

12.5: Compute Amortization of Long-Term Liabilities Using the Effective-Interest Method

Bonds Payable

As you've learned, each time a company issues an interest payment to bondholders, amortization of the discount or premium, if one exists, impacts the amount of interest expense that is recorded. Amortization of the discounts increases the amount of interest expense and premiums reduce the amount of interest expense. There are two methods used to amortize bond discounts or premiums: the effective-interest method and the straight-line method.

Our calculations have used what is known as the **effective-interest method**, a method that calculates interest expense based on the carrying value of the bond and the market interest rate. Generally accepted accounting principles (GAAP) require the use of the effective-interest method unless there is no significant difference between the effective-interest method and the straight-line method, a method that allocates the same amount of the bond discount or premium for each interest payment. The effective interest amortization method is more accurate than the straight-line method. International Financial Reporting Standards (IFRS) require the use of the effective-interest method, with no exceptions.

The **straight-line method** doesn't base its calculation of amortization for a period base on a changing carrying value like the effective-interest method does; instead, it allocates the same amount of premium or discount amortization for each of the bond's payment periods.

For example, assume that \$500,000 in bonds were issued at a price of \$540,000 on January 1, 2019, with the first annual interest payment to be made on December 31, 2019. Assume that the stated interest rate is 10% and the bond has a four-year life. If the straight-line method is used to amortize the \$40,000 premium, you would divide the premium of \$40,000 by the number of payments, in this case four, giving a \$10,000 per year amortization of the premium. Figure 12.5.1 shows the effects of the premium amortization after all of the 2019 transactions are considered. The net effect of creating the \$40,000 premium and writing off \$10,000 of it gives the company an interest expense of \$40,000 instead of \$50,000, since the \$50,000 expense is reduced by the \$10,000 premium write down at the end of the year.

JOURNAL			
Date	Account	Debit	Credit
Jan. 1, 2019	Cash Bonds Payable Premium on Bonds Payable	540,000	500,000 40,000
Jan. 1, 2019	Interest Expense Cash	50,000	50,000
Jan. 1, 2019	Premium on Bonds Payable Interest Expense	10,000	10,000

Figure 12.5.1: Premium Amortization Using the Straight-Line Method. (attribution: Copyright Rice University, OpenStax, under CC BY-NC-SA 4.0 license)

Issued When Market Rate Equals Contract Rate

Assume a company issues a \$100,000 bond with a 5% stated rate when the market rate is also 5%. The bond was issued at par, meaning it sold for \$100,000. There was no premium or discount to amortize, so there is no application of the effective-interest method in this example.

Issued at a Premium

The same company also issued a 5-year, \$100,000 bond with a stated rate of 5% when the market rate was 4%. This bond was issued at a premium, for \$104,460. The amount of the premium is \$4,460, which will be amortized over the life of the bond using the effective-interest method. This method of amortizing the interest expense associated with a bond is similar to the amortization of the note payable described earlier, in which the principal was separated from the interest payments using the interest rate times the principal.

Begin by assuming the company issued all the bonds on January 1 of year 1 and the first interest payment will be made on December 31 of year 1. The amortization table begins on January 1, year 1, with the carrying value of the bond: the face value of

the bond plus the bond premium.

On December 31, year 1, the company will have to pay the bondholders \$5,000 ($0.05 \times \$100,000$). The *cash interest payment* is the amount of interest the company must pay the bondholder. The company promised 5% when the market rate was 4% so it received more money. But the company is only paying interest on \$100,000—not on the full amount received. The difference in the sale price was a result of the difference in the interest rates so both rates are used to compute the true interest expense.

Year	Cash Interest Payment	Interest on Carrying Value	Amortization of Premium	Carrying Value
Jan. 1 Year 1				104,460
Dec. 31 Year 1	5,000	4,178	822	103,638

Assets = Liabilities + Equity + Revenue - Expenses				
Cash	=	Bonds Payable	Premium on Bonds Payable	Interest Expense
5,000		100,000	4,460	5,000
			822	822
			3,638	4,178

The interest on the carrying value is the market rate of interest times the carrying value: $0.04 \times \$104,460 = \$4,178$. If the company had issued the bonds with a stated rate of 4%, and received \$104,460, it would be paying \$4,178 in interest. The difference between the cash interest payment and the interest on the carrying value is the amount to be amortized the first year. The complete amortization table for the bond is shown in Figure 12.5.2. The table is necessary to provide the calculations needed for the adjusting journal entries.

Year	Cash Interest Payment	Interest on Carrying Value	Amortization of Premium	Carrying Value
Jan. 1 Year 1				104,460
Dec. 31 Year 1	5,000	4,178	822	103,638
Dec. 31 Year 2	5,000	4,146	854	102,784
Dec. 31 Year 3	5,000	4,111	889	101,895
Dec. 31 Year 4	5,000	4,076	924	100,971
Dec. 31 Year 5	5,000	4,039	961	100,010

\$10 Rounding Error

Figure 12.5.2: Bond Amortization Table. (attribution: Copyright Rice University, OpenStax, under CC BY-NC-SA 4.0 license)

Issued at a Discount

The company also issued \$100,000 of 5% bonds when the market rate was 7%. It received \$91,800 cash and recorded a Discount on Bonds Payable of \$8,200. This amount will need to be amortized over the 5-year life of the bonds. Using the same format for an amortization table, but having received \$91,800, interest payments are being made on \$100,000.

Year	Cash Interest Payment	Interest on Carrying Value	Amortization of Discount	Carrying Value
Jan. 1 Year 1				91,800
Dec. 31 Year 1	5,000	6,426	1,426	93,226

The cash interest payment is still the stated rate times the principal. The interest on carrying value is still the market rate times the carrying value. The difference in the two interest amounts is used to amortize the discount, but now the amortization of discount amount is added to the carrying value.

Year	Cash Interest Payment	Interest on Carrying Value	Amortization of Discount	Carrying Value
Jan. 1 Year 1				91,800
Dec. 31 Year 1	5,000	6,426	1,426	93,226
Dec. 31 Year 2	5,000	6,526	1,526	94,752
Dec. 31 Year 3	5,000	6,633	1,633	96,384
Dec. 31 Year 4	5,000	6,747	1,747	98,131
Dec. 31 Year 5	5,000	6,869	1,869	100,000

Figure 12.5.3 illustrates the relationship between rates whenever a premium or discount is created at bond issuance.



Figure 12.5.3: Stated Rate and Market Rate. When the stated rate is higher than the market rate, the bond is issued at a premium. When the stated rate is lower than the market rate, the bond is issued at a discount. (attribution: Copyright Rice University, OpenStax, under CC BY-NC-SA 4.0 license)

CONCEPTS IN PRACTICE

Bond Ratings

Investors intending to purchase corporate bonds may find it overwhelming to decide which company would be the best to invest in. Investors are concerned with two primary factors: the return *on* the investment (meaning, the periodic interest payments) and the return *of* the investment (meaning, payment of the face value on the maturity date). While there are risks with any investment, attempting to maximize the return *on* the investment and maximizing the likelihood receiving the return *of* the investment would take a significant amount of time for the investor. To become informed and make a wise investment, the investor would have to spend many hours analyzing the financial statements of potential companies to invest in.

One resource investors find useful when screening investment opportunities is through the use of rating agencies. Rating agencies specialize in analyzing financial and other company information in order to assess and rate a company's riskiness as an investment. A particularly useful website is [Investopedia](https://www.investopedia.com) which highlights the rating system for three large rating agencies—Moody's, Standard & Poor's, and Fitch Ratings. The rating systems, shown below, are somewhat similar to academic grading scales, with rankings ranging from A (highest quality) to D (lowest quality):

Rating Agencies⁸

Credit Risk	Moody's	Standard & Poor's	Fitch Ratings
Investment Grade	—	—	—
Highest Quality	Aaa	AAA	AAA
High Quality	Aa1, Aa2, Aa3	AA+, AA, AA–	AA+, AA, A–
Upper Medium	A1, A2, A3	A+, A, A–	A+, A, A–
Medium	Baa1, Baa2, Baa3	BBB+, BBB, BBB–	BBB+, BBB, BBB–
Not Investment Grade	Ba1	BB+	BB+
Speculative Medium	Ba2, Ba3	BB, BB–	BB, BB–
Speculative Lower Grade	B1, B2, B3	B+, B, B–	B+, B, B–
Speculative Risky	Caa1	CCC+	CCC
Speculative Poor Standing	Caa2, Caa3	CCC, CCC–	—
No Payments / Bankruptcy	Ca / C	—	—
In Default	—	D	DDD, DD, D

Table 12.5.1

Footnotes

- [8](https://www.investopedia.com/article...g-agencies.asp) Michael Schmidt. “When to Trust Bond Rating Agencies.” Investopedia. September 29, 2018.
<https://www.investopedia.com/article...g-agencies.asp>

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