13 .The Sum-of-the-Years'-Digits Method

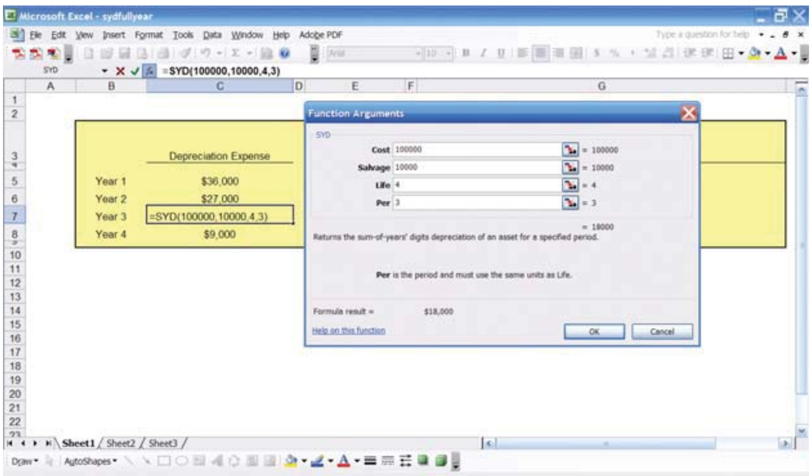
This approach was used in the graphic example at the beginning of this chapter, but without any calculation details. The calculations will undoubtedly be seen as a bit peculiar; I have no idea who first originated this approach or why.

Under the technique, depreciation for any given year is determined by multiplying the depreciable base by a fraction; the numerator is a digit relating to the year of use (e.g., the digit for an asset with a ten-year life would be 10 for the first year of use, 9 for the second, and so on), and the denominator is the sum-of-the-years' digits (e.g., 10 + 9 + 8 + . . . + 2 + 1 = 55). In our continuing illustration, the four-year lived asset would be depreciated as follows (bear in mind that 4 + 3 + 2 + 1 = 10):

	Depreciation Expense	Accumulated Depreciation at End of Year	Annual Expense Calculation
Year 1	$36,000	$36,000	($100,000 - $10,000) X 4/10
Year 2	$27,000	$63,000	($100,000 - $10,000) X 3/10
Year 3	$18,000	$81,000	($100,000 - $10,000) X 2/10
Year 4	$ 9,000	$90,000	($100,000 - $10,000) X 1/10

13.1 Spreadsheet Software

Again, software includes a built-in function for sum-of-the-years'-digits (SYD) method. Following is the function that returns the $18,000 annual depreciation value for Year 3.



13.2 Fractional Period Depreciation

With the sum-of-the-years'-digits method, fractional years require fairly intensive layering for every year (e.g., if a ten-year asset is acquired on July 1, 20X1, depreciation for 20X1 is the depreciable base times 10/55 times 6/12 (relating to six months of use); depreciation for 20X2 is the depreciable base times 10/55 times 6/12 (reflecting the last six months of the first layer), plus the depreciable base times 9/55 times 6/12 (reflecting the first six months of the next layer)). Returning to our $100,000, four-year lived asset; if the asset was acquired on April 1, Year 1, the resulting depreciation amounts are calculated as:

	Depreciation Expense	Accumulated Depreciation at End of Year	Annual Expense Calculation
Year 1	$27,000	$27,000	($100,000 - $10,000) X 4/10 X 9/12
Year 2	$29,250	$56,250	($100,000 - $10,000) X 4/10 X 3/12 ($100,000 - $10,000) X 3/10 X 9/12
Year 3	$20,250	$76,500	($100,000 - $10,000) X 3/10 X 3/12 ($100,000 - $10,000) X 2/10 X 9/12
Year 4	$11,250	$87,750	($100,000 - $10,000) X 2/10 X 3/12 ($100,000 - $10,000) X 1/10 X 9/12
Year 5	$ 2,250	Not applicable -- assumed disposed on March 31	($100,000 - $10,000) X 1/10 X 3/12

Admittedly, the above table is a bit "busy," but if you take time to trace each of the amounts, it will be a good key to your understanding.

Before moving away from the sum-of-the-years'-digits, you may find it tedious to be adding numbers like 10 + 9 + 8 + . . . + 1 = 55. But, mathematicians long ago figured out a short cut for this calculation: (n (n + 1))/2, where n is the number of items in the sequence. Thus, for an asset with a ten year life: (10 (10 + 1)/2 = 10(11)/2 = 110/2 = 55. Try this on your own for the four-year life, and make sure your result is "10." Try again for a 15 year life asset, and make sure you get "120." Do you see that the sum-of the- years'-digit's fraction for the 4th year of use would be 12/120? Remember, you count backwards -- Year one is 15/120, Year two is 14/120, Year three is 13/120, and Year four would be 12/120.

13.3 Changes in Estimates

Obviously, the initial assumption about useful life and residual value is only an estimate. Time and new information may suggest that the initial assumptions need to be revised, especially if the initial estimates prove to be materially off course. It is well accepted that changes in estimates do not require re-doing the prior period financial statements; after all, an estimate is just that, and the financial statements of prior periods were presumably based on the best information available at the time. Therefore, rather than correcting prior periods' financial statements, such revisions are made prospectively (over the future) so that the remaining depreciable base is spread over the remaining life.

To illustrate, let's return to the straight-line method. Assume that two years have passed for our $100,000 asset that was initially believed to have a four-year life and $10,000 salvage value; as of the beginning of Year 3, new information suggests that the asset will have a total life of seven years (three more than originally thought), and have a $5,000 salvage value. As a result, the revised remaining depreciable base (as of January 1, 20X3) will be spread over the remaining five years, as follows:

	Depreciation Expense	Accumulated Depreciation at End of Year	Annual Expense Calculation
Year 1	$22,500	$22,500	($100,000 - $10,000)/4
Year 2	$22,500	$45,000	($100,000 - $10,000)/4
Year 3	$10,000	$55,000	($100,000 - $45,000 - $5,000)/5
Year 4	$10,000	$65,000	($100,000 - $45,000 - $5,000)/5
Year 5	$10,000	$75,000	($100,000 - $45,000 - $5,000)/5
Year 6	$10,000	$85,000	($100,000 - $45,000 - $5,000)/5
Year 7	$10,000	$95,000	($100,000 - $45,000 - $5,000)/5

The depreciation amounts for Years 3 through 7 are based on spreading the "revised" depreciable base over the last five years of remaining life. The "revised" depreciable base is $50,000, and is calculated as the original cost ($100,000) minus the depreciation already taken ($45,000), and minus the revised salvage value ($5,000).