Public Utility

Depreciation Practices

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Costs may also be distributed over production rather than over service life. This method, the unit of production method, distributes the costs as units are produced using a rate per unit developed from the total estimated units to be produced. It is similar to the straight-line method but is a function of production rather than a function of time.

Salvage Considerations

Under presently accepted concepts, the amount of depreciation to be accrued over the life of an asset is its original cost less net salvage. Net salvage is the difference between the gross salvage that will be realized when the asset is disposed of and the cost of retiring it. Positive net salvage occurs when gross salvage exceeds cost of retirement, and negative net salvage occurs when cost of retirement exceeds gross salvage. Net salvage is expressed as a percentage of plant retired by dividing the dollars of net salvage by the dollars of original cost of plant retired. The goal of accounting for net salvage is to allocate the net cost of an asset to accounting periods, making due allowance for the net salvage, positive or negative, that will be obtained when the asset is retired. This concept carries with it the premise that property ownership includes the responsibility for the property's ultimate abandonment or removal. Hence, if current users benefit from its use, they should pay their pro rata share of the costs involved in the abandonment or removal of the property and also receive their pro rata share of the benefits of the proceeds realized.

This treatment of net salvage is in harmony with generally accepted accounting principles and tends to remove from the income statement any fluctuations caused by erratic, although necessary, abandonment and removal operations. It also has the advantage that current consumers pay or receive a fair share of costs associated with the property devoted to their service, even though the costs may be estimated.

The practical difficulties of estimating, reporting, and accounting for salvage and cost of retirement have raised questions as to whether more satisfactory results might be obtained if net salvage were credited or charged, as appropriate, to current operations at the time of retirement instead of being provided for over the life of the asset. The advocates of such a procedure contend that salvage is not only more difficult to estimate than service life but, for capital intensive public utilities, it is typically a minor factor in the entire depreciation picture. The obvious exception, of course, is the huge retirement cost of decommissioning nuclear power plants. The advocates of recording salvage at the time of retirement further contend that salvage could properly be accounted for on the basis of known happenings at the date of retirement rather than on speculative estimates of factors, such as junk material prices, future labor costs, and environmental remediation costs in effect at the time of retirement.

One of the practical difficulties of estimating net salvage is that reported salvage is a mixture of salvage on items retired and reused internally, salvage on items sold externally as functional equipment, and salvage on items junked and sold as scrap. Because the likelihood of reuse is greater for items that are retired at early ages, the historical salvage is usually higher than the future salvage to be realized when the account begins to decline and there is little opportunity for reuse. Therefore, under these circumstances, book salvage may overstate the average salvage realized over the entire life of the account. This has led to the proposal to redefine net salvage and retirements to eliminate the effect of reused material. Reuse salvage is further discussed in Chapter III.

The sensitivity of salvage and cost of retirement to the age of the property retired is also troublesome. Due to inflation and other factors, there is a tendency for costs of retirement, typically labor, to increase more rapidly than material prices. In an increasing number of instances, the average net salvage is estimated to be a large negative number when expressed as a percentage of original cost, sometimes in excess of negative 100%. This may look unrealistic but is appropriate and necessary so that the required cost allocation occurs. Nonetheless, a careful analysis of retirements should be made to determine if such large negative net salvage values are due to unusual circumstances. An example is the retirement of old cast iron gas mains in congested metropolitan areas. Due to urban renewal, a utility may have a significant amount of such activity for a few years. Since most of the investment in this account may now be in plastic mains in rural or suburban areas where access is easier, the removal of old cast iron gas mains at today's cost may not be representative of the costs that can be expected for plastic mains.

While this situation should not impose insurmountable difficulties from a depreciation expense or cost allocation perspective, it presents an interesting problem from the standpoint of the rate base. Since rate base is generally the difference between book cost and accumulated depreciation, the provision for negative salvage further decreases the rate base. If the original book cost for old plant is less than the accumulated provision for depreciation, the rate base could be a negative amount.

As the foregoing discussion indicates, gross salvage, in contrast to service life, is usually small in its overall effect on calculating a depreciation rate. Cost of retirement, however, must be given careful thought and attention, since for certain types of plant, it can be the most critical component of the depreciation rate.

Group Plan

The group plan of depreciation accounting is particularly adaptable to utility property. Rather than depreciating each item by itself (unit depreciation) or depreciating one single group containing all utility plant, a group contains homogeneous units of plant which are alike in character, used in the same manner throughout the utility's service territory, and operated under the same general conditions.

Of course there will be different lives for individual units within groups. For example, poles are generally combined in a single group. Some poles will be retired because of storms or automobile accidents. Some will decay, some will be displaced due to road relocations and some will be retired because of underground replacements. However, they are combined in the same group because they are homogeneous units. Years ago when some poles were untreated, there was a need for a separate grouping as these poles were more susceptible to decay and termite infestation than treated poles. Likewise, concrete poles have unique characteristics and qualify to be grouped separately from wood poles. Buried, aerial, and underground (in conduit) cables are further examples of the same type of plant receiving different grouping because of requirement studies. The results of analyses from theoretical reserve studies answer many questions about the consumption pattern of plant. However, theoretical reserve studies should not be used to modify the life and net salvage parameters for calculating future depreciation rates. If a theoretical reserve study reflects an inadequate reserve, and the service lives are reduced solely on this basis, a new theoretical reserve study based on the new service lives would indicate not a "corrected" reserve but instead a greater deficiency, calling for even higher depreciation rates. This would not be a correct application of the results of a theoretical reserve study.

Theoretical reserve studies also have been conducted for the purpose of allocating an existing reserve among operating units or accounts. Such allocation is done when either the reserve has not been accumulated in sufficient detail or cannot be determined from utility records.

In recent years, theoretical reserve studies have been used to estimate the theoretically correct book depreciation reserve based upon past and/or future service life and net salvage considerations. Changes in technology and challenges from competition place a greater emphasis on theoretical reserve studies. Periodic comparisons of the theoretical reserves to the actual book reserves and the booking, as depreciation expense, of any reserve imbalance decrease the risk that the original cost of plant will not be recovered during its service life.

The booked consumed service capacity of plant is also expressed by the reserve ratio, which is the book depreciation reserve divided by the book plant balance. A higher ratio indicates a higher consumption of service capacity or life.

For example, the reserve and the reserve ratio, for a single unit, continually increase with each accounting period until the unit is retired. The reserve ratio for a single vintage with a large number of units, however, does not steadily increase. The ratio increases, with some fluctuations caused by the retirement dispersion, until the vintage's age equals its average service life, after which the ratio decreases with the later period retirements until the vintage's units are all retired.

The reserve ratio for an account containing several vintages also does not steadily increase. It may be affected by vintages with differing survivor curve characteristics caused by improvements which lengthen the property's service life. Other factors affecting reserve ratios are inflation and the pattern of growth in vintage installations.

Treatment of Reserve Imbalances

A reserve imbalance exists when the theoretical reserve is either greater or less than the actual reserve. If changes are made to the estimated service life and net salvage, creating a reserve imbalance, a decision must be made as to whether and how to correct the reserve imbalance. Should the imbalance be amortized (debited or credited) to the current depreciation expense over a short period of time; or should a remaining life depreciation rate be used to spread the imbalance over the future remaining life of the plant; or should future depreciation rates be adjusted to reflect the current estimated service life of the plant leaving the decision to adjust the reserve for the future? Further analysis will provide additional information to assist in making these decisions.

When a depreciation reserve imbalance exists, one should investigate why past depreciation rates, average service lives, salvage, or cost of removal amounts differ from current estimates. Care should be taken to analyze these effects before correcting for the reserve imbalances. Instances will occur where subsequent experience shows the original estimates no longer to be appropriate. It should be noted that only after plant has lived its entire useful life will the true depreciation parameters become known. Recognizing the nature of depreciation and its requirement for future estimations, no adjustment in annual depreciation accruals to reflect a reserve requirement, based on current rates, should be made unless there is a clear indication that the theoretical reserve is materially different from the book reserve.

Whereas the judgement of materiality is subjective, if further analysis confirms a material imbalance, one should make immediate depreciation accrual adjustments. The use of an annual amortization over a short period of time or the setting of depreciation rates using the remaining life technique are two of the most common options for eliminating the imbalance. The size of the plant account, the reserve ratio, the account remaining life, the technology of the plant in the account, and the account reserve imbalance in relationship to the account annual accrual all have a bearing on the chosen course of action.

Calculating a Theoretical Depreciation Reserve

There are two accepted methods for calculating a theoretical depreciation reserve, the prospective method and the retrospective method.

For any given class of depreciable plant, the theoretical reserve plus the estimated future depreciation accruals equals the service value of the plant (i.e., book cost less estimated net salvage). Under the prospective method, the future depreciation accruals are first estimated. Under the retrospective method, the aggregate of past net accruals (annual depreciation accruals less salvage and cost of removal) is determined.

Future depreciation accruals represent the estimated aggregate of annual depreciation charges during the average remaining life of the plant. Future depreciation accruals are based on the best available data as to past and future conditions affecting the average service lives and net salvage percentages of plant. Past accruals are calculated based upon depreciation rates deemed reasonable for the future but applied to the annual average historical plant balances.

Reasonable estimates of plant service lives, net salvage percentages, and resulting depreciation rates incorporating future conditions are used to estimate the theoretical depreciation reserve.

Prospective Method

As previously expressed, the theoretical reserve, as of the study date, is equal to the plant balance minus future accruals (the depreciation rate times the average annual plant balance times the expected remaining life in years) and minus estimated net salvage value expected at the end of the plant's average life. Expressed as a percent of book cost of plant, the theoretical reserve ratio using the prospective method is:

Conformance Index (CI)
A measure of closeness of fit between calculated and actual balances in the Simulated Plant-Record Model. The best fits are those with the highest CIs. The CI equals 1,000 divided by the index of variation (IV). See **Simulated Plant-Record Model (SPR).**

Continuing Property Record (CPR)
A perpetual collection of essential records showing the detailed original costs, quantities, and locations of plant in service. These records vary in detail depending upon the kind of plant. CPRs are required by most systems of accounts. Generally, a CPR should contain 1) an inventory of property record units which can be readily checked for proof of physical existence, 2) the association of costs with such property record units to ensure accurate accounting for retirements, and 3) the dates of installation and removal of plant to provide data for use in connection with depreciation studies.

Converted Life Table
A life table with the same basic shape as the Graduated Life Table from which it was developed but having whatever average life was specified by the analyst.

Cost of Removal
The costs incurred in connection with the retirement from service and the disposition of depreciable plant. Cost of removal may be incurred for plant that is retired in place. See **Net Salvage**.

Cradle-to-Grave
An accounting method which treats a unit of plant as being in service from the time it is first purchased until it is finally junked or disposed of. Periods in shop for refurbishing, and in stock awaiting reinstallation are included in the service life. See, in contrast, **Location Life.**

Depletion
The loss of service value incurred in connection with the exhaustion of a natural resource in the course of service.

Depreciable Base
The cost of plant in service which is allocable to expense during the service life of the property through the depreciation process.

Depreciable Plant
Plant in service for which it is proper to allocate the original cost to annual expense through the depreciation process. Items such as land and plant under construction are not considered depreciable.

Gross Additions
Plant additions made during an accounting period. These additions do not include adjustments, transfers, and reclassifications applicable to plant placed in a previous year.

Gross Salvage
The amount recorded for the property retired due to the sale, reimbursement, or reuse of the property.

Group Depreciation
In depreciation accounting, a procedure under which depreciation charges are accrued on the basis of the original cost of all property included in each depreciable group.

h Curves
A system of mathematically-developed, generalized survivor curves based on the truncated normal distribution (curve). The h curves are used by the New York Department of Public Service and most New York utilities.

Half-Year Convention
For calculation purposes, the units installed during an age interval are assumed to have been installed simultaneously at the middle of the interval and thus to have an age dating from the middle of the interval during which they were placed in service. <u>See</u> **Age Interval**.

Harmonic Weighting
<u>See</u> **Reciprocal Weighting**.

Historical Cost
<u>See</u> **Book Cost**.

Index of Variation (IV)
The conformance index divided by 1,000. <u>See</u> **Conformance Index (CI)**.

Indirect Weighting
<u>See</u> **Reciprocal Weighting**.

Installations
<u>See</u> **Gross Additions**.

Installed Cost
The cost of labor, material, engineering and overhead associated with transporting and delivering, attaching, testing, and preparing a piece of equipment for the purpose for which acquired. These outlays are capitalized as part of the cost of the asset. This is also referred to as in-place cost.

Location Life
The period of time during which depreciable plant is in service at one location. See, in contrast, **Cradle-to-Grave Accounting**.

Major Structure
A large, identifiable unit of plant or any assembly of plant, most of which will continue in service until final retirement. See **Interim Retirements**, **Final Retirement**, **Average Year of Final Retirement**.

Mass Property Group or Account
An account consisting of large numbers of similar units, the life of any one of which is not, in general, dependent upon the life of any of the other units. For such classes of plant, the retirement of a group of units occurs gradually until the last unit is retired. The retirements and additions to the account occur more or less continually and systematically.

Mortality Data
See **Aged Data**.

Mortality Rate
See **Retirement Ratio (Rate)**.

Net Book Cost
The recorded cost of an asset or group of assets minus the accumulated depreciation of those assets.

Net Salvage
The gross salvage for the property retired less its cost of removal.

Observed Life Table
A series of percents surviving, by age, reflecting the actual experience recorded in a band of mortality data.

Original Cost
The cost of property when first placed in service. See **Book Cost**.

Placement Year
See **Vintage Year**.

Probable Life
The total expected service life for survivors at a given age. It is the sum of the age of the survivors and their remaining life.

Projection Life
The average life expectancy of new additions to plant. See **Projection Life Table**.

Simulated Plant-Record Model (SPR)
A trial-and-error model used to estimate the average service life of a depreciable group. The SPR model simulates retirements and the resultant plant balances for combinations of standardized survivor curves and average service lives and compares the results to the historical data until a good match is found.

Sinking Fund Method
Under this method the depreciation accrual is comprised of two parts: an annuity and interest on the accumulated depreciation. As compared with the straight-line method, the sinking fund method produces lower early accruals and higher accruals in the latter part of the service life.

Statistical Aging
See **Computed Mortality**.

Straight-Line Method
A depreciation method by which the service value of plant is charged to depreciation expense (or a clearing account) and credited to the accumulated depreciation account through equal annual charges over its service life. See **Depreciation Rate**.

Survivor Curve
A plot representing the percent surviving at each age.

Survival Ratio
The ratio of the number of units (or dollars) surviving in a group at the end of a period to the number of units (or dollars) in the group at the beginning of that period. The ratio is equal to one minus the retirement ratio. See **Proportion Surviving**.

T-cut
A truncation of the observed life table values which is generally used in a mathematical fitting of a curve to the observed values.

Theoretical Depreciation Reserve
The calculated balance that would be in the accumulated depreciation account at a point in time using current depreciation parameters, such as average service and net salvage. Also known as "reserve requirement" or "calculated accumulated depreciation (CAD)." See **Accumulated Depreciation Account**.

Turnover Methods
Methods of estimating service life based on the time it takes the plant to "turn over," that is, the time it takes for the actual retirements to exhaust a previous plant balance. See **Computed Mortality**.