

PSAB/Asset Management

NEWSLETTER NO. 22

AGGREGATION AND DISAGGREGATION OF ASSETS

By Bruce Ratford, CMA

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You will doubtless have a number of large capital assets for which you probably have data for the total asset, such as your administration building, or a water filtration plant. At the same time, such assets have components which have different life expectancies, and which may or may not require major maintenance or replacement. Treating the facility as a single asset may be a misleading over-simplification. As a result, you may want to disaggregate, or break the asset up into logical parts or components.

The flip side is that you may have assets that clearly have individual components, all of which are similar, and that are managed and maintained as a single entity or asset as a whole. This would be reason to simplify your accounting and reporting by aggregating the individual items into a single consolidated asset. One major Ontario city had been thinking of treating its entire water distribution network as a single asset for this reason.

How will you deal with such situations? This newsletter looks at the advantages and disadvantages of both approaches, and when and how you may want to use them.

Two notes of caution:

1. It is very easy to aggregate. It may difficult and time-consuming to disaggregate unless you have detailed historical costing on a disaggregated basis? If you think that you might need disaggregated data at any point in the future, you run the risk of not having what you might need if you start with data that is highly aggregated.
2. This discussion of aggregation and disaggregation will be strictly from the perspective of tangible asset accounting. Asset management will have other very different requirements and concerns, which we will address in a future newsletter. You might, for example, have data on a disaggregated basis for asset management but aggregate the data for PSAB reporting purposes.

Public Sector Accounting Handbook Section 3150.12

"Many tangible capital assets, particularly complex network systems such as those for water and sewage treatment, consist of a number of components. Whether a government decides to record and account for each component as a separate asset will be determined by the usefulness of the resulting information to the government and the cost versus the benefit of collecting and maintaining it."

Pros and Cons

Chapter 4, Section 2.0 of the [PSAG Guide to Accounting for and Reporting of Tangible Capital Assets](#) gives a very good summary (pp 39 to 44), as follows:

Determining whether to use a single asset versus component approach should be based on what it costs to compile the information versus the value it has to management. The approach taken does not have to be consistent across all categories of assets. Different approaches may be taken for each category. Judgment and the usefulness of the information will govern the selection of the approach and the level of detail maintained.

The Guide then goes on to elaborate on the pros and cons of the single asset or aggregated approach and of the multiple component or disaggregated approach. This is as follows:

TABLE 1 – AGGREGATION VERSUS DISAGGREGATION

<i>Single Asset Approach</i>	
<i>Advantages</i>	<i>Disadvantages</i>
<i>Less expensive and simpler to maintain because it does not require detailed records and estimates of useful lives of the components of assets.</i>	<p><i>There is no control over the stock and no information about its cost, location or physical attributes.</i></p> <p><i>Provides only summarized information for asset management plans and financial planning.</i></p> <p><i>Can skew the cost information of programs and services. For example, if an entire water system were to be amortized over its average expected life of, say 75 years, the costs of components having expected lives of less than 75 years may well be understated in period costs and overstated in periods where major</i></p>

	<p>replacements are required. Estimating the useful life of an asset is more difficult and, for long-lived infrastructure assets, is likely to be arbitrary. For example, pipes in water systems could last 100 years or more based on physical attributes. Other factors, such as capacity, actual usage, deferred repair and maintenance, effects of idle time, geological conditions, technical obsolescence and changes in demand must be factored into the estimate of useful life. The influences of these factors are easier to estimate on a component basis than over an entire system.</p>
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Component Approach	
Advantages	Disadvantages
<p>Complex network systems have major components with significantly different expected useful lives and that require replacement at different intervals throughout the life of the system. Accounting for components provides better information on asset condition, location and physical attributes.</p> <p>Information required for asset management plans and financial planning is readily available and can be compiled on local government-wide basis.</p> <p>The information about the cost of providing programs and services is more accurate since the costs of major components are amortized and expensed over their individual lives. This may improve pricing decisions.</p> <p>Improves comparability of period cost information and removes "lumpiness" in period costs since each component is accounted for individually and amortized over its estimated useful life. Each replacement is capitalized.</p>	<p>Requires the creation and maintenance of detailed records and estimates of useful lives of individual components. Accounting for components does not, however, require recording each individual item. Components having similar useful lives and consumption patterns can be grouped. For example, a water system could be broken down into treatment facilities, pumping stations, water mains and distribution lines. Further, pumping stations could be broken down into pumps, pipes, facilities, etc.</p>

<i>Improves accuracy of estimates of useful lives and costs. It is easier factor in effects of physical attributes, capacity, actual usage, deferred repair and maintenance, idle time, geological conditions, technical obsolescence, and changes in demand for individual components.</i>	
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Section 4.2.2 (page 42) identifies implementation issues, and notes that “As part of accounting for network or system assets on a component basis, a local government may need to:

- *Construct an asset management database.*
- *Identify appropriate components of the system or network.*
- *Ascertain the age and condition of the components.*
- *Assess the remaining useful life of existing asset components.*
- *Identify features of the component, for example type of surface or method of construction for a road.*
- *Identify the levels of use for particular parts of a system or network.*
- *Establish a method for distinguishing between maintenance and upgrades or improvements for that component.*
- *Determine the valuation of assets for inclusion in the financial records.*
- *Calculate the amount of decline in service potential (amortization) for the financial period.*
- *Plan for a cycle of inspection to check accuracy of records against actual conditions.*
- *Link the underlying data to asset management plans, and link asset management plan information to the financial records and financial statements (that is, reconcile to general ledger information).*

Section 4.2.3 elaborates further on the potential advantages of disaggregation or segmentation.

Linear assets (complex network systems such as roads, water systems and sewer systems) are usually defined in terms of details such as length, unit of measure and geographic reference (e.g., start and end points). For linear assets, it may be appropriate to break down assets into corresponding segments. For example, when work is performed at a specific point in a linear asset - such as replacing a portion of a water main or roadway - the cost and work involved is attributed to that portion of the asset rather than the entire asset.

Segmentation may make the accounting and reporting of assets easier. It allows more accurate tracking of an asset by age, type, use and other attributes used in estimating an asset’s useful life. It may allow for more accurate tracking of betterments and maintenance. For example, if a segment of water main is replaced, the costs of the

replacement can be capitalized and amortized over its useful life and the old water main written off. Many infrastructure management systems track infrastructure assets on this basis. It may be possible to utilize existing infrastructure management systems as the asset register and interface the systems with the accounting records for accounting and reporting purposes.

Linear coordinates can also be used to identify other related assets. For example, street lights, traffic signals, sidewalks and fire hydrants can all be related to a coordinate of a road segment. This improves asset tracking and management.

Disaggregation

When you have a large asset, such as a major facility or building, it would be appropriate to disaggregate for two very important reasons:

1. The individual components may have very different life expectancies, so that amortizing the whole over an average life span does not reflect the consumption of benefits provided by the individual components. For example, a building's structural components might last anywhere from 60 to 120 years or more, whereas the floor, wall and ceiling finishes may require replacement after 10 to 15 years.
2. The replacement of those interior surface finishes may be able to be capitalized if they are identified as a separate components, whereas the replacement would be simply maintenance, if the building is accounted for as a single asset.

The first point is obvious, in that it would better reflect reality were the interior finishes to be amortized or written off 4 to 10 times as fast as the building structure itself. One would be using an appropriate amortization rate for each individual component.

The second point is more subtle, and is an example of the betterment versus maintenance dilemma. At its heart, this is because betterments can be capitalized, whereas maintenance is always to be expensed in the fiscal year in which the maintenance is carried out. An activity on a component of a tangible capital asset can have a very different accounting treatment and accounting ramifications, depending on how the asset and its components are identified.

Note that:

“A betterment is a cost incurred to enhance the service potential of a tangible capital asset. In general, .service potential may be enhanced when there is an increase in the previously assessed physical output or service capacity, where associated operating costs are lowered, the useful life of the property is extended or the quality of the output is improved”. (PS3150.19)

Where a building is a single asset, working on the roof, or replacing key mechanical or electrical equipment will be maintenance by definition, as neither the life nor the capacity or output of the facility have likely been changed. If by chance they have, so that there has been a measurable upgrade of the item replaced, then one can argue that the expense is indeed a betterment.

If the building is disaggregated, the situation is much simpler. When the roof requires to be stripped off and replaced after so many years, the old component will have been disposed of, literally, and a new component acquired (i.e. the new roof), which can be capitalized along with any directly attributable costs. The new roof does not change the service potential of the whole building, but even if this was only a major repair and not a strip-down, it will have changed the useful life of the roof from something living on borrowed time, perhaps, to an asset with a significant future life expectancy.

While it is easy to identify potential components, how do you define and value them, in an older facility where you will be lucky if have the historical cost of the whole facility as a single figure? We will look at this in more detail in a future newsletter.

When might you want to aggregate for asset accounting?

Disaggregation seems to be an appropriate approach for dealing with large buildings and operational facilities. Aggregation, on the other hand, is often an appropriate way of dealing with linear assets, such as road, water and sewer networks. Your networks may have thousands of components, sections, blocks, parts, and a multitude of sizes, materials, ground conditions, ages, and other variables. Do you really want to have to deal with each one separately?

First, let us note that your operations staff will answer that question affirmatively, because they have to for asset management and asset maintenance purposes. And they will have (or should have) data and documentation at that level of detail to support those purposes. For asset accounting, you do not need to keep records at this level of detail. In short, you may want to aggregate these assets to be able to capture the unique types of each, without having to deal with thousands of individual records. Aggregation is analogous to pooling, but where the parts add up to a whole, such as a water supply system, whereas an asset pool is simply a large group of like or related assets.

While your linear assets are maintained at the item, component and section level, aggregation would be like taking the entire system as a single asset, and then disaggregating it into the smallest number of components that makes sense from an accounting perspective.

The first consideration would be the nature of the component – the width and type of road, or the diameter and material of the pipe in the ground. The second consideration will be the age of the component, in years, perhaps using 5- or 10-year intervals for anything older than 20 years. You may also want to track the nature of the terrain, as cost and maintenance will be

different for sections crossing rock, versus sand or muskeg. Your operating staff or local contractors should be able to provide current pricing per linear meter for these different types of assets, if historical cost is not available.

For each type of asset defined, the total length in your municipality can be determined, so that the replacement cost will simply be length times standard cost per metre. If you then deflate this figure back to the year of construction, your valuation of your linear assets for the initial asset inventory will be complete, once you have then calculated the accumulated amortization through to December 31, 2008.

Peripheral items can either be included on a standard basis, such as a fire hydrant every 123 metres of network, or perhaps addressed separately. If significant in number and value, they can be treated as an asset pool, or themselves aggregated by age, type, size, soil condition and any other criteria that may be relevant.

Note that in this case, the assets are discrete to start with, so that the betterment/maintenance issue is more clear-cut. If you aggregate your sewers by age, and have 100 Km of 1955 vintage, of which 10 Km need to be replaced in 2009, then your 1955 asset becomes only 90 Km long by year-end, because you have disposed of the other 10 Km. You now have instead a 2009 asset that is 10 Km long, and which can be capitalized in 2009 at the total cost incurred to dig up the old pipe and replace it with the new one.

We will take a more detailed look at the accounting for aggregated assets in a future newsletter.

How will you document these assets?

For disaggregated assets, your basic documentation will be for the asset as a whole, as the contract and expenditure breakdown was likely for the whole, rather than for the components you have identified for asset accounting purposes. The individual components should each be identified and tagged in your records as related to the whole asset, but documented as to how you derived the valuation and life expectancy for each one. And do check that the sum of the components is equal to the value of the whole asset.

For aggregated assets, the concern will be that each type and class of asset you are using captures all of the actual components that are out there. For this, you will be relying on the records maintained by the operations unit for managing the network. Thus the source documentation will be theirs, supplemented by documentation as to how the individual components have been aggregated and/or pooled, to give the assets that your TCA accounting will be reporting on.

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To date, we have been very concerned with how you should be developing your asset inventories, and what goes into them. Our next newsletter will step back, and go through the thought process required to determine whether that *doodad* you have acquired is a tangible capital asset that should be included in your asset inventory and reported on in your financial statements.

For more information and resources regarding tangible 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 26

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.