Chapter 8 Alternate Demonstration Problem

A new machine costs $120,000, has an estimated useful life of five years and an estimated salvage value of $15,000 at the end of that time. It is expected that the machine can produce 210,000 widgets during its useful life.

The New Times Company purchases this machine on January 1, 2021 and uses it for exactly three years. During these years the annual production of widgets has been 80,000, 50,000, and 30,000 units, respectively. On January 1, 2024, the machine is sold for $45,000.

**Required:**

**1. Calculate the depreciation expense for each of the first three years using:**

**a. Straight-line**

**b. Units-of-production**

1. **Double-declining-balance**

**2. Prepare the proper journal entry for the sale of the machine under the three different depreciation methods.**

Chapter 8 Solution: Alternate Demonstration Problem

**1a. Straight-line

The depreciation expense each year is equal to cost minus salvage value divided by useful life. In this example the cost is $120,000, the salvage value is $15,000, and the useful life is 5 years. Therefore,**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **D**  | **=** | **(120,000 - 15,000) / 5** |
|  |  | **=** | **21,000 each year** |

**1b. Units-of-production

The depreciation expense each year is equal to a rate [(cost minus salvage) divided by total production] multiplied by the actual number of units produced that year. In this example the rate would be $0.50 per widget, (120,000 - 15,000) / 210,000, and the depreciation expense for each of the first three years would be:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **D1** | **=** | **.50** | **×** | **80,000** | **=** | **40,000** |
|  | **D2** | **=** | **.50** | **×** | **50,000** | **=** | **25,000** |
|  | **D3** | **=** | **.50** | **×** | **30,000** | **=** | **15,000** |

**1c. Double-declining balance

The depreciation expense each year is equal to a rate (twice the straight-line rate divided by useful life) multiplied by the asset’s net book value (cost minus accumulated depreciation) at the beginning of the year. In this example the rate would be 2/5, or 40%, and the depreciation expense for each of the first three years would be:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **D1** | **=** | **.40** | **×** | **120,000** | **=** | **48,000** |
|  | **D2** | **=** | **.40** | **×** |  **72,000** | **=** | **28,800** |
|  | **D3** | **=** | **.40** | **×** |  **43,200** | **=** | **17,280** |

1. **The journal entry for the sale of the asset will have the same general form regardless of the method of depreciation adopted, except that whether there is a gain or a loss on the sale may change according to the depreciation method used. The gain or loss on disposal of the asset is determined by comparing the sale price, in this case $45,000, with the net book value of the asset at the time of the sale.**

**Straight-line**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Cash** | **45,000** |  |
|  | **Accumulated depreciation** | **63,000** |  |
|  | **Loss on sale of machine** | **12,000\*** |  |
|  |  **Machine** |  | **120,000** |
|  |  |  |  |
| **\* Book value of 57,000 less sale price $45,000 equals loss of $12,000**  |

**Units-of-production**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Cash** | **45,000** |  |
|  | **Accumulated depreciation** | **80,000** |  |
|  |  **Machine** |  | **120,000** |
|  |  **Gain on sale of machine** |  | **5,000** |
|  |  |  |  |
| **\* Sale price $45,000 less book value of $40,000 equals gain of $5,000** |

**Double-declining balance**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Cash** | **45,000** |  |
|  | **Accumulated depreciation** | **94,080** |  |
|  |  **Machine** |  | **120,000** |
|  |  **Gain on sale of machine** |  | **19,080** |
|  |  |  |  |
| **\*Sale price $45,000 less book value of $25,920 equals gain of $19,080** |
|  |

Chapter 8 Alternate Demonstration Problem #2

A new van costs $25,000, has an estimated useful life of five years and an estimated salvage value of $5,000 at the end of that time. It is expected that the van will be driven 100,000 miles during its useful or service life.

The Nation Express Company purchases this van on April 1, 2020. During 2021 the van is driven 13,000 miles and during 2022 it was driven 21,000 miles.

**Required:**

**1. Calculate the depreciation expense for 2021 and 2022 using:**

**a. Straight-line**

**b. Double-declining-balance**

**c. Units-of-production**

Chapter 8 Solution: Alternate Demonstration Problem #2

|  |  |  |  |
| --- | --- | --- | --- |
| **Straight Line** |  |  |  |
|  |  |  |  |  |
| **Cost - Salvage value** | **=** | **25000 - 5000** |
| **useful life** |  | **5 years** |
|  |  |  |  |  |
|  |  |  | **20,000** |  |
|  |  |  | **5** |  |
|  |  |  |  |  |
|  |  |  |  **$4,000**  | **per year** |

**2021: 4,000 x 9/12 = 3,000**

**2022: 4,000**

|  |
| --- |
| **Double declining balance** |
|  |  |  |  |  |  |
| **2** | **x** | **book value** | **=** | **Depreciation expense** |  |
| **life** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **2021: 2/5** | **x** |  **25,000**  | **=** |  **10,000**  | **x** | **9/12 =** |  **7,500**  |
|  |  |  |  |  |  |  |  |
| **2022: 2/5** | **x** |  **17,500**  |  |  **7,000**  | **x** | **12/12 =** |  **7,000**  |
|  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Units of Production** |  |  |  |
|  |  |  |  |  |  |
| **cost - salvage** | **=** | **depreciation rate per mile** |
| **total miles** |  |  |  |  |
|  |  |  |  |  |  |
|  | **Rate** | **x** | **actual mileage** | **=** | **Depreciation expense** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **25,000 - 5,000** | **=** |  **$ 0.20**  | **per mile** | **(rate)** |
| **100,000 miles** |  |  |  |  |
|  |  |  |  |  |  |
|  | **rate** | **x**  | **actual mileage** | **=** | **Expense** |
| **2021:** |  **$ 0.20**  | **x** |  **13,000**  | **=** |  **$ 2,600**  |
| **2022:** |  **$ 0.20**  | **x** |  **21,000**  | **=** |  **$ 4,200**  |
|  |  |  |  |  |  |