost. The market value can be used as a WDRC in the balance sheet if required and the replacement cost used as a guide for renewal planning.

Assumptions without verification

Practices such as assuming a residual value of NIL as a default without giving due consideration to the true residual value and not collecting sufficient and appropriate evidence to support critical assumptions such as the pattern of consumption, useful life, and gross current replacement costs, can lead to bad AM decisions, extra information collection costs and audit qualifications. **See SAM 266 for further details.**

There's no such thing as a 'one true' valuation

Only the 'most appropriate' valuation. What do you need - reproduction, replacement, indemnity, market, existing use, best use, deprival value (and more) **see SAM 251**

The purpose of assets is to provide service - so what is your community value?

How do we maximise the community value of community infrastructure. (with contributions from Ken Harlow and Ashay Prabhu. **See SAM 235**

Can Valuation be used as a measure of Performance?

Well yes it can, but there are caveats. See article by Gordon Sparks **in SAM 234**

Should we strive to maximise value?

Yes, of course. But this is not the same as maximising 'valuation', **in SAM 234**

Many valuation methods may produce a valuation acceptable to Accountants

But what does it take to make it acceptable to asset managers? **in SAM 234**

Historic Cost or Replacement Value? A comparison

The pros and cons **in SAM 217**

USA introduces an AM useful depreciation option

The 'modified approach' allowed under the USA accounting standard GASB 34 is very close to the condition based depreciation (with asset management plan) approach that was being argued for in Australia. **SAM 50**

Is Replacement Cost the same as Replacement Value? **See SAM 24**