NEWSLETTER NO. 38

AMORTIZATION AND SUSTAINABILITY

By Bruce E. Ratford, CMA

This Newsletter has been made available as a result of financial support from the Province of Ontario

The requirement to implement accounting for tangible capital assets, as well as the move to full accrual accounting has generated heated discussion between the accounting and operations staffs. Both are having to address the concept of the asset being consumed or expended, but the language, approach and methodology used by each is often quite different. This Newsletter will look at the two approaches, asset accounting and asset management, and analyze the differences between them.

Amortization

Etymologists would note that the root of the word "amortization" is the Latin noun "mors, mortis", meaning "death." Thus the accounting term "amortization" has the connotation of slowly killing off your assets. Or at least their value!

PS 3150 requires that "The cost, less any residual value, of a tangible capital asset with a limited life should be amortized over its useful life in a rational and systematic manner appropriate to its nature and use by the government." Amortization can be a significant cost in service provision. Care should be taken in its estimation to ensure good information is provided to decision makers. Otherwise, bad pricing decisions could result.

You buy an asset for one million dollars today that has a useful life of ten years. Over the decade, you will record $100,000 as amortization expense each year, to represent the one-tenth of the asset that is "consumed" or used up each year. At the end of the decade, you will have accumulated amortization of $1,000,000.00, and an asset with a gross book value (historical cost) of $1,000,000.00, but a net book value of zero (historical cost less accumulated amortization). **Please note that this has nothing to do with fair market value of the asset, or replacement cost.**

Sustainability

Sustainability is the concept that your million dollar asset will provide goods or services over its ten-year life span, and that after it departs this life, you will still want to receive that package of goods or services in the eleventh and subsequent years. In short, you will need to replace the asset at the end of year 10, but it will likely cost you considerably more at that point in time.

This is replacement cost, and to maintain a sustainable operation, operations needs to be planning on how and when to acquire the replacement asset at the end of the current asset's useful life. The goal of

sustainability is to ensure the on-going provision of services at equal or equivalent levels and standards, through repair and/or replacement of the assets required to provide or support those services. There is the question of how this will be financed, which has nothing to do with financial reporting.

The Focus of Asset Accounting

Accounting and financial reporting are effectively maintaining and reporting on the financial history of the organization. PS 1200.02 states, in part, that financial "statements present aggregated information and serve as a means by which a government demonstrates its accountability for the resources, obligations and financial affairs for which it is responsible. They report information required to make assessments of and judgments on government financial operations and management." Historical cost is the basis for valuing assets, because this is the reality that you dealt with, this is what you paid. All the numbers can be independently verified (the audit), so that any financial statement can be held up as reflecting what actually transpired in the period, or is the actual financial position of the organization as of the date indicated. This is important, as independent third parties may make decisions or take actions based on what appears in the financial statements.

Estimates of fair market value or replacement cost cannot necessarily be verified. Historical cost, however, is a matter of record, assuming you have the record, of course.

As indicated in the table developed by Prior and Prior (Table 1 at the end of this newsletter), asset accounting reports on the consumption of future economic benefits from past investments, and allocates the historical cost over the life of the asset.

The Focus of Asset Management

Asset management, by contrast, is forward-looking, with the objective of maintaining levels of service over the coming years, by replacing or upgrading assets as and when required. This includes estimating what the likely maintenance and replacement cost of an asset will be, as this will be the out-of-pocket expense, and which will have to be funded.

Similarly, if there will be service upgrades, or higher standards to be met, the cost of these must be estimated, and factored into the asset management plan. These numbers may well be checked, many times, but are not necessarily independently verifiable. However, this does not matter, as the numbers are for Council and senior management to use to be able to address the financial demands of future infrastructure requirements, in order to develop a financial plan

Asset management also reports on the consumption of future benefits from assets, but is concerned with the future cost of ensuring the continuation of the benefit stream.

Accounting and Sustainability – the accounting and financing issues

As discussed earlier, PSAB reporting requires the amortization of the historical cost over the expected life of the asset. Note that this is a **non-cash** accounting journal entry:

Debit – Amortization Expense
Credit – Accumulated Amortization – Tangible Capital Asset

If you choose to fund only amortization, this will not provide sufficient funding for replacement unless there is either zero inflation or aggressive investment yields. This will be a separate, additional **cash-based** accounting entry:

Debit – Cash (for capital asset replacement)
Credit – Source of revenue (such as taxation or user rates)

At the end of ten years, you will have an old asset worth $1 million, accumulated amortization of $1 million, and an increase in cash on hand of $1 million, intended to be used for replacement of the old asset. Exit the old asset, the first two amounts will be journalled out and there remains the $1 million cash available for buying a replacement.

Again, assume that you pay $1 million for an asset that has a useful life of 10 years. Over that period, let's assume that the cost of a replacement will increase by various rates annually. You have paid out $1 million in Year 0, and estimate that you will need to pay $1,714,000 in Year 10, in order to buy a replacement to maintain service. How do you account for the consumption of that asset, and prepare to fund its replacement?

Three possible approaches are shown in Table 2 at the end of this newsletter. Amortization represents the consumption of what you actually bought over time. Proportion of replacement cost is the prepaying for a stream of benefits that will begin 10 years from now. If you fund at this level each year, you will be able to pay cash for the full cost of the replacement at the end of the current asset's life (expectancy). Charging of current year cost recognizes that in Year 4, you are consuming assets with a market price of $134,400 in that year, 10% of the then-current replacement cost, even though your original cost was actually $100,000.

While this may be a better indicator of the value of the proportion of the asset consumed in a given year, it will still not provide sufficient funding to replace the asset at the end of its useful life, if you decide to fund this type of cost stream. Replacement cost does, but this is charging this generation for benefits that will accrue to the next generation, or inter-generational inequity. And the consumption cost does not match the current reality. For these latter two approaches, the accounting entries will still be as above, except that the cash based entry will be the appropriate amount indicated, not $100,000 a year.

At the end of ten years, you will now have an old asset worth $1 million, accumulated amortization of $1 million (as before), and an increase in cash on hand of $1,714,000 or $1,409,000 million respectively, intended to be used for replacement of the old asset. Exit the old asset, the first two amounts will be journalled out as before and there remains the $1,714,000 or $1,409,000 cash available for buying a replacement. In the first case, this amount should actually be sufficient to do so.

These assume that you may choose to fund the selected approach each year. If you simply borrow to acquire assets, then your annual cost can be just amortization plus interest. When you buy the replacement, the subsequent annual cost will be simply the higher amortization expense, plus interest. And the beneficiaries of the asset will be paying off the cost. However, note that while you can certainly sell one- to three-year promissory notes to pay for acquisition of IT assets, there is no ready market for long-term debentures. This means that the there would be no matching of borrowing term with life expectancy for major assets like buildings, plants, watermains and sewers.

Let us now assume that you will generate revenue to fund your amortization or your asset consumption expense each year, and invest it for the day that replacement is required. This scenario is shown in Table 3. The same random inflation rates have been used, and we have assumed that the return on investment will be at the rate of inflation. Money managers normally expect to make at least 2 to 3% more, the real rate of return. This assumption for ROI allows for the fact that returns may not exactly parallel inflation, such as if the funds are invested in fixed-term instruments.

Even under this relatively worst case scenario, notice how the cumulative numbers change. Amortization of historical cost does still not yield sufficient funding for replacement, though it is getting there. A positive yield spread would improve the picture even more. Funding replacement cost yields far more than you will ever need for straight replacement so before would be overkill, unless this were seen as a strategy for funding upgraded or expanded services.

Now look at the charging of current year cost column. On this basis, the annual stream of charges will be sufficient to fund the estimated cost of the replacement to within less than 0.05%. This result is the same no matter what the inflation rate may be in any year, or for how long the asset's life expectancy. If there is a positive yield spread on the invested funds, then this approach will provide some potential surplus funds too, but nowhere near the large surplus that funding replacement cost would provide. However, this approach would require obtaining the current replacement cost of the asset each year, and using it in the calculation for each year's expense/contribution, above and beyond amortization.

As stated earlier, this approach would contribute to cash on hand each year an amount equal to the cost of buying a share of the asset in that particular year, so that this does seem a more balanced approach, where consumption matches the current cost of replacing the consumption, and that "replacement" cost is funded each year from revenues.

Note the different end values in Table 3:

Replacement cost	$ 1,714,000
Straight amortization	$ 1,240,283
Provision for replacement cost	$ 2,125,845
Charging of current-year cost	$ 1,714,250

The spreadsheet that generated this analysis will be made available as part of the PSAB accounting toolkit.

Caveat

This discussion has been based on starting as of the date of acquisition of an asset. For the assets that you already have, you can and should adopt a strategy for promoting sustainability for 2009 and going forward. The years up to 2008 are effectively off the table, so that funding some or all of a replacement for a currently-owned tangible capital asset will have to be addressed in other ways. Unfortunately, this will be a transition issue for you, but no worse than the current situation, where you have to fund 100% of the replacement cost, when it happens, anyway.

Summary

Other than to document the municipality's assets, asset accounting to be PSAB compliant will not provide operations staff with all of the information they need to ensure that assets are kept in a state of good repair. However, in many instances, the move to accounting for tangible capital assets will trigger a major shift in thinking. Instead of looking on assets as something you buy and then accept as a given, because they have been written off on the books, we will now be viewing capital expenditures as investments for the future, and that there will have to be a future benefit stream. We have looked at three different approaches for trying to fund asset replacement in the future to ensure on-going service levels.

How will you maintain that benefit stream, when the current asset has reached the end of its useful life?

-----ooooo-----

Our next newsletter will take a brief look at some more unusual tangible capital assets that we have been asked about – the weird and the wonderful.

For more information and resources regarding tangible capital asset management, go to PSAB/Asset Management or contact:

Dan Cowin
Executive Director
MFOA
dan@mfoa.on.ca
Tel: 416-362-9001 x 223

Andy Koopmans
Executive Director
AMCTO
akoopmans@amcto.com
Tel: 905-602-4294 x 26NO

NOTE: This Newsletter is published to assist you with your implementation of tangible capital asset accounting and with related matters. The Public Sector Accounting Handbook is the only authoritative primary source on matters relating to GAAP, and you should consult with your auditor to resolve specific issues that you may have.

Appendix to Newsletter 38

TABLE 1 – ASSET ACCOUNTING AND ASSET MANAGEMENT – A COMPARISON

Integration

Key Considerations	Asset Accounting	Asset Management
Point of View	← Backward Looking	Forward Looking →
Overall Objective	• To report on consumption of future economic benefits from past investments • Used to allocate cost over life of asset	• To plan for sustaining services from infrastructure • Gives asset renewal cost estimates plus timing
Asset Inventory What asset level to track?	Level of segmentation is based on: • Thresholds for capitalization • Similar asset life spans	Asset are tracked based on: • Value and importance to asset renewal planning • Importance to City risk exposure
Asset Valuation What costs are of interest?	• Original historical cost (supported by invoice) or deflated reproduction cost (replacing with exactly that which currently exists)	• Net present value of lifecycle maintenance and renewal/replacement costs (equivalent capacity & LOS)
Asset Lifecycles How are assets depreciated What is capital versus maintenance?	• Annual amortization expense • Straight line is easiest amortization method but does not represent deterioration of many infrastructure assets • Consideration of an improvement as a betterment or a repair, and write downs	• Renewal & O&M cashflow projections • Lifecycle analysis can include remaining life, condition/ performance, deterioration prediction, risk analysis (criticality of asset, probability of failure/event) • AM Plans include development of and prioritization/optimization of maintenance and renewal works
Levels of Service & Performance Measures What services and standards?		• Customer expectations, council strategies and regulatory requirements all drive service level standards & performance measures

March 2007

Prior & Prior Associates Ltd.

Appendix to Newsletter 38

TABLE 2 – CASH FLOWS WITHOUT ALLOWANCE FOR INVESTMENT RETURN

COL.	1	2	3	4	5	6	7	8	9
YEAR	INFLATION RATE		REPLACEMENT VALUE IN YEAR	AMORTIZATION	ACCUMULATED AMORTIZATION OF HISTORICAL COST	PROVISION FOR REPLACEMENT COST	ACCUMULATED PROVISION FOR REPLACEMENT COST	CHARGING OF CURRENT YEAR COST	ACCUMULATED CHARGING OF CURRENT YEAR COST
0			1,000,000	0	0	0	0	0	0
1	5.00%		1,050,000	100,000	100,000	171,400	171,400	105,000	105,000
2	15.00%		1,208,000	100,000	200,000	171,400	342,800	120,800	225,800
3	4.00%		1,256,000	100,000	300,000	171,400	514,200	125,600	351,400
4	7.00%		1,344,000	100,000	400,000	171,400	685,600	134,400	485,800
5	6.00%		1,425,000	100,000	500,000	171,400	857,000	142,500	628,300
6	1.00%		1,439,000	100,000	600,000	171,400	1,028,400	143,900	772,200
7	5.00%		1,511,000	100,000	700,000	171,400	1,199,800	151,100	923,300
8	3.00%		1,556,000	100,000	800,000	171,400	1,371,200	155,600	1,078,900
9	2.00%		1,587,000	100,000	900,000	171,400	1,542,600	158,700	1,237,600
10	8.00%		1,714,000	100,000	1,000,000	171,400	1,714,000	171,400	1,409,000

Column 1 gives random annual rates of inflation, including a spike in Year 2.

Column 3 gives the value of the million dollar asset inflated year by year by the annual rate of inflation. This represents the replacement cost for the asset in each particular year.

Column 4 shows the annual straight-line amortization expense over the expected life of the asset.

Column 5 shows how the annual amortization expense accumulates over the asset's life expectancy.

Column 6 shows the Year 10 replacement cost allocated equally each year over the expected life of the asset.

Column 7 shows how the annual provision for replacement accumulates over the expected life of the asset.

Column 8 shows the annual cost of one-tenth of the current replacement cost of the asset over the expected life of the asset (Column 3 divided by 10). This would be the cost you might have to pay were you to go out to replace in that year the tenth of the asset that you have notionally consumed.

Column 9 shows how the annual provision shown in Column * accumulates over the expected life of the asset..

Appendix to Newsletter 38

TABLE 3 – CASH FLOWS WITH INVESTMENT RETURN

COL.	1	2	3	4	5	6	7	8	9
YEAR	INFLATION RATE	RETURN ON INVESTMENT	REPLACEMENT VALUE IN YEAR	AMORTIZATION	AMORTIZATION AND INVESTMENT RETURN	PROVISION FOR REPLACEMENT COST	REPLACEMENT COST AND INVESTMENT RETURN	CHARGING OF CURRENT YEAR COST	CURRENT YEAR COST AND INVESTMENT RETURN
0			1,000,000	0	0	0	0	0	0
1	5.00%	5.00%	1,050,000	100,000	100,000	171,400	171,400	105,000	105,000
2	15.00%	15.00%	1,208,000	100,000	215,000	171,400	368,510	120,800	241,550
3	4.00%	4.00%	1,256,000	100,000	323,600	171,400	554,650	125,600	376,812
4	7.00%	7.00%	1,344,000	100,000	446,252	171,400	764,876	134,400	537,589
5	6.00%	6.00%	1,425,000	100,000	573,027	171,400	982,168	142,500	712,344
6	1.00%	1.00%	1,439,000	100,000	678,757	171,400	1,163,390	143,900	863,368
7	5.00%	5.00%	1,511,000	100,000	812,695	171,400	1,392,960	151,100	1,057,636
8	3.00%	3.00%	1,556,000	100,000	937,076	171,400	1,606,148	155,600	1,244,965
9	2.00%	2.00%	1,587,000	100,000	1,055,818	171,400	1,809,671	158,700	1,428,564
10	8.00%	8.00%	1,714,000	100,000	1,240,283	171,400	2,125,845	171,400	1,714,250

Columns 1, 3, 4, 6 and 8 are exactly the same as in Table 2 on the previous page.

Column 2 gives the annual return on investment. To be conservative and to allow for those situations where investment return may lag the market due to timing, this assumes the generally worst-case scenario, where there is zero real rate of return. A higher rate yields a higher return, or more money at the end of ten years. A lower rate will result in less money being accumulated over the ten-year period. The rate for Year 2 is an example of the type of inflation rate currently being experienced in construction

Columns 5, 7 and 9 show the corresponding funding streams accumulating, as in Table 2, but with the investment return each year factored in. For example, the figure for Year 4 is the Year 3 figure, plus 7% of this earned during the year, plus the Year 4 contribution If one assumed that the Year 2 rate of return is 5%, instead of 15% (the current situation, perhaps), then the Year 10 figure in Column 9 is reduced by $14,904, which hopefully would be covered by earning a real rate of return in other years.

It should be stressed that these tables give hypothetical examples of how one might fund asset replacement, and use simplified assumptions.