Distribution

Purpose of Distribution

Distribution will have no real meaning for a cash flow model. But the nature of the Component Funding Model requires it. Annuity payments are based on an accumulation of reserves for each component in the study. Because a study will rarely start with 'perfect' funding for each component, a starting point for each year must be established.

At the start of the study (The beginning fiscal date)

The beginning balance is used for distribution

Going through the components ordered by remaining life and starting with the least remaining life, the balance is assigned to the components by the value of fully funded for each component. Fully funded for components with no life left is the replacement value of the component.

If after the last component there is still a balance remaining, The list of components is iterated again and the moneys are assigned at the replacement cost of each component.

If after the second pass on there are remaining funds then just the components being replaced are iterated and distribution is set to twice the replacement value.

If there are still funds after the above, they are considered excess funds.

In each following year of the projection

Money is accumulated from contributions and interest on deposit. Expenditures for replacement/repair of components is subtracted. This becomes the ending balance of the year. This money is distributed in the same manner as described above.

Component Funding Method

AKA, The Straight Line Method

In the accounting world a desired future value of a fund is calculated by an annuity. When the first payment occurs at the beginning of each period of an annuity, the annuity is called an 'Annuity Due'. The formula:

$$FutureValue = \left(\frac{Payment\,((\,1+r)^{n}-1\,)}{r} \right)(1+r)$$

$$r = Annual\ Interest\ Rate$$
$$n = Number\ Of\ Payments$$

(1)

This can be rearranged to acquire the payment for a future value.

$$Payment = \frac{FutureValue}{\left(\frac{(\,1+r)^{n}-1}{r} \right)(\,1+r\,)}$$

$$r = Annual\ Interest\ Rate$$
$$n = Number\ Of\ Payments$$

(2)

So....

For a calculation of a required contribution not only is the future value needed but the present deposit from distribution must be accounted for. This is done by subtracting the future value of the present deposit, (distribution), from the future value of the annuity.

The formula is extended to:

$$Payment = \frac{FutureValue - PresentDeposit * (1+r)^n}{\left(\frac{(1+r)^n - 1}{r}\right)(1+r)}$$

$$r = Annual\ Interest\ Rate$$
$$n = Number\ Of\ Payments$$

(3)

Fully Funded Methods

Basic Fully Funded

There are two published methods of calculating Fully Funded. The first only considers the present value of a component. Present value in each period will change according to the inflation applied.

$$FullyFunded = (\ Age/\ Useful\ Life\ ) * Present\ Value$$

Community Association Press Fully Funded

To account for inflation and interest earned on deposit the writers of **'RESERVE FUNDS: Ho & Why community Associations Invest Assets'** came up with:

$$Basic\_FF = (\ Age/\ Useful\ Life\ ) * Present\ Value$$

$$\begin{aligned} CAI\_FF = Basic\_FF \\ + Basic\_FF/(1 + interest)^{Remaining\ Life} \\ - Basic\_FF/(1 + inflation)^{Remaining\ Life} \end{aligned}$$

This is better than the basic method but still an approximation.

Annuity Due Fully Funded

Get the components future replacement cost. This can be done with:

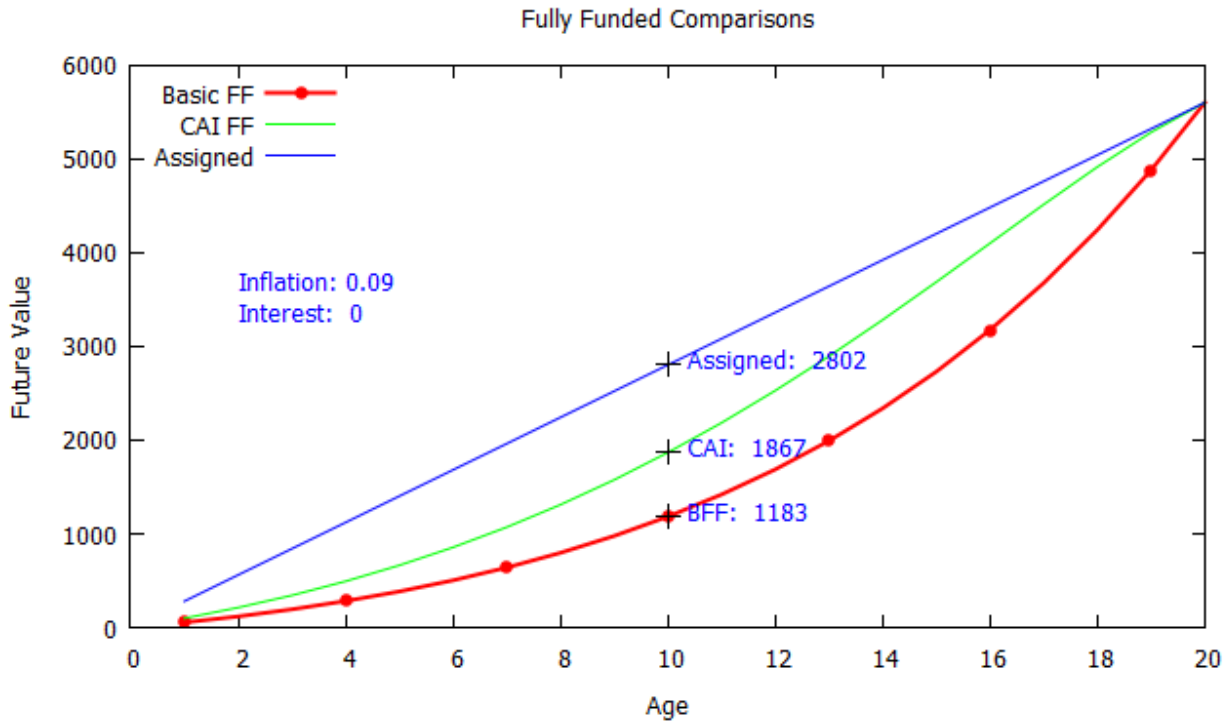
$$\begin{gathered} Future\ Cost = (\ 1 + inflation)^n * Current\ Cost \\ n = Years\ Until\ Replacement \end{gathered}$$

Then get the payment needed for the full term replacement, (using useful life) with equation (2)

Finally, get the future value of the Annuity Due with equation (1) using the age of the component for n. The result is an Annuity Due Fully Funded

Fully Funded Methods Chart

This goes along with the 'One Comp' project comparing Fully Funded Methods



Geometric (*Growing*) Annuity

$$FV_{GA} = P\left[\frac{(1+r)^n - (1+g)^n}{r-g}\right]$$

$P = First\ Payment$
$r = rate\ per\ period$
$g = growth\ rate$
$n = number\ of\ periods$

"Straight Line funding", also called "Component Funding", is a method of calculating the required contributions to reserves by an annuity for each component. If a component is fully funded, the contribution will offset the depreciation of the component. If all the components are fully funded, the property plus the reserve fund maintained the full replacement cost of the components. <ref>http://reserveanalyst.com/Funding_Stratigies.html</ref>