CCIM

Ward Center for Real Estate Studies
www.ccim.com

**365/360 US
Rule
Mortgage
Amortization**

Reference

Manual

EXCELLENCE

SUCCESS

SKILL

LEADERSHIP

CHALLENGE

STRENGTH

Dear Student,

The CCIM Institute's Ward Center for Real Estate Studies and Real Property Strategies, LLC welcome you to the webinar, 365/360 US Rule Mortgage Amortization.

This webinar is designed for the commercial real estate professional who wants to expand and sharpen their financial analysis skills and integrate technological applications into the commercial real estate financial analysis process. This course focuses on comparing different methods of mortgage amortization.

To receive the maximum benefit from this webinar, students are advised to complete all practice problems and actively participate in online activities. This course is designed to be interactive, so student discussion and questions are welcomed.

Course Material

All Ward Center courses are designed to ensure a highly effective learning experience. This course consists of the following components:

Reference Manual

The reference manual is designed to be used as an online reference manual and an after-class reference tool. This manual includes conceptual material, calculations, examples, and activities. The activities are real-life real estate scenarios that demonstrate the various methods of mortgage amortization.

Excel Spreadsheets

These customized spreadsheets will be your tools for working the activities and practice problems. They can also be used in your everyday practice of real estate.

365/360 US Rule Mortgage Amortization

1

365/360 US
Rule-Mortgage
Amortization

In This Module

365/360 US Rule Mortgage Amortization

Module Snapshot

Module Goal

After completing this module, you will be able to apply traditional and 365/360 US Rule mortgage amortization processes for commercial real estate loans.

Objectives

- Perform and interpret the following mortgage calculations:

  - Traditional monthly payments, interest, principal, and outstanding balance.
  - Interest, principal, and outstanding balance using a daily interest rate based on a 360 day year with traditional monthly payment.
  - Interest, principal, and outstanding balance using a daily interest rate based on a 360 day year with adjusted monthly payment.
  - Effective interest rate when 365/360 US Rule mortgage amortization is used both with and without monthly payment adjustment.

Mortgage Amortization

Mortgage amortization is the process whereby the amount borrowed is paid off over the amortization period. This process calls for making periodic payments of the same amount over the entire amortization period. Even though the total payment is a constant amount, the amounts of each payment that are allocated to principal and interest change with each payment. In addition to the total principal amount of the loan being paid off over the amortization period (return of), the lender receives interest (return on) for each dollar of the loan for each period the dollar is outstanding. The amount of the loan outstanding decreases as each payment is received. This decrease in the loan balance is determined by the amount of principal reduction contained in each payment. This principal amount is calculated by subtracting the interest for the period from the total periodic payment.

The vast majority of commercial and residential loans require monthly payments and pay interest in arrears. The amount of interest contained in each monthly payment is usually calculated using one of the following two methodologies.

Monthly Rate Methodology

For most residential and some commercial loans interest is calculated using a monthly rate which is the nominal annual rate divided by 12, the number of months in a year. This monthly rate is applied to the outstanding principal balance at the beginning of each period to determine the amount of interest due for that period. This interest amount is subtracted from the total monthly payment amount to determine the amount of principal reduction in each payment. This principal amount will be subtracted from the outstanding principal balance at the beginning of that period to determine the outstanding principal balance at the end of that period after each payment has been made. This process is applied to every month of the amortization period.

365/360 US Rule Methodology

For most commercial loans interest is calculated using a daily rate based on a 360 day year. The daily rate is calculated by dividing the nominal annual rate by 360 days. The interest calculation for each month using the daily interest rate is a two-step process. The first step is to multiply the outstanding principal balance at the beginning of the month by the daily rate to determine the interest due for one day. The second step is to multiply the amount of interest due for one day by the actual numbers of days in the monthly pay period, such as 31, 30, 28, or in a leap year, 29.

The monthly payment for the "365/360 US Rule Methodology" is calculated the same way as calculated for the "Monthly Payment Methodology". The amortization process is the same for the "365/360 US Rule Methodology" as it is for the "Monthly Rate Methodology" except the interest is calculated using a daily rate instead of the monthly rate. This daily rate calculation of interest results in a greater amount of interest being charged which results in an effective interest rate greater than the nominal interest rate.

Using the "365/360 US Rule Methodology" interest is earned for 365 days even though the daily rate was calculated using 360 days. Using the "Monthly Payment Methodology" interest is earned on 12 thirty day months or in effect 360 days.   Using the daily interest and the "365/360" method results in more interest being charged for the seven 31 day months which means in these months less principal is amortized. During each February less interest is payable, either 28 or 29 times the daily interest rate. This lesser principal reduction each month other than February results in an outstanding principal balance remaining at the end of the amortization period.

An alternative method of amortization quite often used when applying the "365/360 US Rule Methodology" to calculate interest is to recalculate the monthly payment using the effective interest rate instead of the nominal rate. This results in a higher periodic payment which fully satisfies the loan balance by the end of the amortization period.

Sample Problem 1-Mortgage Amortization

Loan Assumptions for Sample Problem 1

- Loan amount: $1,000,000
- Annual interest rate: 6.00%
- Amortization Period: 20 years
- Loan term: 20 years
- Payments per year: 12
- Closing date: 6/1/12

Monthly Rate Methodology

Step 1. Calculate monthly payment

Step 2. Calculate monthly interest rate

Annual Nominal Rate ÷ Payments Per Year = Monthly Rate

6.00% ÷ 12 = .50%

Step 3. Amortization Process

Payment Number	Due Date	Beginning Balance	Principal and Interest	Interest	Principal	Ending Balance	Effective Rate
1	7/1/2012	$1,000,000.00	$7,164.31	$5,000.00	$2,164.31	$997,835.69	6.0000%
2	8/1/2012	$997,835.69	$7,164.31	$4,989.18	$2,175.13	$995,660.56	6.0000%
3	9/1/2012	$995,660.56	$7,164.31	$4,978.30	$2,186.01	$993,474.55	6.0000%
240	6/1/2032	$7,128.95	$7,164.31	$35.64	$7,128.67	$0.00	6.0000%

The interest for each month is simply the beginning of month principal balance multiplied by the monthly interest rate. For example, the interest for month one of the above amortization process is $5,000 which is the beginning of month principal balance of $1,000,000 multiplied by the monthly rate of .50%.

The principal reduction is the total payment less the interest. For example, the principal reduction for month one of the above amortization process is $2,164.31 which is the interest of $5,000 subtracted from the total payment of $7,164.31.

Notice that the principal balance is $0 after the 240th payment has been made. This is because the 240 monthly payments of $7,164.31 were sufficient to completely repay the total loan amount of $1,000,000 as well as pay the interest for each month which was calculated using the monthly rate.

365/360 US Rule Methodology-No Payment Adjustment

Step 1. Calculate monthly payment

CCIM Financial Calculator

Time Value of Money Calculations

Input		EOP		$
		0	PV =	(1,000,000.00)
YEARS	20	1	PMT =	7,164.31
P/YR	12			
N	240			
I/YR	6.00%			
PV	($1,000,000.00)	240	PMT =	7,164.31 + FV =
PMT	$7,164.31			
FV			I/YR =	6.00%
Beg 1/End 0				

Step 2. Calculate daily interest rate

Annual Nominal Rate ÷ 360 Days = Daily Rate

6.00% ÷ 360 = .016667%

Step 3. Amortization Process

Payment Number	Due Date	Beginning Balance	Number of Days	Principal and Interest	Interest	Principal	Ending Balance	Effective Rate
1	7/1/2012	$1,000,000.00	30	$7,164.31	$5,000.00	$2,164.31	$997,835.69	6.0000%
2	8/1/2012	$997,835.69	31	$7,164.31	$5,155.48	$2,008.83	$995,826.86	6.0996%
3	9/1/2012	$995,826.86	31	$7,164.31	$5,145.11	$2,019.20	$993,807.66	6.1329%
239	5/1/2032	$37,522.25	30	$7,164.31	$187.61	$6,976.70	$30,545.55	6.0872%
240	6/1/2032	$30,545.55	31	$7,164.31	$157.82	$7,006.49	$23,539.06	6.0872%

The interest for each month is the beginning of month principal balance times the daily interest rate times the number of days in the payment period. For example, the interest for month one of the above amortization process is $5,000 which is the beginning of month principal balance of $1,000,000 times the daily rate of .016667% times 30 days.

The principal reduction is the total payment less the interest. For example, the principal reduction for month one of the above amortization process is $2,164.31 which is the interest of $5,000 subtracted from the total payment of $7,164.31.

Notice that the principal balance is $23,539.06 after the 240th payment has been made. This is because the 240 monthly payments of $7,164.31 were insufficient to completely repay the total loan amount of $1,000,000 as well as pay the interest for each month which was calculated using the daily rate.

Step 4. Effective Rate

At this point the effective rate for the "365/360 US Rule Methodology" can be calculated. The four knowns to enter into the "CCIM Financial Calculator" to solve for rate are:

- n: 240 months
- PV: ($1,000,000)
- PMT: $7,164.31
- FV: $23,539.06

The effective annual rate of 6.087241% is greater than the nominal rate of 6.000000% because the interest is calculated using a daily rate versus a monthly rate and the interest is earned over 365 days per year versus the 360 day year when calculating the monthly interest using the monthly rate.

365/360 US Rule Methodology-Payment Adjustment

Step 1. Calculate monthly payment

The monthly payment is now calculated as before except using the effective rate instead of the nominal rate.

CCIM Financial Calculator
Time Value of Money Calculations

Input		EOP		$
		0	PV =	(1,000,000.00)
YEARS	20	1	PMT =	7,214.73
P/YR	12			
N	240			
I/YR	6.087241%			
PV	($1,000,000.00)	240	PMT =	7,214.73 + FV =
PMT	$7,214.73			
FV			I/YR =	6.087241%
Beg 1/End 0				

Step 2. Amortization Process

The daily rate of .016667% calculated by dividing the nominal rate of 6.000000% by 360 days is still used in the "365/360 US Rule Methodology-Adjusted Payment" amortization process. The only thing that is changed is the adjusted payment of $7,214.73.

Payment Number	Due Date	Beginning Balance	Number of Days	Principal and Interest	Interest	Principal	Ending Balance	Effective Rate
1	7/1/2012	$1,000,000.00	30	$7,214.73	$5,000.00	$2,214.73	$997,785.27	6.0000%
2	8/1/2012	$997,785.27	31	$7,214.73	$5,155.22	$2,059.51	$995,725.76	6.0996%
3	9/1/2012	$995,725.76	31	$7,214.73	$5,144.58	$2,070.15	$993,655.61	6.1328%
239	5/1/2032	$14,319.59	30	$7,214.73	$71.60	$7,143.13	$7,176.46	6.0872%
240	6/1/2032	$7,176.46	31	$7,214.73	$37.08	$7,177.65	$0.00	6.0872%

The interest for each month is the beginning of month principal balance times the daily interest rate times the number of days in the payment period. For example, the interest for month one of the above amortization process is $5,000 which is the beginning of month principal balance of $1,000,000 times the daily rate of .016667% times 30 days.

The principal reduction is the total payment less the interest. For example, the principal reduction for month one of the above amortization process is $2,214.73 which is the interest of $5,000 subtracted from the total payment of $7,214.73.

Notice that the principal balance is $0 after the 240th payment has been made. This is because the 240 monthly payments of $7,214.73 were sufficient to completely repay the total loan amount of $1,000,000 as well as pay the interest for each month which was calculated using the daily rate.

Activity 1-1: Practice Problem

1. Mortgage Amortization

Use the following loan assumptions to complete this activity:

- Loan amount: $2,500,000
- Annual interest rate: 5.50%
- Amortization Period: 20 years
- Loan term: 20 years
- Payments per year: 12
- Closing date: 9/12/12

Using the excel worksheet provided to amortize the loan and fill in the information on the following table:

	"Monthly Payment"	"365/360 US Rule" No Adjustment	"365/360 US Rule" Payment Adjustment
Monthly Payment			
Interest-Month 24			
Principal-Month 36			
Balance-EOM 60			
Balance-EOM 240			
Total Interest			

End of activity

Answer Section

Activity 1: 1 Practice Problem-Solution

1. Mortgage Amortization

   Use the following loan assumptions to complete this activity:

   - Loan amount: $2,500,000
   - Annual interest rate: 5.50%
   - Amortization Period: 20 years
   - Loan term: 20 years
   - Payments per year: 12
   - Closing date: 9/12/12

Using the excel worksheet provided to amortize the loan and fill in the information on the following table:

	"Monthly Payment"	"365/360 US Rule" No Adjustment	"365/360 US Rule" Payment Adjustment
Monthly Payment	$17,197.18	$17,197.18	$17,308.51
Interest-Month 24	$10,821.86	$11,199.24	$11,186.47
Principal-Month 36	$6,734.94	$6,359.94	$6,491.26
Balance-EOM 60	$2,104,703.52	$2,115,202.89	$2,107,517.94
Balance-EOM 240	$0	$48,947.56	$0
Total Interest	$1,627,324.37	$1,676,270.76	$1,654,027.87